1.3.2

1) Documents showing experiential learning through project work / field work / internship as prescribed by the affiliating university curriculum

Pages from 001 - 068

2) Reports of the field work done year wise during the last 5 years

Pages from 069 - 789

3) Consolidated list of courses that include experiential learning through project work / field work / internship year wise during the last 5 years

Pages from 790 - 793

K.L.E.Society's
BASAVPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE,
CHIKKODI – 591201 District – Belagavi (Karnataka state)
WEBSITE: www.klebkcollegechikkodi.edu.in

1.3.2

(1) Document showing experiential learning through project work / field work / internship as prescribed by the affiliating university

Program name	**Program code**	**Name of the Course that include experiential learning through project work/field work / internship**	**Course code**
BSc Chemistry, Botany and Zoology	BSC4	Chemistry Sixth Semester Paper - II	14BSCCHEP62
BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	F460
M.Com	MCOM	Project report	4.3
BSC Chemistry, Botany and Zoology	BSC4	Cell biology, histology, animal behaviour	D380
M.Sc	MSCBOT	Practical based on 4.2	D041
M.Sc	MSCBOT	Project 4.4	D051
BSc Chemistry, Botany and Zoology	BSC5	Biology of Chordates	B380

RANI CHANNAMMA UNIVERSITY, BELAGAVI

WEL-COME

TO THE COURSE STRUCTRE AND SYLLABUS OF UNDERGRADUATE PROGRAMMES – B.Sc

VI Semester

w.e.f.

Academic Year 2016-17 and onwards

3. CHEMISTRY (OPTIONAL)

SIXTH SEMESTER B.Sc. COURSE

Chemistry
Paper-I
Code : 14BSCCHET61
Teaching Hours : 50 Hours

Inorganic Chemistry:

UNIT-I

Coordination compounds –II **09 hours**

Crystal field theory(CFT) with reference to octahedral, distorted octahedral(Jahn-Tellar distortion), tetrahedral and square planar complexes, calculation of crystal field stabilization energy, factors affecting 10Dq, consequences of crystal field splitting on ionic radii of M^{+2} ions, enthalpy of hydration of M^{+2} ions, explanation of colour and magnetic properties of magnetic complexes, limitations of crystal field theory, calculation of magnetic moment using Gouy's method,

UNIT-II

Metal-ligand Equilibria: **05 hours**

Stability constant, stepwise and overall formation constants, trends in step wise constants, factors affecting the stability of the metal complexes with reference to the nature of metal ion and ligand.

Chelates - definition, characteristics, factors influencing the stability of metal chelates and importance of chelates.

UNIT-III

Organometallic Chemistry **03 hours**

Introduction, classification of organotransition metal complexes, 18 electron rule with respect to $[Fe(CO)_5]$, $[Ni(CO)_5]$, $[Mn(CO)_5]^+$, ferrocene, structure and bonding in metal olefins (Zeise's Salt).

Organic Chemistry:

UNIT-I

Carbohydrates **05 hours**

Haworth and conformational formulae of glucose and fructose, mutarotation and its mechanism, osazone formation, Killani's synthesis, Ruff's degradation, epimers and epimerisation with respect to monosaccharides, interconversions of glucose and fructose.

UNIT-II

Vitamins and Harmones **03 hours**

Vitamins: Classification and importance of vitamin-A, B_6, B_{12}, C, D and E. Synthesis of Vitamin-C from D(+)-glucose, synthesis of vitamin-A by Vandrop etal.

UNIT-III

Amino acids, Peptides and Proteins **06 hours**

Classification, structure and stereochemistry(D and L) of amino acids, acid-base behaviour, iso-electric point and electrophoresis, p eptides-nomenclature and structure of peptides, synthesis of a dipeptide(Bergmann synthesis), Classification of proteins, levels of protein structure(primary, secondary and tertiary structure), protein denaturation and renaturation.

UNIT-IV

Terpenoids **03 hours**

Introduction, classification of terpenes, Ingold's isoprene rule, constitution of citral with synthesis, synthesis of α and β ionones, synthesis of α-terpeniol.

Physical Chemistry:

UNIT-I

Electronic Spectrum **05 hours**

Concept potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules, energy levels and respective transitions, Frank–Condon principle.

UNIT-II

Physical properties and molecular structure **04 hours**

Introduction-dipole moment, induced dipole moment, measurement of dipole moment by temperature variation method and its applications.

UNIT-III

Polymers **03 hours**

Introduction, classification, determination of molar masses of macromolecules by viscometry and Donnan membrane equilibrium.

UNIT-IV

Quantum Chemistry **04 Hours**

Photoelectric effect - Einstein's photoelectric equation, wave particle duality, de-Broglie hypothesis, de-Broglie equation(derivation), experimental verification-Davisson-Germer experiment.

Reference books for inorganic chemistry

01. Advance Inorganic Chemistry Vol-I and II	Gurudeep Raj
02. Advance Inorganic Chemistry	Satya Prakash
03. Modern Inorganic Chemistry	R.D. Madan
04. Inorganic Chemistry	James Huheey
05. Concise Inorganic Chemistry	J.D. Lee
06. Inorganic Chemistry	Shriver and Atkins

Books recommended for organic chemistry:

01. Organic Chemistry P.L. Soni
02. Organic Chemistry I.L. Finar Vol–II
03. Biochemistry Voet and Voet

Books recommended for physical chemistry:

01. Molecular Spectroscopy C.N. Banwell
02. Physical Chemistry Atkins
03. Physical Chemistry Puri and Sharma, New edition

SIXTH SEMESTER B.Sc. COURSE

Chemistry
Paper-II
Code : 14BSCCHET62
Teaching Hours : 50 Hours

Inorganic Chemistry:

UNIT-I

Chromatography **07 hours**

Principle, types, stationary and mobile phases, physical factors of separation, brief account of paper chromatography, calculation of Rf value, brief account of column chromatography and its applications.

Flame photometry: Principle, Limitations, Instrumentation, Flame photometric determination of Na and K.

Thermogravimetry: Principle and applications of thermogravimetric methods (TG and DTA).

Electrogravimetry: Principle, Instrumentation, Electrogravimetric determination of Copper.

UNIT-II

Soil Analysis **03 hours**

Macro nutrients, trace metals and organic matter in soil. Determination of pH, Determination of nitrogen by alkaline permanganate method and phosphorus by Bray's and Olsen's method present in the soil.

UNIT-III

Electronic spectra of transition metal complexes **07 hours**

Russel-Sandar's coupling in defining ground states of spectrochemical series, derivation of spectroscopic ground terms(d1 to d10 without J values), types of electronic transitions(d-d transitions, charge transfer transitions-MLCT and LMCT), selection rule for d-d transitions, Orgel- energy level diagram-d1 and d2 states, discussion of the electronic spectrum of [Ti(H2O)6]3+ complex ion.

Organic Chemistry:

UNIT-I

Chemotherapy **05 hours**

Introduction, requirement of an ideal synthetic drug, classification, synthesis and uses of the following-

Antipyretics–antipyrine, paracetamol

Anaesthetics-novacaine(local) and pentothal sodium(general)

Antihistamines–chlorpheniramine maleate(CPM)

Antimalarials–paludrine, chloroquine

Antibiotics-chloromycetin, penicillin, tetracyclin

Para pharmaceutical reagents–Benedict's reagent, sodium citrate, Barfoed reagent

UNIT-II

Soaps and Detergents **03 hours**

Soaps - Introduction, manufacture by modern process, cleaning action of soap. Detergents - anionic, cationic, nonionic, with suitable examples, distinction between soaps and detergents, emulsifiers, stabilisers and builders.

UNIT-III

Reaction Mechanism **04 hours**

a) Beckmann rearrangement
b) Favorskii rearrangement
c) Benzidine rearrangement
d) Benzillic acid rearrangement

UNIT-IV

NMR Spectroscopy **05 hours**

Principle of Proton Magnetic Resonance(1H NMR) spectroscopy, nmr spectrum, chemical shift, nuclear shielding and deshielding, spin-spin coupling(n+1) rule, intensity(height) of the signal, TMS as internal standard-advantages, interpretation of PMR spectra of simple organic molecules such as ethyl bromide, n-propyl bromide, iso propyl bromide, ethanol, acetaldehyde and benzene.

Physical Chemistry:

UNIT-I

Electro motive force **11 hours**

Reversible and irreversible cells, EMF of a chemical cell and its measurement by potentiometer, standard cell (Weston standard cell).

Types of electrodes - Reference electrode, calomel electrode, derivation of Nernst equation for emf of a cell, c oncentration cells– with and without transference, liquid junction potential and its derivation, salt bridge.

Applications of emf measurements-

1) Determination of pH: Using hydrogen electrode, quinhydrone electrode and glass electrode.

2) Potentiometric titrations: Acid-base and redox titration.

UNIT-II

Photochemistry **05 Hours**

Photochemical reactions, laws of photochemistry – Beer's law, Lambart's Law, Beer-Lambart's Law, Grothus-Draper Law and Einstein's Law of photochemical equivalence, quantum efficiency or yield, reasons for high and low quantum efficiencies with examples, fluorescence, phosphorescence, photosensitization and chemiluminescence.

Reference books for inorganic chemistry

01. Instrumental methods of chemical analysis	Wilard martin and Dean
02. Instrumental methods of chemical analysis	H. Kour.
03. Quantitative Inorganic analysis	A.I. Vogel

Books recommended for organic chemistry:

01. Organic Spectroscopy	Y. R. Sharma
02. Organic Spectroscopy	P.S. Kalsi
03. Synthetic Organic Chemistry	Gurdeep Chatwal

Books recommended for physical chemistry:

01. Quantum Chemistry	Lewin
02. Physical Chemistry	Atkins
03. Physical Chemistry	Puri and Sharma

CHEMISTRY PRACTICALS

SIXTH SEMESTER B.Sc. COURSE
Chemistry Practical
Paper-I
Code : 14BSCCHEP61

Total number of hours per week: 04
Internal Assessment=10 Marks
Total No. of hours per Semester: 52
Practicals: 40 Marks

A. Organic estimation

01. Estimation of phenol.

02. Estimation of aniline.

03. Estimation of acetamide.

04. Determination and saponification value of groundnut/coconut oil.

05. Determination of Iodine value of groundnut/coconut oil.

06. Estimation of glucose by Benedict's reagent.

B. Physical Chemistry Experiments

01. Determination of concentration of given acids mixture ($HCl+CH_3COOH$) conductometrically using standard NaOH.
02. Verification of Beer–Lambert's Law by colorimetric method and calculation of molar extension coefficient of $FeCl_3$.
03. Verification of Beer-Lamberts Law by colorimetric method and calculation of molar extension coefficient of copper sulphate.
04. Determination of concentration of strong acid HCl by potentiometric titration against strong solution of NaOH.
05. Potentiometric titration of $FeSO_4$ against $K_2Cr_2O_7$.
06. Determination of the solubility and solubility product of sparingly soluble salts (Silver halides) by potentiometrically.
07. Determination of heat of neutralization of strong acid by strong base by water equivalent calorimetric method.
08. Determination of dissociation constant of weak acid (acetic acid) Potentiometrically.

Note: For examination:

50% students will perform organic estimation and 50% students will perform Physical.

CHEMISTRY PRACTICALS

SIXTH SEMESTER B.Sc. COURSE

Chemistry Practical

Paper-II

Code : 14BSCCHEP62

Total number of hours per week: 04
Internal Assessment=10 Marks
Total No. of hours per Semester: 52
Practicals: 40 Marks

A. Gravimetric experiments: Internal assessment-10 Marks and Experiment-30 Marks

01. Estimation of barium as Barium sulphate.
02. Estimation of aluminium as aluminium oxide.
03. Estimation of Iron as ferric oxide.
04. Estimation of led as led sulphate.

B. Dissertation/Tour report: 10 marks

The Dissertation/Tour report should be submitted at the time of **Chemistry Practical–VIb**.
Student shall be assigned either dissertation or Tour report. The topics for dissertation shall be selected either from the V and VI semester theory syllabi or general topics related to chemistry. For Tour report, student shall visit an Industry or Academic/Research institutions like BARC, IISC etc.

Note: For examination:

Gravimetric experiments and Dissertation/Tour report are Compulsory.

4. ELECTRONICS (OPTIONAL)

B. Sc. SEMESTER – VI

Electronics (Optional) PAPER – I

Total Teaching hours: 50, Teaching hours per week: 4 hours

ELE- 6.1**:** DIGITAL COMMUNICATION, SATELLITE COMMUNICATION & TELEVISION

UNIT - I : **PULSE AND DIGITAL COMMUNICATION:**

Introduction – sampling theorem, types- PAM, PWM, PPM, PCM – quantization. Digital communication systems – introduction, Digital modulations (FSK, PSK, and ASK). Advantage and disadvantages of digital transmission, Applications. Characteristics of data transmission circuits – Shannon limit for information capacity, Bandwidth requirements, Data transmission speed, Noise, Cross talk, Echo Suppressors, Distortion and Equalizer.

8Hrs.+2Hrs.Problems =10hrs

RANI CHANNAMMA UNIVERSITY, BELAGAVI

WEL-COME

TO THE COURSE STRUCTRE AND SYLLABUS OF UNDERGRADUATE PROGRAMMES – B.Sc

VI Semester

w.e.f.

Academic Year 2016-17 and onwards

11. ZOOLOGY (OPTIONAL)

BSc – Zoology (Optional) Sixth Semester

Paper 6.1 and 6.2 Outline

STRUCTURE

Semester	Syllabus	Hour's
Paper I	APPLIED ZOOLOGY, Sericulture Apiculture, Insect pest management. Vermiculture, Aquaculture, Poultry breeds, Animal Husbandry and Lac culture	50
VI Paper-II	Microbiology, Nanotechnology, Bioinformatics and Methods in Biology	50

Rani Channamma University, Belagavi
B.Sc VI Semester _ 6.1

Paper I

Total hours – 50
Marks _ 80
Theory 4 hrs/week

APPLIED ZOOLOGY (optional)

Sericulture : Mulbery Silkworm and Life History of Bombyx mori
07 hrs
Rearing of Silkworm: Grainage management, Emergence of moth and fertilization, egg laying, hatching and moulting of-silkworm, spinning of cocoons, Cocoon processing, stiffling and spinning silk. Filature. Non mulberry silkwarm, types. in brief & Silkworm diseases- Muscardine, Grasserie, Flacherie & Pebrine.

Apiculture: Species of Honey Bees, their Social organization, Life History 05 hrs
Methods of Bee Keeping, products of Bees, & their Economic importance

Insect Pest Management : Natural control and Applied control of pests
05 hrs
Applied Control __ Mechanical, Physical, Cultural, Legal, Chemical control

Vermiculture: Eerthworm species used in vermiculture,vermiculture technique,and
Importance of vermiculture.
04 hrs

Aquaculture :
10 hrs
Prawn Fisheries, Species of Prawns, Culture of freshwater and marine Prawns, Preservation and processing of Prawns.

Pearl Culture : Pearl producing molluscans, Pearl formation, Pearl producing
Sites in India. Quality and composition of Pearl.
Pearl Industry:Artificial Insertion of nucleus
Brief technique of Fish culture, Preservation of fishes and their Byproducts

Poultry : Breeds of fowl, Diseases of poultry, Poultry maintenance and By-products, and CoMposition and Nutritive value of Egg.

06 hrs

Animal Husbandary: Maintenance, Breeds Diseases, Products and By Products of the following

10 hrs

Sheep and Goats, Cow and Buffalos, Composition and Nutritive value of Milk

Lac culture: Classification of Lac insect (Techardia lacca, Life history of Lac
Insect. Host plants, Cultivation of Lac. Compostion and properties & Economic importance

3 hrs.

Practicals – 6.1 **Total -11**

Practicals

1. Project on any of the applied branch studied in theory 1
2. Study of mulberry silkworm and Life cycle 1
3. Types of non mulberry silkworms in brief and Silkworm diseases (Pebrine, Muscardine and Grasserie & Flaturie) 1
4. Species and castes of honeybees 1
5. Agricultural pests and domestic pests (total 8 varieties) 1
6. Study of fisheries __ Molluscs (three), Crustaceans (three) And Pisces (six)
7. Study of Varieties of sheep and goat (from chart/photographs) 1
8. Study of varieties of Cow & Buffalos(from chart/photographs) 1
9. Vermiculture__ Study of types of Earthworm species 1
10. Study of poultry breeds 1
11. Study of Lac insect (Life cycle) 1

Scheme for practicals 6.1 APPLIED ZOOLOGY

Q No. I	Sericulture	03 marks
Q No. II	Apiculture	03 marks
Q No. III	Pest management	03 marks
Q No. IV	Pisciculture	03 marks
Q No. V	Vermiculture	03 marks
Q No. VI	Animal Husbandry	06 marks
Q No. VII	Prawn & Pearl culture	04 marks
Q No. VIII	Project report & Viva	10 marks
Q No. IX	Journal	05 marks

Total 40 marks

Note 1 :Examiners can alter the Scheme of marks for practical in consultation With the staff of the host college.

Note 2 : Theory		Internal	20 marks
		Final	80 marks
	Pracatical	Internal	10 marks
		Final	40 marks

Note 3 : Question paper pattern for THEORY examination

Q No. I	02 marks	10* 02	= 20 marks
Q No. II	05 marks	06* 05	= 30 marks
Q No. III	10 marks	01* 10	= 10 marks
Q No. IV	10 marks	01* 10	= 10 marks
Q No. V	10 marks	01* 10	= 10 marks

Note 4 : Q Nos IIIrd IV & V each should have one internal option

B.Sc VI Semester _ 6.2

Paper II
(Microbiology, Nanotechnology, Bioinformatics and Methods in Biology)

Total hours – 50
Marks _ 80
Theory 4 hrs/week

Microbiology

1. **Microscopy** : Compound Microscope and its functions 03 hrs
   Dark field microscope. Fluorescent Microscope
   Phase Contrast Microscope and Electron Microscope and their uses
2. **Sterilization and other Techniques** _ Physical and Chemical methods 01 hr
   Bacteria:Classifiction based on shapes, structure (anatomy)
   Bacterial 02 hrs
   reproduction and growth.

3. **Virus** _Morphology, chemical properties, classification and nomenclature 02 hrs
   DNA and RNA viruses.

   4. Fungi: Structure, classification and reproduction, Yeasts 02hrs
5. **Fermentation**: Types of Fermentor and basic functions 03hrs

   Methods of preservations and criteria for the selection of microorganisms

6. **Production of antibodies** Penicillin, Streptomycin, Enzyme protease, Riboflavin. 02hr
7. Ormal microbial flora of the human body 01hr

8.Role of microbes in environment 01hr

Nanotechnology 4hrs

Introduction : History, Name, Tools and Techniques in Nanotechnology.

Nanobiology; application of Nano in biology- Nano drug Administration Diagnostic & Therapeutic applications. Lotus effect, Gold & Silve Nanotechnology. Curcumin phytochemicals, Cinnamon in green nano technology.

Bioinformatics

1.**Introduction'** : Definition, Goal of Bioinformatics, Sequencing-Sequences analysis and Structure analysis 02hrs
Applications of Bioinformatics.

2. Classification of Biological Data Bases. Characteristics of FASTA (FastAlignment) BLAST (Basic Local Alignment Search Tool). 02hrs

3. **Aims and goals of Human Genome Project**: Main findings of huma genome Project., Prediction and tools for gene prediction.
Comparative genomics. 02hrs

4. **Proteomics**: Two dimensional Gel Electrophoresis
Mass spectrometry, SDS __ PAGE
Structure of protein __ Primary, Secondary, Tertiary and Quarternary. 02hrs

Protein structure prediction 01hr
Application of Proteome analysis
The future of Proteomics 01hr

<u>Methods in Biology</u>

Techniques of Cell fraction and Centrifugation.
Homogenization and cell tissue disruption
Centrifugation, Ultra centrifugation. 02hrs

DNA Sequencing, _ In situ Hybridization, DNA microchips 02hrs

Genetic Engineering in animals- Transgenic Mouse, Transgenic sheep, Genetically Altered Fish.Mosquito and Drosophila. 02hrs

Gene therapy in Humans 02hr

Histochemical and Immunization Techniques _ ELISA, RIA, Flow Cytometry 02hrs

Nucleic Acid Blotting and their applications _ Southern Blotting, Northern Blotting, Western Blotting 02hrs

Biophysical Methods _ Brief note of NMR, ESR, Spectroscope and their uses 02hrs

Radioisotopes Techniques in Biochemistry - Types of radioactive decay- Alpha, Beta emission & Gamma rays 01 hr

Geigar-Mullar counter, Liquid Scintillator 01hr

Biological applications of Radioisotopes 01hr

A brief note on the use of **ECG, PET, MRI, CAT**. Single Neuron recorder in Electro Physiological methods 02hrs

B.Sc VI SEMESTER 6.2

PRACTICAL DETAILS

ZOOLOGY Pract-II

TOTAL 11 PRACTICALS

Measurement of micro organisms (Micrometery)

Preparation of liquid medium (Broth)

Preparation of solid media (PDA medium and PDA plates)

Preparation of agar slants.

Bacterial cell counting using haemocytorneter.

Simple and Grams's staining differentiation of bacteria.

Isolation, Identification and enumeration of Bacteria/Protozoa
from moist soil or sewage water

Practical application of Bioinformatics: Tool BLAST
And FASTA to find out sequence of nucleotides in
Desired gene/Amino acid in desired protein

Study of Microbiological Lab Equipments—
Microscope, Centrifuge, Autoclave, Pressure cooker, Laminar air flow, Streak Plate, Inocculation needle etc.

Visit to Diagnostic center to study practical application of ECG, PET, MRI, CAT

Suggestions for Practical Examination

Microbiology, Nanotechnology, Bioinformatics & Methods in Biology

SEM – VI 6.2 ZOOLOGY (OPTIONAL)

Q No. I	Microbiology Spotting (05*2)	10 marks
Q No. II	Bioinformatics	07 marks
Q No. III	Methods in Biology	07 marks
Q No. IV	Viva	05 marks
Q No. V	Visit to diagnostic center – A Report	06 marks
Q No. VI	Journal	05 marks

Note 1 : Examiners can alter the Scheme of marks for practical in consultation with the staff of the host college.

Note 2 :	Internal	20 marks
	Final	80 marks
Practical	Internal	10 marks
	Final	40 marks

Note 3 : Question paper pattern for THEORY examination

Q No. I	02 marks	10* 02	= 20 marks
Q No. II	05 marks	06* 05	=30 marks
Q No. III	10 marks	01* 10	=10 marks
Q No. IV	10 marks	01* 10	=10 marks
Q No. V	10 marks	01* 10	=10 marks

Note 4 : Q Nos III, IV & V each should have one internal option.;

. Note : TWO INTERNAL THEORY TESTS SHOULD BE CONDUCTED FOR EVERY SEMESTER

First Internal Theory TEST should be set for maximum of 20 marks for duration of

one hour &Second Internal Theory TEST should be set for maximum of 80 marks

Duration of THREE HOURS.

Note 3 : Question paper pattern for Theory examination

02 marks	10x2	=20
05 marks	6x5	=30
10 marks	3x10	=30

Note 4 : Q Nos . III, IV & V--- SHOULD have ONE internal option OF 10 MARKS

Note : Paper setters should give due weightage to the TOPICS of the SYLLABUS

Note 5: Staff meet should be conducted to discuss the syllabus % before every semester.

All the staff members should attend the meeting compulsorily.

RANI CHANNAMMA UNIVERSITY, BELAGAVI.

Department of Post Graduate Studies and Research in Commerce

Syllabus of Master of Commerce

(With effect from Academic Year 2017-18)

IV Semester

M.Com Course Structure

Sem	Paper Code	Course	IA Marks	Sem End Marks	Total	Hrs/ Week	Credits
III	3.1	Business Research Methods	20	80	100	04	04
	3.2	International Financial Management	20	80	100	04	04
	Group- A : Accounting and Finance						
	3.3 A	Financial Markets and Institutions	20	80	100	04	04
	3.4 A	Corporate Accounting	20	80	100	04	04
	3.5 A	Accounting for Specialised Institutions	20	80	100	04	04
	Group- B: Cost Accounting						
	3.3 B	Production and Operation Management	20	80	100	04	04
	3.4 B	Cost Management	20	80	100	04	04
	3.5 B	Cost Accounting Standards	20	80	100	04	04
	Group – C: Banking						
	3.3 C	Bank Marketing	20	80	100	04	04
	3.4 C	Banking in India	20	80	100	04	04
	3.5 C	Management Accounting for Bankers	20	80	100	04	04
	Open Elective Course						
	3.6	To be chosen from the other Department	20	80	100	04	04
		Open Elective Course meant for other Departments - Personal Financial Planning	20	80	100	04	04
		Total Marks/Credits	**120**	**480**	**600**	**24**	**24**
IV	4.1	E-Commerce	20	80	100	04	04
	4.2	International Business	20	80	100	04	04
	4.3	Project Report	50	50	100	04	04
	Group A: Accounting and Finance						
	4.4 A	Security Analysis and Portfolio Management	20	80	100	04	04
	4.5 A	Innovations in Accounting	20	80	100	04	04
	4.6 A	Mutual Funds	20	80	100	04	04
	Group- B: Cost Accounting						
	4.4 B	Techniques of Costing	20	80	100	04	04
	4.5 B	Strategic Cost Management	20	80	100	04	04
	4.6 B	Recent Developments in Cost Accounting	20	80	100	04	04
	Group – C: Banking						
	4.4 C	Foreign Exchange and Risk Management	20	80	100	04	04
	4.5 C	Financial Management in Commercial Banks	20	80	100	04	04
	4.6 C	Fund Management in Commercial Banks	20	80	100	04	04
Total Marks/Credits			**150**	**450**	**600**	**24**	**24**

IV SEMESTER
Course 4.1 – E-Commerce

Objective: To equip students to assess e-commerce requirements of a business and develop e-business plans and to interact with various IT professionals who may be developing e-commerce applications.

Unit-I: Introduction to E-commerce: Meaning and Concept of E-Commerce, Business Model for E Commerce; Features of E-Commerce; Element of E-Commerce; Benefits and Limitations of E-Commerce; Types of E-Commerce System; B2B, B2C, C2C, C2B, B2G and G2C. Internet Concept and Technologies: History of Internet; Ways to connect to the Internet; Internet Accounts; Public and Private Network; Applications of Internet.

Unit-II: Electronic Payment systems: Features of an ideal electronic payment system; Types of an Electronic Payment System-Credit Cards, Debit Cards, Smart Cards, E-Money, E-Check and Electronic fund transfer(EFT), Need of security in E-Commerce; Essential security requirements for safe electronic payments; Security Schemes for an Electronic Payment Systems- Encryption, Digital Signature, Security Certificates.

Unit-III: Business to Consumer E-Commerce: Introduction to B2C E-Commerce; Products in B2C Model; Consumers shopping procedure on the Internet; Role of E-Brokers; Broke Based Service on line; On-line Travel and Tourism Service; on-line Stock Trading; on line Banking; On-line Financial Services; E-Auctions.

Unit-IV: Business-to-Business E-Commerce: Introduction to B2B E-Commerce; Marketing issue in B2B; Key Technologies for B2B E-Commerce; Electronic Data Interchange, Internet, Intranet, Extranet, Integration with Back-end Information System.

Unit-V: Accounting Software and E-Commerce: Need for Accounting Software and software types- Tally 10 SAP.

Suggested Readings:

1 Joseph P T, E-Commerce- A Managerial perspective, PHI, New Delhi.
2 Krishnamurthy Sandeep, E-Commerce Management, Vidya Vikasa publication.
3 Laudon, Kenneth C. and Carol Guercio Traver (2002) E-commerce: business, technology, society. (New Delhi : Pearson Educatin).
4 Awad, Elias M. (2007), Electronic Commerce: From Vision to Fulfillment (New Delhi : Pearson Education).
5 Kalakota, Ravi and Marcia Robinson (2001). Business 2.0: Roadmap for Success (new Delhi : Pearson Education).
6 Smith, P.R. and Dave Chaffey (2005), eMarketing eXcellence; The Heart of eBusiness (UK : Elsevier Ltd.)

Course 4.2 - International Business

Objective: To expose the students to the different dimensions of international business and its environment.

UNIT – I: International Business : Definition, nature, approaches, Problems of international business International Economic Environment, International trade policies and relations , tariffs, subsidies, import quota, voluntary export restraints, administrative policies.

Unit –II: Multinational Corporations: Definition, Distinction among I.C., M.N.C., G.C. etc. Factor contributing to growth of multinationals – criticism on multinationals

Unit III: International Trade Theories - Mercantilism, Absolute Advantage, Comparative Advantage, Heckscher-Ohlin Theory, Product Life-Cycle Theory, New Trade Theory, National Competitive Advantage, Global competitive Alignment matrix, mapping competitive shift.

UNIT- IV: Modes of International Business: Exporting, licensing, Franchising Contracts- contracts of manufacturing, management contracts Turnkey projects, mergers, acquisitions, Joint ventures Market entry strategies International marketing channels, Export policies – export import procedure

UNIT V: World Trade Organization and Trade Blocks: Economic Integrations – free trade area, custom unions, common markers, economic unions EEC, ASEAN, SAARC, SAFTA, Liberalization of agriculture trade.

Suggested Readings:

1. International Business by Francis Cherunilam, Oxford University press.
2. International Business: Text and Cases by P Subba Rao, Himalaya publishing House.
3. International Business by K Ashwathappa, Tata Mc Graw Hill Publication.
4. International Business by Justin Paul, PHI Publication.
5. International Business Environment and Management by V K Balla and S Shivarama, Anmol Publication Pvt., Ltd.

Course 4.3 - Project Report

RANI CHANNAMMA UNIVERSITY, BELAGAVI

WEL-COME

TO THE COURSE STRUCTRE AND SYLLABUS OF UNDERGRADUATE

PROGRAMMES – B.Sc

IV Semester

w.e.f.

Academic Year 2015-16 and onwards

Semesters	Syllabus	Total Hours	Theory & Practical/ Week
IV	**Cell Biology, Histology & Animal Behaviors**	50hrs.	4 hrs.
	PRACTICAL	12	4 hrs.

NOTE:

THEORY MARKS			PRACTICAL MARKS		
Internal	**Annual**	**Total Marks**	**Internal**	**Annual**	**Total Marks**
20	80	100 marks	10	40	50 marks

Question paper pattern for THEORY examination

Que.No.	Marks	Solve	Total Marks
I	02	10	20
II	04	05	20
III	10	04	40
			TOTAL --- 80 MARKS

PRACTICAL pattern for examination

Que.No.	Solve	Total Marks
I	Make a temporary preparation of Histology slide.	10
II	Make a temporary squash preparation of Onion root tip/Grasshopper Testis/Onion flower bud	08
III	Identification (6X2)	12
IV	Field study report & viva	05
V	Journal	05
		TOTAL --- 40 MARKS

UNIT-I Cell Biology

Cell Biology: Ultra structure of animal cell, Cell theory & cell cycle. **1hr**

Ultra Structure & function of cell organelles: Plasma membrane, Endoplasmic reticulum, Ribosome's, Golgi-complex, Lysosomes, Mitochondria and Nucleus. **8hrs**

UNIT-II Cell Biology

Chromosomes: Structure & types of chromosomes. Ultra structure of chromosome. **2hrs**

Cell division: Types- mitosis & meiosis. **2hrs**

Cellular Aging & Cell Death: Concept of Aging theories, Effect of Aging on Cell organelles. Apoptosis, Necrosis-Definition & significance. **2hrs**

Cancer Biology: Introduction, Characteristics of cancer cells. Carcinogens, cause & prevention. **3hrs**

UNIT-III Histology

Histo chemical Techniques: Cytoplasmic & Nuclear stains. Preparation of histological slides. **3hrs**

A). Study of histological structure and functions of the following Mammalian organs. **8hrs**

a). Tongue **b). Salivary glands**
c). Stomach **d). Intestine**
e). Liver **f). Kidney**

UNIT-IV Histology

B). Study of histological structure and Endocrine functions of the following Mammalian organs **9hrs**

a) Pituitary **b) Pancreas** **c) Adrenal** **d) Thyroid**
e) Parathyroid **f) Thymus** **g) Testes** **h) Ovary**

UNIT-V Ethology (Animal Behaviour)

Ethology: Introduction Definition, Scope of ethology. Brief Contributions of Konard Lorenz, NikoTinbergen and Karl Von Frisch. **2hrs**

Types of Animal Behaviour: **7hrs**

1). Innate Behaviour: Taxes, Reflexes, Instincts & Motivation.

2).Learned Behaviour: Habituation, Imprinting, Conditioned, Reflexes and Insight learning.

3).Social behaviour: Types of animal society & Colony in Honey Bees and Monkey troops.

4). Territoriality & Courtship Behaviour in Scorpion, Stickle Back Fish & Peacock.

5).Study of nesting behavior and mimicry in animal.

6). Biological clock, Circadian rhythm and Chronobiology.

Animal Communication: Chemical, visual and Audio. Function of

Signals odours, sounds and light. **2hrs**

Parental care: Concepts, Fishes, Amphibians and Birds. **3hrs**

PRACTICALS

Total Practicals-12 hrs

1) Study of permanent cytology slides of Mitosis & Meiosis. **2hrs**
2) Study of temporary preparation of Mitotic stages from onion Root tip cells. **2hrs**
3) Study of temporary preparation of Meiotic stages from onion Flower bud/Grass Hooper testis. **2hrs**
4) Preparation and observation of permanent histological slides **4hrs**
   Stomach, Intestine, Liver, Pancreas, Kidney, Adrenal Thyroid, Testis &Ovary.
5) Study of mimicry in leaf insect, Chameleon, Butterflies, Stick Insect, Ants, Wasps and Spiders. **1hr**
6) Study of Nest and nesting material. **1hr**
7) Internal Practical Test **1hr**

NOTE:

1. With the help of Charts/Models/Diagrams/Printouts & Xerox Sheets are used in practical demonstration
2. Compulsory field visit to study Mimicry, Habitats and Community.
3. Submission of field visit report carries 5 marks.

REFERENCE BOOKS

1. Introduction to Histology. Gauba R.K. Tata Mc Graw Hill New Delhi.
2. Cells and Tissues: Introduction to Histology ND Cells :Rogers:A.W. AcademicPress .
3. Basic medical Histology :Biology of cells & tissues & organs Kessel R.G. oupNew York.
4. Text Book of Histology :Bloom and Fawcett.Saunders Publ.Philadelphia.
5. Bailey's Text Book of Histology.Bailee Baltimore,Willims andWilkins.
6. Text Book of Ecology : Odum.
7. Introduction to animal behavior:Aubrey Manning and Marian.S.DawkinsCambridge Uni Press.
8. Essentials of organizational behavior:Stephan Robbins,Prentice Hall of IndiaNew Delhi.
9. Animal Behaviour :McFarland D ELBS with Longman.
10. Ethology " Barnett.
11. An introduction to Behavioural Ecology J.R. Krebs & N.B. Davies Black wellScientific Publ.
12. Text Book of Animal Behaviour: Fatik Baran mandal. PHI Learning Pvt Ltd newDelhi.
13. Animal Behaviour :Reena Mathur,Rastogi and Coimpani.
14. Cell Biology –Chennarayappa – Unniversity Press

RANI CHANNAMMA UNIVERSITY,

Vidyasangama, PB-NH-4, Bhutaramanahatti,

BELAGAVI – 591 156

SCHOOL OF BASIC SCIENCES

Department of Studies in Botany

M.Sc., Botany Course

(CBCS)

w.e.f.

Academic Year 2016-17 and onwards

COURSE STRUCTURE AND SCHEME OF EXAMINATION

Sem No.	Course No	Title of the course	Credits	Teaching Hr/week	Maximum Marks		
					Exam proper	I.A.	Total
		Compulsory Courses:					
I	1.1	Microbial Diversity	4	4	80	20	100
	1.2	Biodiversity and Conservation Biology	4	4	80	20	100
	1.3	Systematic Botany of Angiosperms	4	4	80	20	100
	1.4	Evolutionary Biology & Plant Geography	4	4	80	20	100
	1.5	Practical – I Based on 1.1 & 1.2	4	4	80	20	100
	1.6	Practical – II Based on 1.3 & 1.4	4	4	80	20	100
II		**Compulsory Courses:**					
	2.1	Biochemistry and Bio-Physics	4	4	80	20	100
	2.2	Developmental Biology	4	4	80	20	100
	2.3	Genetics and Plant Breeding	4	4	80	20	100
		Open Elective Course:					
	2.4	Medicinal Plants	4	4	80	20	100
		Compulsory Courses:					
	2.5	Practical – III Based on 2.1	4	4	80	20	100
	2.6	Practical – IV Based on 2.2 & 2.3	4	4	80	20	100
III		**Compulsory Courses:**					
	3.1	Plant Physiology	4	4	80	20	100
	3.2	Cell Biology and Molecular Biology	4	4	80	20	100

	3.3	Medicinal Plants & Herbal Drug Technology	4	4	80	20	100
		Open Elective Course:					
	3.4	Plant Propagation Techniques	4	4	80	20	100
		Specialization Courses:					
	3.5	Practical V: Based on 3.1	4	4	80	20	100
	3.6	Practical VI: Based on 3.2 & 3.3	4	4	80	20	100
IV		**Compulsory Courses:**					
	4.1	Mycology and Plant Pathology	4	4	80	20	100
	4.2	Ecology and Environmental Biology	4	4	80	20	100
	4.3	Plant Biotechnology	4	4	80	20	100
	4.4	Research methodologies and Techniques in Botany	4	4	80	20	100
	4.5	Practical VII: Based on 4.1 and 4.2	4	4	80	20	100
	4.6	Project	4	8	80	20	100

M.Sc., BOTANY SYLLABUS

I SEMESTER

1.1 Microbial Diversity

Teaching Hours per Week: 4
No. of Credits: 4

UNIT I **13 HOURS**

Plant Bacteriology: Diversity in structure and organization of Eubacteria, Spirochetes, Rickettsias, Chlamydias, Actinomycetes, Archaebacteria, mycoplasmas and Cyanobacteria, metabolic diversity in relation to phototrophic, chemolithotrophic, symbiotic, saprophytic and parasitic mode of life. Diversity in relation to photosynthetic pigments and energy biogeochemical cycling, Present picture of phylogeny and systematics of bacteria.conversion. phylloplane and rhizosphere microbiology-role of bacteria in

UNIT II **12 HOURS**

Methods of studying microbial biodiversity various culture methods biodiversity of culturable bacteria. Techniques used to study plant-microbe interaction. Isolation strategies recovering microbial biodiversity using environmental DNA, environmental genomics, screening environmental libraries preservation of microbial biodiversity, polyphasic taxonomy of microorganisms.

UNIT III **13 HOURS**

Plant Virology: Origin of viruses, classification and nomenclature of Viruses with special stress on plant viruses, introduction to molecular virology, Virology on Internet - viral databases and their use for understanding viral phylogeny, Viral genomics and proteomics Transmission of viruses; Mechanism of replication of DNA and RNA viruses, modern techniques to study the viruses- Morphology, chemical composition, ultrastructure, replication. The virus cryptogram, Transmission of Plant Viruses, Virus-Vector relationship, Control of Plant Viruses. Present knowledge of Viroid's and prions. Virus pandemics in recent years -SARS Family viruses, Covid-19 virus- origin, Causes and Response measures.

UNIT IV **12HOURS**

Structural diversity distribution and the ecological significance of lichens. Fungal biodiversity- taxonomic diversity, general structural features and the latest classification. Phocobionts & Mycobionts- Lichenized versus nonlichenized fungi.

References:

1. Ainsworth, G. C., Sparrow, F. K. and Sussman, A. S. (1973). The Fungi. Academic Press, New York.
2. Alexopoulose, C. J., Mims, C. W., Blackwell, M. (1996). Introductory Mycology. John Wiley & Sons, New York.
3. Atlas, M. and Bartha, R. (2000). Microbial Ecology, Longmann, New York.

4. Awasthi D. D. 2013). A hand book of lichens, Publisher: M/s Bishen Singh Mahendra Pal Singh, Dehra Dun.
5. Dubey, R. C. and Maheswari, D. K. (2010). A Text book of Microbiology, S.Chand& Company, New Delhi.
6. Fundamentals of Mycology,1983 J.H. Burnett, William Clows and Sons, London.
7. Fungal spores and their liberation and dispersal C.T. Ingold 1971 Oxford University press Oxford.
8. General Microbiology 1993 H.G. Schlegal Cambridge University press, Cambridge.
9. General Microbiology 1998 S.B. Sullia and S. shantharam oxford & IBH Publication, New Delhi.
10. Global Biodiversity Assessment 1995, V.H. Heywood, Cambridge University Press,Cambridge.
11. Larry Peterson R., Hugues B. Massicotte, Lewis H. Melville, 2004. Mycorrhizas: Anatomy and Cell Biology, CAB International, UK.
12. Measuring and monitoring fungal diversity 1999 G. Mueller, A.Y. Rossman andG.F. Bills Smithsonian Institution press, Washington DC.
13. Microbial diversity and ecosystem function1995 Allsopp, D. R.R. colwell and D.L. Hawksworth, CAB international Wallingford U.K.
14. Modern soil microbiology1997, J.D. Van Elsas, J.T. Trevors and E.M.H. Wallington Morcal Dekker, Newyork.
15. Pelezar, M. J., Chan, E. C. S and Kreig, N. R. (1993). Microbiology-concepts and Applications. McGraw Hill, Inc. New York.
16. Powar, C. B. and Daginawala, H. F. (1982). General Microbiology Vol.II. Himalaya Publishers, Bombay. Rao, A. S. (2001). Introduction to Microbiology. Prentice Hall of India, New Delhi.
17. Sally E. Smith and David J. Read (2008). Mycorrhizal Symbiosis. 3rd edn. Academic Press, New York.
18. The fungi an advanced treatise Vol I-IV Ainsworth and Sussman A.S. 1965,1966,1968,1973 Academic Press Newyork.

1.2 Biodiversity and Conservation Biology

Teaching Hours per Week: 4
No. of Credits: 4

Unit I **12 HOURS**

Biodiversity: Definition, levels of diversity - genetic, species and ecosystem diversity. Endemism - concept, types, endemism in Western Ghats, Biodiversity hotspots - general and with special reference to India; Mega-diversity regions. Importance of biodiversity, magnitude and distribution of Biodiversity. Biodiversity documentation assessment - Inventory and monitoring, Biodiversity indices, Biodiversity database.

Unit II **13 HOURS**

Threats to biodiversity, IUCN threatened plant categories, methods of conservation: In-situ

methods – Protected area network, National parks, Biosphere reserves, sacred grooves.
Ex-situ methods: Botanical gardens, Germplasm collection seed bank, pollen bank. Human wildlife conflict, conservation case studies.

Unit III **13 HOURS**

Environmental movements: Global and regional. Environmental laws: Forest Conservation Act, Biodiversity bill (2002); Community Biodiversity Register (PBR); Convention on International Trade in Endangered Species (CITES), Ramsar Convention, Intellectual Property Rights (IPR).

Unit IV **12 HOURS**

Biodiversity Management: Sustainable development, Environmental Impact Assessment (EIA) Ecological restoration, Aforestation, Green belt, Social forestry, Agro forestry. Remote sensing and biodiversity management.

Reference:

1. Ahmedullah, M. and M.P. Nayar, 1986. Endemic plants of the Indian region. Vol 1. Botanical Survey of India.

2. Krishnamurthy K V 20014. An advanced text book of Biodiversity, Principles and Practice. Oxford and IBH Publishing Co. Lvt. Ltd.

3. Negi S S 1933. Biodiversity and its conservation in India. Indus Publishing Company, New Delhi
4. Primack, Richard B 2006. Essentials of conservation biology, 4th edition, Senaceer Associates, Sunderland, Mass.

5. Rao R R 1994. Biodiversity in India (floristic aspects). Bishen Singh Mahendra Pal Singh, Dehradun.

6. Ravikumar K and D K Ved 2000. Illustrated fidd guide to 100 redlisted medicinal plants of conservation concern in Southern India.

1.3 Systematic Botany of Angiosperms

Teaching Hours per Week: 4
No. of Credits: 4

Unit I **13 HOURS**

Brief history and development of plant classification, Importance and need for classification, hierarchical classification. phases of plant classification. Overview on pre- and post-Darwinian systems of classification. Artificial systems of classification - Herbalists, Theophrastus, Linnaeus Natural system of classification - Bentham and Hooker, Phylogenetic systems of classification - Cronquist, Takhtajan, APGsystem of classification, APweb.

Unit II **12 HOURS**

Botanical Nomenclature: Need for scientific names, history of botanical nomenclature. Principles of ICBN, typification, rule of priority, ranks of taxa and nomenclature of taxa,

effective and valid publication, Author citation, retention, choice and rejection of names and epithets, conservation of names, names of hybrids, names of cultivated plants.

Unit III **12 HOURS**

Tools of taxonomy: Tools of taxonomy: Floras, monographs, revisions, websites, Artificial dichotomous keys.

Herbarium methodology, significance of herbaria, floras

Botanical Survey of India Botanical Survey of India - organization and contributions of BSI

Taxonomic evidence: Chemotaxonomy, Cytotaxonomy, Embryology as taxonomic evidence.

Brief account of numerical taxonomy.

Unit IV **13 HOURS**

Major clades in APG-IV: characteristic features (APG-IV), Study of the following families with economic important, systematics and phylogeny: Magnoliaceae, Menispermaceae, Capparidaceae, Caryophyllaceae, Meliaceae, Oxalidaceae, Balsaminaceae, Meliaceae, Droseraceae, Combretaceae, Melastomataceae, Cactaceae, Sopotaceae, Oleaceae, Gentianaceae, Lentibulariaceae, Podostemaceae, Piperaceae, Myristicaceae, Lauraceae, Loranthaceae, Moraceae, Orchidaceae, Zingiberaceae,Commelinaceae, Araceae, Cyperaceae, Poaceae.

Reference Books:

1. APG III, 2009. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG III. Botanical Journal of the Linnean Society 161: 105 –121.
2. Bennet, S.S.R. 1979. An Introduction to Plant nomenclature. International Book Distributors. 9/3. Rajpur Road, DehraDun 248001. India.
3. Bhattacharya B. and B.M. Johre. 1998. Flowering plants Taxonomy and phylogeny. Narosa Publishing House, New Delhi.Gurucharan Singh, 1999.
4. Current Concepts in Plant Taxonomy. Academic Press, London. Heywood V.H., 1976. Botanical Systematics, Academic Press London.
5. Flora of peninsular India. http://flora-peninsula-indica.ces.iisc.ac.in/.
6. Flora of World online. http://www.worldfloraonline.org/
7. Heywood, V.H. and Moore, D.M. 1984.
8. Lawrence, H.M., 1966. Taxonomy of vascular plants. The Mac Million Company, New York. Naik, V. N. 1984. Taxonomy of Angiosperms. Tata McGraw-Hill, New Delhi.
9. Plant systematics - Theory and practice. Oxford and IBH Publishing Co., Pvt Ltd., New Delhi.
10. Plant Taxonomy and Biosystematics (2nd Edition. Edward Arnold Ltd., London. Singh G., 1999. Plant Systematics, Oxford and IBH, New Delhi
11. Singh, G. 2009. Plant systematics: an integrated approach. Science Pub Inc.
12. Sivarajan V.V., 1985. Introduction to Principles of Plant Taxonomy, Oxford and IBH Publication, New Delhi. Stace, C.A. 1989.
13. Stevens, P. F. (2001 onwards). Angiosperm Phylogeny Website. Version 9, June 2008 [and more or less continuously updated since]. http://www.mobot.org/MOBOT/research/APweb/.

1.4 Evolutionary Biology and Plant Geography

Teaching Hours per Week: 4
No. of Credits: 4

UNIT I **12 HOURS**

Origin of Life – A biogenesis, Hypothesis of panspermia. Theory of Chemical of evolution, origin of life at molecular level process- structure of Cosmos primitive earth, prebiotic synthesis, origin and evolution of RNA world, Ribonucleoprotein, adaptive radiation in progenote, Evolution of Eukaryotes – Endosymbiotic hypothesis, theories of evolution- Lamarckism Neolamarkism, Darwinism, Neo-Darwinism, Germplasm theory, Mutatiuon theory and Synthetic theory.

UNIT II **13 HOURS**

Population genetic and Evolution – Madeline population, gene pool, gene frequency, genetic drift, founder effect, genetic polymorphism, Hardy Weinberg's Law, Genetics equilibrium and mechanism of speciation. Patterns of evolution in plants- Evolution of vegetative, reproductive structure in Algae, Fungi, Bryophytes, Pteridophytes and spermatophytes (Evolution of sporophytes in Bryophytes). Steelar evolution in Pteridophytes, Heterospory and seed habit. Fossil forms- Lepidodendron, Lepidocarpon, Stigmaria.

UNIT III **13 HOURS**

Plant Geography: Principles of Plant Geography- Origin of islands and Continents. Plant tectonics and Continental drifts. Center of origin of cultivated plants-Vavilocenters and Zhukoskycenters with plants in each region.

Cladistics: Introduction – advantages and problems. Cladistics (Phylogeny) – concepts, parsimony, cladograms and trees; characters: apomorphic and plesiomorphic characters, homologous vs analogous; character states, binary and multistate characters.

UNIT IV **12 HOURS**

Plant distribution and Plant migration- Floristic regions of the world. Phytogeographical regions of India, Hansen's classifications, distribution of plants based on altitude and latitude, contisin, tricontisin and endemic distribution. Age and area hypothesis- Wills theory. Plant migration and barriers for plant migration.

References

1. Darwin, C. 1859. On the Origin of Species. London: John Murray (always seek out the first edition, facsimile version, and avoid later editions)
2. Michael George Simpson, 2006. Plant systematics. Elsevier Academic Press. Nei, M. & S. Kumar, 2000. Molecular Evolution and Phylogenetics. Oxford University Press Inc.
3. Peter Skelton and Andrew Smith, 2002. Cladistics: A Practical Primer on CD-ROM with accompanying booklet by Neale Monks. Cambridge University Press.
4. Strickberger, Monroe W. 2000. Evolution. 3rd Ed., Jones & Bartlett Publishers, Inc. 40 Tall PineDrive Sudbury, MA 01776, United States of America.
5. Futuyma, Douglas J. 2005. Evolution. Sinauer Associates, Inc., 23 Plumtree Road, Sunderland, MA 01375, United States of America.
6. Dodson E. O. and Dodson P. 1976. Evolution: Process and Product. 2nd Ed., D. Van Nostrand Company, 450 West 33rd Street, New York, N.Y. 10001

PRACTICALS 4 hours per week

Practicals - I: (1.1 - Microbial Diversity)

1) Laboratory guidelines, design, tools, equipments and other requirements for studying microorganisms.
2) Preparation of media sterilization, inoculation.
3) Observation and identification of mycoplasma and Spiroplasma their related genera
4) Bacterial smear positive and negative staining.
5) Gram staining acid fast staining cell wall staining
6) Bacteria in milk, curd and root nodules.
7) Estimation of soil microbes.
8) Streak plate method and air borne microbes.
9) Vegetative organization in fungi.
10) Asexual and sexual reproduction in fungi.
11) Different fruiting bodies in fungi.

Practicals - I: (1.2 - Biodiversity and Conservation Biology)

1. Study of endemic plants (a minimum of 10) - their taxonomy - distribution, threats, status and economic use, if any.
2. Study of the locally available medicinal and Economic important plants (a minimum of 10 for each) - Distribution, origin, taxonomy, status, parts used and uses.
3. Remote sensing application - vegetation mapping.
4. Rapid EIA (Environmental impact Assessment)
5. Calculation of Biodiversity indices -Shannon and Simpson index.
6. Calculation of Frequency, density and abundance of species in population.
7. Field visit to Forest ecosystem/ Wetland ecosystem/ a sacred groove.

Practicals - II: (1.3 - Systematic Botany of Angiosperms)

1. Identification of plants to the family, genus and species level using keys (Cook's flora, Gamble's flora or Flora Karnataka by Saldanha Flora of peninsular India and world flora online can be used.)
2. Preparation and submission of 10 herbarium sheets (Use very commonly available species for herbarium preparation, strictly avoid collecting rare plants)
3. Field trips to nearby floristically rich areas.

Practicals- II (1.4 -EVOLUTIONARY BIOLOGY AND PLANT GEOGRAPHY)

1. Study of homologous, analogous and vestigial organs with suitable examples.
2. Study of molecular evolution with suitable examples.
3. Patterns of Evolution in plants-vegetative and reproductive structures in Algae and Fungi.
4. Evolution of Sporophytes in Bryophytes.
5. Stellar evolution in Pteridophytes.
6. Study of Heterospory
7. Study of fossil forms –Lepidodendron, Lepidocarpon, Stigmaria and Lygenopteris.
8. Study of center of origin of cultivated plants.
9. Plant Phytogeography.
10. Plant migration and distribution with examples.
11. Study of adaptive radiation, micro and macro evolution with examples
12. Calculating gene frequencies in population by Hardy-Weinberg law.
13. Study of Vavilov centers and Zhnkoskycenters with plant in each region.

Note: New practical may be added with the permission of BoS in Botany.

II SEMESTER

2.1 Biochemistry and Biophysics

Teaching Hours per Week: 4
No. of Credits: 4

Biochemistry

UNIT I **13 HOURS**

Physical and chemical properties of water, nucleotides, nucleic acids structure of nucleotides and poly nucleotides. Chemical and physical properties of nucleic acids. Conformation of nucleic acids (helix (A, B, Z), t-RNA, micro-RNA). Amino acids- peptide bonds, classification and characteristics of amino acids. Proteins-primary structure, secondary structure-alpha-helix and beta sheets, solubility of protein, protein sequencing methods, protein conformation-Fibrous and globular proteins, protein folding, Ramachandran Plot, Hydropathic index, solid phase synthesis of polypeptides, protein denaturation.

UNIT II **12 HOURS**

Carbohydrates-A brief account of monosaccharide's and disaccharides, structure of starch cellulose, pectin and chitin. lipids-lipid classification and chemical structure and physical properties of saturated and unsaturated fatty acids.

Enzymes- nature and classification of enzymes, enzyme specificity, reaction rates and activation energy, enzyme kinetics-Micheaelis-Menten equation, Line weavers Burk plot. Kinetics of Bisubstrate reactions. Enzyme inhibition.

Biophysics

UNIT III **12 HOURS**

Atoms, bonds and molecules. Basic principles of diffusion, osmosis and viscosity, and their application in biology. Electromagnetic radiation-electromagnetic spectrum and light scattering absorption and emission of electromagnetic radiations by biomolecules. Fluorescence and phosphorescence. Theory of fluorescence-instrumentation, polarization and anisotropy of fluorescence. Fluorescence spectroscopy,UV spectroscopy, CD spectroscopy for proteins structure determination.

UNIT IV **13 HOURS**

Nuclear Magnetic Resonance: The phenomenon of energy absorption and relaxation, chemical shifts. Instrumental; techniques –Proton NMR, C-13 NMR, P-31 NMR, two dimensional NMR-FINMR, solid state NMR, Magnetic resonance imaging. Mass spectrometry- basic theory andinstrumentation, general modes of fragmentation Gas Chromatography and Mass Spectroscopy (GCMS), FTIR spectroscopy and LASERS its applications in biology and medicine.

References:

1. Principles of Biochemistry (2000) lehningermacmilon , worth publisher.

2. Fundamentals of Biochemistry (1999) D. Voet,J.G.Voet and C. W. Pratt, Johnwiley and sons.
3. Biochemistry (1998) K. C. Van Holde , W.C. Johnson and P. Shing Prentice Hall International.
4. Essential of biophysics (2000) P. Narayan New Agri International publishers.
5. Modern Experimental Biochemistry (2000) R. Boyer, Benjamin, Cumming.
6. Fundamentals of Molecular Spectroscopy (1994) C.V. Banwell and E.M. Mccash ,TataMcgrew –Hill publishing co. Ltd.

2.2 Developmental Biology of Plants

Teaching Hours per Week: 4
No. of Credits: 4

UNIT I **12 HOURS**

Differentiation and cell polarity in acellular (Dictyostelium) unicellular (Acetabularia, fucus egg, equisetum spore) systems, shoot apicalmeristems (SAM)origin structure and function organogenesis formation of auxiliary buds. Cytohistological zonation and biochemical activity in the shoot apex and ultra-structure of meristems, SAMmutant, Phyllotaxis positioning, transition to reproductive phase, vernalization – changes in the biochemical activity.

UNIT II **13 HOURS**

Mechanism of leaf primordium initiation and stomata formation, Developmental pattern at the flowering apex, ABC model, specification floral organs, molecular aspects of MADS box genes during flower development. Cellular differences in between floral organs. senescence a general account, root hair Formation, structure and function of root apical meristem (RAM) quiescent centre, origin of lateral roots, genetics of root development.

UNIT III **13 HOURS**

Androgenesis-Microsporogenesis and Micro gametogenesis- wall layers and functions; Tapetum- types, Histochemical,ultra-structural, genetical and fictional aspects concept and significance of male germ unit.

Gynogenesis- Ovular structure and types; Development of monosporic, bisporic, tetrasporic and special types of embryo sacs Histochemical, ultra-structural, genetical and fictional aspects concept and significance of female germ unit.

Pollination and fertilization-structural and functional aspects of pollen, stigma and styles in thecurrent aspects of fertilization. Male sterility concept, causes and mechanism and present status.

UNIT IV **12 HOURS**

Embryogenesis- Cellular and biochemical aspects, composition and function of endosperm in relation to embryo development. Regulation of gene activity during zygotic embryogenesis, embryo suspensor-composition and function. Seed development and germination-Physiology and biochemistry expression of genes during seed germination. Seed dormancy and role of hormones Photo morphogenesis-photoreceptors, structure and function.

References

1. Bell P.R. 2000 Green Plants, their origin and Diversity, Cambridge University Press,
2. Bhojwani, S. S.and Bhatnagar, S. P. 1978. The embryology of Angiosperms. Vikas Publishing House, New Delhi.
3. Eames, 1961. Morphology of Angiosperms. McGraw Hill book Co., Inc., New York.
4. Johri, B. M. 1982. The experimental embryology of vascular plants. Springer Verlag, New York.
5. Johri, B. M. 1984. The embryology of Angiosperms. Springer Verlag.
6. Maheshwari, P. 1950. An introduction to the embryology of Angiosperms. McGraw Hill book Co., Inc., New York.
7. Maheshwari, P. 1963. Recent advances in the embryology of angiosperms. ed. New Delhi
8. Raghavan V. 1986 Embryogenesis in Angiosperms, Cabridge University Press Cambridge.
9. Robert F. Lyndon 1988 The Shoot Apical Meristem, Cambridge University, Press, UK.
10. Swamy, B.G.L. & Krishnamurthy, K. V. 1982. From flower to fruit: The embryology of angiosperms. Tata McGraw Hill Co. New Delhi.
11. Wearing P.F. and Philips, I.D.S.1981 Growth and Differentiation in Plants. Pergamon

Paper-2.3: Genetics and Plant Breeding

Teaching Hours per Week: 4
No. of Credits: 4

Unit I **13 HOURS**

Transmission Genetics: An over view of Mendelian Genetics, extension of Mendelian's principles-Quantitative inheritance, multiple alleles, lethal allele. Extra nuclear inheritance: Inheritance of mitochondrial and chloroplast genes, male sterility in plant.

Sex determination: Role of chromosomes and hormones in sex determination, molecular basis of sex determination and dosage compensation in man and Drosophila, Genetic disorders in man and their managements, Genetic testing and counselling, sex determination in plants.

Unit II **12 HOURS**

Population Genetics: Population and gene pools, Allele frequencies and genotype frequencies,Hardy-Weinberg's Law, Factors effecting allelic frequencies in population-Mutation, Migration, Non-random mating, selection, genetic drift, genetic equilibrium.

Linkage and crossing over, Cytological and molecular basis of crossing over, Recombination: -homologous and non-homologous, Linkage maps mapping by 2 point and 3-point test cross.

Unit III **12 HOURS**

DNA as genetic material, Gene concept, Mechanism of DNA replication in prokaryotes and eukaryotes, Enzymes in DNA replication. Types and role RNA, Genetic Code-Contribution of Nirenberg and Khorana. Structural and numerical abnormalities.

Unit IV **13 HOURS**

Plant Breeding: Mode of reproduction, methods of hybridization in self- and cross-pollinated plants, Plant Introduction, Domestication and acclimatization, patterns of evolution in crop plants. Heterosis-genetic basis of heterosis. Breeding plants for resistance to abiotic and biotic stresses. Marker Assisted Selection (MAS) in plant breeding.

References:

1. Concept of Genetics 4th Ed: William S Klung and M R Cummings
2. Elementary Principles of Plant Breeding, Chaudhary H K.
3. Genetics 4th Ed: Susan Elrod and William Stan field.
4. Genetics: Denial J Fairbanks.
5. Genetics: MW Stritckberger.
6. Genetics-Analysis and Principles: Robert J Brooker.
7. Heterosis, Frankel R and Bet Dagan.
8. Molecular Genetics: G S Stent.
9. Plant Breeding, Singh B D.
10. Plant Breeding-Theory and Practices, Chopra V L.
11. Principles and Practices of Plant Breeding, Sharma J K.
12. Principles of Genetics: D Peter Snustad et al.
13. Singh, B.D. (2005). Plant breeding: principles and methods. 7th edn.
14. Strickberger, M.W: Genetics (4th edn). Mcmillan Publishing company, New York.
15. The Human Genome: R Scott Hawley and Catherine and Mori.
16. Understanding GENETICS-A molecular approach. Norman V Rothwell.

2.5 Practical Based on 2.1

1. Extraction of chloroplast pigments and demonstration of their absorption spectra.
2. Extraction of seed protein depending upon the solubility.
3. Estimation of protein by Lowry's method
4. Extraction of Chlorophyll pigment by paper chromatography
5. UV and VIsible spectra of biomolecules.
6. Fractionation of proteins by gel filtration.
7. Estimation of phospholipids.

2.6 -Practical- IV Based on 2.2

1. Microtome sectioning and histochemical stains (PAS, Protein and RNA).
2. Histochemical nature of matured shoots and root apices using thin sections (PAS, Protein, RNA and DNA) L.S. of Maize, Banyan roots.
3. Histochemical nature of floral meristems (PAS, Protein DNA, RNA)
4. Developmental and histochemical nature of anther/Ovule/Embryo (PAS, Protein, RNA) using available plant material.
5. Invitro pollen germination to find out the percentage of viability and also the effect of volatile substances on germination and tube growth use different methods of culture (hanging, sitting suspension, surface).
6. Acetolysis test to demonstrate the nature of pollen wall.
7. Study to composition of wet and dry stigmatic papillae (Esterase, peroxidase, RNA, Proteins, PAS)
8. Multiple staining for localizing pollen tubes in the pistil.
9. DNA fluorochromes to study the nuclei of pollen grains and pollen tube.
10. Study of different types of endosperm, isolation of different embryonic stages.

2.6 -Practical –IV Based on 2.3

1. Preparation of stains, Fixatives, preservatives and pre-treatments to plant material.
2.Study of mitosis.
3. Preparation of karyotypes using Feulgen technique
4. Determination of mono, dihybrid and test cross ratio.
5. Mutation induction by EMS
6. Polyploidy induction by Colchicines
7. Genetics problems on linkage and crossing over, gene mapping and population genetics.
8. Techniques of Emasculation and hybridization.

OPEN ELECTIVE: MEDICINAL BOTANY

Teaching Hours per Week: 4
No. of Credits: 4

Unit 1 **12 HOURS**

History, scope and importance of medicinal plants. A brief account of Indigenous medicinal sciences- Ayurveda, Siddha and Unani. Brief account of herbal formulations and preparations.

Unit II **13 HOURS**

Plant identification- Elementary knowledge of Binomial nomenclature- Outline of Bentham and Hooker classification, Herbarium techniques and deposition of specimen in herbaria, Ethnic communities of India. Ethnobotany and folk medicine, Applications of ethnobotany.

Unit III **13 HOURS**

Study of some important medicinal plants with reference to their systematic position, diagnostic features, methods of propagation and medicinal uses of Solanum trilobatum, Cardiospermumhalicacabum, Vitex negundo, Adathodavasica, Azadirachtaindica, Gloriosa superba, Eclipta alba, Aristolochiaindica, Phyllanthus amarus, Boerhaaviadiffusa, Curcuma longa, Ocimum sanctum, Centellaasiatica, Aloe vera, Coleus forskohlii and Costusspeciosus.

Unit IV **12 HOURS**

Methods of preparation of herbal extracts and phytochemical analysis. Antibacterial and antifungal activity assay of herbal extracts, Medicinal plants and plant products used in the treatment of Jaundice, cardiac problems, infertility, cancer and diabetes. Conservation of medicinal plants- In situ and Ex situ. IPR and Patenting.

Practicals:

1. Identification and medicinal value of locally available medicinal plants.
2. Morphology of the useful parts of important medicinal plants.
3. Methods of propagation of important medicinal plants.
4. Demonstration of solvent/s extract/s preparation using Soxhlet apparatus.
5. Demonstration of antibacterial/ antifungal activity using medicinal plant extracts.

References:

1. Trivedi, P. C. (2006). Medicinal Plants: Ethnobotanical Approach, Agrobios, India.
2. Purohit and Vyas, (2008). Medicinal Plant Cultivation: A Scientific Approach, 2nd edn. Agrobios, India.
3. Yoganarasimhan, S. N. Medicinal Plants of India- Vol 1- Karnataka, Interline Publishing Pvt.
4. Gokhale, S. S., Kokate, C. K. and Purohit, A. P. (1994). Pharmacognosy. NiraliPrakashan. Pune.
5. Tyagi and Dinesh Kumar (2005). Pharma Forestry. Field Guide to Medicinal Plants. Atlantic Publishers and Distributors, New Delhi.
6. Singh and Jain (1985). Taxonomy of Angiosperms. Rastogi Publications, Meerut.
7. Sinha R. K. and Shweta Sinha (2001). Ethnobiology. Surabhe Publications – Jaipur.

8. Pal, D. C. and Jain, S. K. (1998). Tribal medicine. Naya Prakash, Bidhan Sarani, Calcutta.
9. Jain, S. K. (1995). Contribution to Indian ethnobotany. 3rd edition, Scientific publishers, Jodhpur, India.
10. Jain, S. K. (1995). A Manual of Ethnobotany , 2nd edition.
11. John R. Dean. (2010). Extraction Techniques in Analytical Sciences John Wiley & Sons, Ltd. UK. 12. Surhone, L. M., Tennoe, M. T. and Henssonow, S. F. (2011). Soxhlet Extractor. Betascript Publishing. Germany.
13. Schwalbe, R., Moore, L. S. and Goodwin, A. C. (2007). Antimicrobial susceptibility testing protocols. CRC Press, Taylor and Francis Group, Boca Raton, London, New York.

III SEMESTER

3.1 PLANT PHYSIOLOGY

Teaching Hours per Week: 4
No. of Credits: 4

UNIT-I. **12 HOURS**

Bioenergetics - First and second law of thermodynamics. Relation between free energy change and equilibrium constant. Reduction potential. Relation between reduction potential and free energy change. Water uptake, transport and transpiration, Stomatal physiology, mechanism and regulation of guard cell Hexose catabolism – Study of Glycolysis and citric acid cycle and its regulation.

UNIT-II. **13 HOURS**

Oxidative phosphorylation and photophosphorylation. Electron transfer reaction in mitochondria. Light absorption by chloroplast pigments. Light harvesting complexes. Macromolecular organization of chloroplast membranes. Carbohydrate biosynthesis and inter conversions. Photosynthetic carbon reduction cycle and its regulation. C4 pathways and photorespiration. CAM plants. Biosynthesis of sucrose, starch and cellulose.

UNIT-III. **13 HOURS**

Lipid metabolism – fatty acid biosynthesis and oxidation. Biosynthesis and catabolism of storage lipids. Biosynthesis and functions of membrane lipids. Membrane transport – organization of transport at plasma membrane and Tonoplast pumps, carriers and ion channels, P-type and V- type, ATPases, ABC transporters. Regulation of membrane transport in guard cells.

UNIT-IV. **12 HOURS**

Nitrogen metabolism – uptake of nitrate and its reduction; catalytic and genetic regulation of nitrate reductase. Symbiotic nitrogen fixation, mechanism of action of nitrogenase. Plant growth regulators-synthesis, mechanism of action and functions of auxins, gibberellins, cytokinin’s, ethylene, abscisic acid.

REFERENCES:

1. Essential of Biophysics, P. Naryanan. New Agri International publisher, 2000.
2. Fundamentals of Biochemistry. D. Vote, J.G. Vote, and C.W. Pratt, John Wiley an Sons 1999.
3. Physical Biochemistry, K.E Van Holde, W.C. Johnson and P. Shing Ho, Prenta Hall International IN. 1998.
4. Plant Biochemistry, P.M dey and J.B. Harborne, Harcourt Asia Ltd. Academic press, 1997.
5. Salisbury F.B. Plant Physiology. Thomson.
6. Signal and Signal transduction pathways in plants. K. Palme (Ed.) Kluwer Academic publishers 1994.

7. Smith H. Phytochrome and photomorphogenesis: An introduction to the photocontrol of plant development. McGraw Hill London.
8. Taiz L. and Zeiger E. Plant Physiology. Panima, New Delhi.
9. Zimmermann M.H. Xylem structure and ascent of sap. Springer.

3.2 CELL AND MOLECULAR BIOLOGY

Teaching Hours per Week: 4
No. of Credits: 4

UNIT-I **13 HOURS**

Microscopy: Concepts and applications of Light, Phase contrast, Fluorescent and Electron microscopy. Autoradiography, Cell fractionation and Centrifugation technology.

Chromosome: Organization of chromatin – nucleosome model, Euchromatin and heterochromatin, constitutive and facultative heterochromatin, rearrangement, repetitive and non- repetitive DNA, C-value paradox, structure and organization of telomere, centromere and kinetochore.

Central dogma of molecular biology, Fine structure of gene, Concept of split gene, Gene families, Overlapping gene, Pseudo gene and cryptic gene. Molecular markers and their applications.

Unit – II **12 HOURS**

Cell cycle- Regulation of CDK-cyclin activities, cellular check points, DNA damage and repair-Excision repair, Post replication repair, Mismatch repair, SOS response and mutagenesis, transcription couples repair in prokaryote and eukaryotes.

Mutation: Chemical and radiation mutagens, molecular basis of mutations and their role in evolution and cancer development. Oncogenes, Proto-oncogenes, P53 gene, Tumour suppressor genes, RB gene, E2F gene, RAS genes.

Unit – III **12 HOURS**

Transposable elements: Retro-elements, mechanism of transpositions, Prokaryotic transposons: Insertion and composite sequences, AC-DS elements in Maize, Transposable elements in man, Applications of transposons in research and health care system. Human genome project.

Expression of Genome: Transcription - RNA polymerase-types, structure and function, mechanism of transcription-initiation, elongation and termination in prokaryotes and eukaryotes. RNA processing-capping, polyadenylation, splicing, alternate splicing, exon shuffling, structural organization of m-RNA, t-RNA and r-RNA, m-RNA transport.

Unit – IV **13 HOURS**

Translation: t-RNA identity, amino acylation of t-RNA, amino acyl synthetase, mechanism of translation-initiation, elongation and termination, proof reading, translational inhibitors, post translational modifications of proteins.

Gene regulation in prokaryotes: Concept -Lac operon-positive and negative control, tryp – operon, Gene regulation in phages and viruses, A detailed study of Gene regulation in eukaryotes.

References:

1. A.K. Tobin, 1992, Plant organelles compartmentation of Metabolism in Photosynthetic tissue, Cambridge University, Press.
2. G. Shanmugam, 1988, Cell Biology Lab Manual, Mac. Millan, India Ltd., Madras.
3. Gamer, E.J. and Sherstal. D.P. Principles of Genetics, 6th Ed. John Wiley and Sons, New York, Garland Publishers, 1999
4. Genes IX– Benjamin Lewin, Jones and Bartlett, 2008
5. Genes X– Benjamin Lewin, Jones and Bartlett, 2011
6. George, M. Malacinski, 1986, Macmillan publishing co., New York. Molecular Genetics of Mammalian cells.
7. H.S. Bhamaah, 1990, Molecular cell Biology, Anmol Publication New Delhi.
8. H.S.Bhamrah, 1990. Molecular cell Biology, Anmol Publications, New Delhi.
9. Herkwitz, I.W. 1977, Principles of Genetics, 2nd Ed. Macmillon Publ. Co., New York.
10. James Jorwell, Honey Ladish, 1986. Molecular cell biology scientific American Books. New York. P.S. Verma and V.K. Agarwal, 1999. Cell Biology and Genetics S. Chand and company Ltd., New Delhi.
11. Lewin B. 2004. Genes 8th Ed. John willey and sons. New York.
12. Molecular Biology of the Cell – Alberts, B, Bray, D, Raff, M, Roberts, K and Watson JD.
13. Prescott, D.M.1988 Cells: Principles of Molecular structure and function. Johes and Bortlet pub. Boston.
14. Reeta Arora, 1988. Cell Biology,Anmol Publications New Delhi 19. G.Shanmugam, 1998. Cell Biology Lab Manual, Macmillan India Ltd., Madras.
15. RoerlMiesfeld, 1999, Applied Molecular Genetics, Wiley's Liss Publication.
16. S.C. Rastogi, 1995, Concepts, in Molecular Biology. Reeta Area, 1998, Cell biology, Anmol Publications, New Delhi.
17. S.C.Rastogi, 1995. Concepts in Molecular Biology.
18. Strickberg, M.W.1985. Genetics 3rd Ed.Macmillan Pub. Co., New York.
19. Syenga. I. 1972, General cytogenetics, North Hapland Pub. Co.
20. Waston, I.D. Et. Al. 1965. Molecular, Biology of the gene. 4th Ed.

3.3 MEDICINAL PLANTS AND HERBAL DRUG TECHNOLOGY

Teaching Hours per Week: 4
No. of Credits: 4

UNIT-I. 12 HOURS

History, scope and importance of medicinal plants. A brief account of Indigenous medicinal sciences- Ayurveda, Siddha and Unani. Brief account of herbal formulations and preparations. Ethnic communities of India. Ethnobotany and folk medicine, Applications of ethnobotany. Organization and institutes: national medicinal plant board (NMPB) foundation for revitalization of local health tradition (FRLHT) national botanical research institute (NBRI) central institute for medicinal [and aromatic plants (CIMAP) AYUSH

UNIT-II 13 HOURS

Importance & scope of post-harvest management of crop, fruits and vegetables in Indian.Economy, Importance of post-harvest loss management in crops, flowers and fruits.Pre- and Post-harvest factors affecting shelf life of crops, flowers and fruits. Packing techniques- grading, containers, cushioning, vacuum packing, canning, bottling, freezing, dehydration, drying, UV and Ionizing radiations. Principles of preservation by heat, low temperature, chemicals and fermentation. preservatives and colors permitted and prohibited in India. Storage techniques- Zero Energy Cold Storage Chambers and On Farm Storage facilities.Microbial contaminants and post-harvest pathology in crops, flowers and fruits.

UNIT-III. 12 HOURS

Database of medicinal plants, Methods of preparation of herbal extracts and phytochemical analysis. Antibacterial and antifungal activity assay of herbal extracts, Medicinal plants and plant products used in the treatment of Jaundice, cardiac problems, infertility, cancer and diabetes. Conservation of medicinal plants- In situ and Ex situ. IPR and Patenting, threatened medicinal plants.

UNIT-IV 13 HOURS

Method of isolation and estimation of the following drugs; Forskolina from Coleus forskaoli L-Dopa from MucunapruriensAlicin- alliun sativa Piperine from piper nigram Catechines from camellia sinensis (green tea). Study of some important medicinal plants with reference to their systematic position, diagnostic features, methods of propagation and medicinal uses of Solanum trilobatum, Cardiospermumhalicacabum, Vitex negundo, Adathodavasica, Azadirachtaindica, Gloriosa superba, Eclipta alba, Aristolochiaindica, Phyllanthus amarus, Boerhaaviadiffusa, Curcuma longa, Ocimum sanctum, Centellaasiatica, Aloe vera, Coleus forskohlii and Costusspeciosus.

References:

1. Cultivation of selected Medicinal Plants published by National medicinal plants board, Department of AYUSH, Ministry of Health and Family Welfare Government of India,Chandralok Building, 36, Janpath, New Delhi 110001.
2. Dynamics of Medicinal and Aromatic Plants by Singh, H.P., Sunita T. Pandey and Babita Singh. Indus valley Publication
3. Demand and supply of Medicinal Plants in India by D.K. Ved and G.S. Goraya by Gajendra Singh Gahlot for M/s Bishen Singh Mahendra Pal Singh, Dehra Dun, India and Foundation for Revitalisation of Local Health Traditions Bangalore, India.
4. Handbook of Horticulture Edited by K.L. Chadha and published by Directorate information and publication of Agriculture, Indian Council of Agricultural Research Krishi Anusandhan Bhavan, Pusa, New Delhi 1100 12.
5. Aromatic and Medicinal Plants by M.P. Shiva, AlokLehri and Alka Shiva. International Book Distributors, 9/3, Raipur Road, 1st floor, P.Box No. 4, Dehradun248 001.
6. Medicinal Plants Field and Laboratory Manual for identification with its phytochemical and in vitro studies data by S. Farooq. International Book Distributors, 9/3, Raipur Road, 1st floor, P.Box No. 4, Dehradun248 001.
7. Indian Medicinal Plants – Kirtikar and Basu, B.O.
8. The Medicinal and Poisonous Plants of India – J.F.Calus
9. Medicinal Plants of Arid Zone – UNESCO Publication
10. Some Useful Aromatic Plants – R.L. Bachawar
11. Indigenous Medicinal Plants – P. Kaushik
12. Drug Plants of India – V.S. Agrawal and B.Ghosh.
13. OshadhiDarshani (Information on cultivation of medicinal plants, growers and traders compiled by Dr. K.P. Srivasuki. Publised by Andhrapradesh medicinal and Aromatic plants board, Hyderabad.
14. A Handbook of Medicinal Herbs by D.J. Despande. Published by Agrobios (India) AgroHouseAgro-technique of selected medicinal plants. CD published by National medicinal plants board, Department of AYUSH, Ministry of Health and Family Welfare Government of India, Chandralok Building, 36, Janpath, New Delhi 110001.
15. Phytosanitation, HACCP, GM fruits and vegetableFood Biotechnology, by Roges, A. 1989. Elsevier Applied Sci. Pub., London, U.K.
16. Functional Foods by Goldberg, I. 1994. Chapman and Hall, New York.
17. Postharvest physiology and storage of tropical and subtropical Fruits,2005, CABIPublishing.
18. Postharvest by Wills, Mcglasson, 2007, CABI.
19. Jain, S. K. (1995). Contribution to Indian ethnobotany. 3rd edition, Scientific publishers, Jodhpur, India. 10. Jain, S. K. (1995).
20. A Manual of Ethnobotany, 2nd edition. 11. John R. Dean. (2010). Extraction Techniques in Analytical Sciences John Wiley & Sons, Ltd. UK.

Practical-V Practical's based on 3.1

1.Effect of time and enzyme concentration on the rate of enzyme action.
2. Effect of substrate concentration and pH on enzyme action.
3. Extraction of total lipids from plant tissue purification by column chromatography analysis by TLC
4. Determination of lipase activity in germinating seeds.
5. Determination of chlorophyll a/b ratio in C3 and C4 plants.
6. Crassulacean acid metabolism.
7. Estimation of proline from stressed plants.
8. Gibberellin induction of amylase activity in cereal grains.
9.Bioassay of Cytokinin concentration using test system of greening of cotyledons.
10. Effect of light, K, Ca and some inhibitions and against stomatal opening.
11. Determination of Photosynthesis rates in C3 and C4 plants using IRGA.

Practical-VI Practical's based on 3.2

1. Identification of different stages of mitosis and study of morphology of metaphase chromosomes from Onion root meristems. (Allium/Maize)
2. Determination of chromosome number at mitotic metaphase and diakinesis/metaphase I of meiosis Maize/Allium/Rhoeo/Aloe/ Tradescantia and translocation heterozygote in Rhoeo.
3. Karyotype analysis in Allium and Aloe
4. Study of Polytene chromosome in Chironomus larvae/Fruit fly.
5. Estimation of DNA by Diphenyl method
6. Estimation of RNA by Orcinol method
8. Demonstration of microscopes (phase contrast, fluorescence, SEM, TEM) Charts and photographs and Videos.

Practical-VI based on 3.3

1. Identification and medicinal value of locally available medicinal plants.
3. Methods of propagation of important medicinal plants.
4. Demonstration of solvent/s extract/s preparation using Soxhlet apparatus.
5. Demonstration of antibacterial/ antifungal activity using medicinal plant extracts.
6. Estimation of total amino acids in germinating and non- germinating seeds
7.Estimation of ascorbic acid in ripe and unripe fruits.
8.Agarose gel electrophoresis for separation of DNA Charts/models and photographs

3.4 OPEN ELECTIVE PLANT PROPAGATION TECHNIQUES (THEORY)

Teaching Hours per Week: 4
No. of Credits: 4

Unit-I **12 HOURS**

History, scope and importance of plant propagation, propagation structures, green house equipment's and media, seed propagation, structure of seeds, techniques of seed production types of seeds –recalcitrant, orthodox, post-harvest handling of seeds.

Unit-II **13 HOURS**

Vegetative propagation: techniques of propagation by cutting, stem cuttings- hard wood, semi hard wood, soft wood and herbaceous, leaf cuttings, leaf bud cuttings, root cuttings. Biology and techniques of grafting: Whip and tongue, wedge and cleft, bark, side grafting approach.

Unit-III **12 HOURS**

Techniques of budding: T- budding, patch budding chip budding ring budding. Layering and its natural modifications: simple layering tip layering, mound and stool layering air layering, compound and serpentine layering and trench layering. Propagation by specialized stem and roots

Unit-IV **13 HOURS**

Micro propagation techniques: cell and tissue culture techniques, media, growth regulators, micro and macro nutrients, sterilization techniques, MS media, root, bud.Advantage, limitations and applications of vegetative propagation, clones , genetic variation in asexually propagated plants, different methods. Propagation methods of some selected plants – citrus, grape, mango, mulberry, hibiscus, rose, croton, eucalyptus, banana, orchids, papaya, watermelon, potato, tomato, chilly, coconut, pepper, anthurium.Nursery techniques: composting, green house, planting mixture, vermicompost.

References:

1. Abbottt, A.J. and atkin R.K. 9eds (1987) improving vegetatively propagated crops, academic press, London.

2. Bose, T.K., Sadhu M.K. & Das, P. (1986) propagation of tropical and subtropical horticultural crops, Nowya Prakash, culcutta.

3. Hartmann and Kester (1983) plant propagation.

4. Hartmann H.T., kestere.D.davis, f.T. and geneve R.L. 1997 plant principle s and practices prentile hall of india private limited ,newdelhi.

5. Krishnamurthy H.M. (1981) plant growth substances including application in agriculture.

6. Pierik L.M. (1987) invitro culture of higher plantsmurtinusNijhoff pub. Dordrecht.

7. Razdan, M.K. (1994) an introduction to plant tissue culture, oxford and IBH pub.co. PVT Ltd. Bombay and Calcutta.

8. Mac Donald, B. (1987) practical woody plant propagation for nursery growers Portland OR timber press.

9. Sadhu, M.K. (1989) plant propagation Wiley eastern Ltd. New Delhi.

Practicals for open elective

1. Vegetative propagation: types of cuttings
2. Vegetative propagation: tapes of grafting
3. Vegetative propagation: types of budding
4. Vegetative propagation: types of layering
5. Propagation by modified stems and
6. Propagation by modifies roots.
7. Micro propagation: preparation of media, preparation of explants, culture, initiation of shoot. Multiplication (demon starvation)
8. Pot and green house implants (demonstration)

IV SEMESTER

4.1 MYCOLOGY & PLANT PATHOLOGY

Teaching Hours per Week: 4
No. of Credits: 4

MYCOLOGY

Unit-I **12 HOURS**

Mycology: Present status of fungi; Outline classification of fungi (Ainsworth-1973). Vegetative organization in fungi; Nutrition in fungi (saprotrophs, biotrophs, necrotrophs; symbiotrophs); Methods of reproduction in fungi - Asexual and sexual methods; Spore liberation in fungi; Evolution of sex in fungi; Heterothallism and parasexuality; Life cycle pattern and phylogeny of Myxomycotina, Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina and Deuteromycotina; Fungi and their economic importance. Somatic incompatibility – Systems in Ascomycetes and and Basidiomycetes in culture and in nature, parasexuality.

Unit-II **13 HOURS**

Fungal physiology: Nutrition of carbon, nitrogen, mineral, vitamin and growth regulators, metabolism and biosynthesis of carbohydrates (Including chitin) non carbohydrate (organic acids and lipids) and nitrogen (including lysine, amino acids, nucleic acids and proteins) secondary metabolites and their role. Fungal genetics: Fungi as organism for genetic study, genetic markers, isolation and selection of mutants, tetrad analysis. Industrial application of fungal genetics and strain improvements.

PLANT PATHOLOGY

UNIT-III **12 HOURS**

Introduction and history of plant pathology – Plant diseases caused by fungi, bacteria, virus and nematodes, The concept of disease in plants, Classifications of plant diseases. Genetic engineering and plant pathology, Significance of plant diseases, Plant diseases and world crop production, Effects of changes in agricultural methods and in human society on the development and spread of plant diseases, Diagnosis of plant disease. Parasitism and disease development –Attack of pathogens: Mechanical force exerted by pathogens in host tissues, Chemical weapons to pathogens, enzymes, Microbial toxins on plant diseases, Growth regulators in plant diseases.

Unit-IV **13 HOURS**

Plant defense mechanism against pathogens – structural metabolic pre-existing biochemical. Environmental effects on infections: Effect of temperature, soil, pH moisture, wind, light, Host – plant nutrition. Herbicides and pesticides. Plant disease epidemiology, The elements of an endemics, Measurement of plant disease, pattern, Comparison, Development, modeling computer simulation, forecasting of plant disease endemics. Management and control of plant diseases: Control methods that exclude the pathogen from the host, Control methods that

eradicate the pathogen inoculums. Cultural methods, Biological methods. Environmental factors that cause plant disease. General Chrematistics, Diagnosis, and control, Temperature effects,Moisture effects. Air pollution, nutritional deficiencies in plants. The often Confused Etiology of stress disease**.**

References:

1. "A higher level phylogenetic classification of the Fungi". Mycological Research 111(5): 509–547. doi:10.1016/j.mycres.2007.03.004. PMID 17572334. 3. 21stcentuary guidebook of fungi, David Moore, Geoffrey D. Robson, Anthony P. J. Trinci:Cambridge university press. 2011.
2. Agrios, G. N. 2005. Plant Pathology 5th edn. Academic Press, San Diego.
3. An introduction to fungi: by H.C. Dube, Scientific publisher India, fourth edition, 2015.
4. Biodiversity of fungi: Inventory and Monitoring methods by M. S. Foster, G. F. Wills and J. M. Mueller, first edition, Academic Press, 2004.
5. Mycoremediation: Fungal Bioremediation by Harbhajan Singh, first edition, John Wiley and Sons, Hoboken, New Jersey, 2006.
6. Dickinson, M. 2003. Molecular Plant Pathology, Garland Publishing Inc, CT.
7. Fungal Biology by J. W. Deacon, forth edition, Blackwell Publishing Ltd, 2006.
8. Hibbett DS, Binder M, Bischoff JF, Blackwell M, Cannon PF, Eriksson OE, et al. (2007).
9. Ingram,D.S. and Robertson, N.F. 1999. Plant Diseases, Collins Publishers, London.
10. Introduction of Fungi by John Webster and Roland Weber, Third edition, Cambridge
11. Introductory Mycology by Alexopolous J., Mims C. W. and M. Blackwell, fourth edition,
12. Johnston, A and Both, C. 1983. Plant Pathologists Pocket-book. 2nd edn. Commonwealth Mycological Institute, Oxford and IBH Pub. Co. Calcutta.Kolkata, 2007.
13. Topics in Mycology and Pathology by L. N. Nair, first edition, New Central Book Agency
14. University Press, 2007. Wiley India Pvt Ltd, 2007**.**

4.2 ECOLOGY AND ENVIRONMENTAL BIOLOGY

Teaching Hours per Week: 4
No. of Credits: 4

Unit-I **12 HOURS**

History and scope of ecology and environmental biology: ecosystem – concept, structure, types, components, functions and dynamics. Energy flow in the ecosystem, tropic levels food chains food web ecological pyramid. Biogeochemical cycle; hydrological cycle, gases nutrient cycle, and sedimentary nutrient cycle. Major terrestrial ecosystem of the world- disserts, grasslands, savanna, tundra, forest.

Unit-II **13 HOURS**

Population ecology- growth and charecteristics of populationation natality, mortality, life table, age structure, concept of carrying capacity, concept of density dependent and density independent action in population control, Biotic community- concept, structure, dominanve, fluctuation and succession, ecological niche- intraspecific asnd inter specific interactions allelopathy preadation.-prey relationship.system ecology and ecological models.

Unit-III **12 HOURS**

Major aquatic ecosystems of the world- fresh water ecosystem, marine ecosystem, Plant indicators in pollution. Global environment problem, ozone depletion, global warming and climatic change. Basics of chemical ecology, Plant mimicry, Pollination ecology, carbon sequestration, Ecosystem services, Ecology and climate change.

Unit-IV **13 HOUR**

Study of Intellectual Property Rights – patents, trademark, geographical indication, copyright; IPR and Traditional Knowledge; Bio-piracy of traditional knowledge, National and international organizations and treaty related to traditional knowledge – WIPO, TKDL, TRIPS, CBD, Nagoya protocol. linkage between resources livelihood, energy security, sustainability, ecological planning.

References:,

1. Muller Dombois J. And Ellenberg, H. (1974) aims and methods of vegetation ecology Wiley, new york.

2. Odum, E.P. 91971) fundamentals of Ecology, saunders, Philadelphia.

3. Kormondy, E. J. (1996) concepts of ecology, prentice hall, India, New Delhi.

4. Foin, T.C. (1976) ecological system and environment, Mifflin, boston.

5. Nobel B.J. and Wright, R.T. (1996) environmental science, prentice hall New Jersey.

6. Lillesand T.M. and Kiefer R.W. (1987) Remote sensing and image interpretation , John Wiley and sons, new York.

7. Agarwal, S.B. and Agarwal, M. (Ed.) (2000) environmental pollution and responses, CKC press, London.

8. Koshoo, T. N. (1991) environmental concept and stragiesashish publ. House, new delhi.

9. Colinvaux P.C. (1993) ecology John Wiley and Sons, New york.

4.3 PLANT BIOTECHNOLOGY

Teaching Hours per Week: 4
No. of Credits: 4

Unit I **12 HOURS**

Introduction: Definition Old and New Biotechnology. An interdisciplinary activity, Scoped and importance, commercial potential, Biotechnology centres in India.
Genetic Engineering: Introduction, Genetic Engineering of microorganisms, Tools in Genetic Engineering Enzymes in genetic engineering - restriction endonucleases, types and their actions, other DNA modifying enzymes, Cloning vectors- plasmids isolation and purification - Ti Plasmid, pBR322, pUC-series. Phage vectors-M13 phage vectors, Cosmids -types, phasmids or phagemids, shuttle vectors-types; YAC and BAC vectors, Lambda phage vectors, Lambda phage DNA as a vectors, Cloning vectors and expression vectors, Vectors for plant cells, Direct transformation methods.

UNIT II **13 HOURS**

Plant Tissue Culture: Scope and importance of plant tissue culture , Basic requirements for tissue culture laboratory, composition of tissue culture medium ,explants for organogenesis, Micro propagation, embryo and endosperm culture, somatic embryogenesis, variation and cell line selection, androgenesis and microspore culture, significance of haploids, diploidization and bulbosum technique, Somatic Hybrids- Isolation and protoplast culture and somatic hybridization and its significance, Somaclonal variations. Role of tissue culture technology in crop improvements.

Unit III **13 HOURS**

Industrial Biotechnology: Introduction, Industrial microbial products: Alcohol production (Beer), Antibiotics production (penicillin), production of Vitamins (Vitamin B12), production of Single Cell Protein, Algal protein: (Spirulina) Fungal protein: (Mushroom) and economic aspects**.**Genetic engineering of plants for delayed ripening and better shelf life.
Biofuels: Introduction, Production of biogas, Structure of biogas plant, Biochemistry of methane production, Biogas research in India, Uses of biogas.
Biofertilizers: Introduction, Types, Blue green algae, Sea weeds, Azolla, Vesicular arbuscular mycorrhizal fungi and Rhizobium.

Unit IV **12 HOURS**

The genetic manipulation of herbicide resistance, strategies for engineering herbicide resistance, the environmental impact of herbicide-resistant crops, The genetic manipulation of pest resistance-GM strategies for insect resistance, Bacillus thuringiensis approach to insect resistance, insect resistant crops and food safety. Virus free plant production, Transgenic approaches to viral and bacterial disease resistance.Engineering for stress tolerance -The nature of abiotic stress, the nature of water deficit stress, targeted approaches towards the manipulation of tolerance to specific water deficit stresses.

REFERENCES:

1. Glazer, A.N and Nikaido. H. 1995. Microbial Biotechnology. W.H.Freeman And co. New York.

2. Gliek Barnard and Pasternak, Jack.J.1996. Molecular Biotechnology principles and application of recombinant DNA: Pavan publishers. New Delhi.

3. Kumar.H.C. 1992. Text book on Biotechnology. East west press. New York.

4. Walker.J.M and Gingold. W.B. 1989. Molecular Biology and Biotechnology. 2nd edition. Royal Society of chemistry, London.

5. Keshav Trehan.1990. Biotechnology. Wiley Eastern/td. New Delhi.

6. Gaurd.R.S. Gupta.G.D and Gukhade.S.B.2000. Practical Biotechnology: Nirali park ashan publishers. Pune. 33

7. Firn.R.K and Prave.P Biotechnology. 1988. Hanser Publisher publication. New York.

8. Dube.H.C.1991. Fungi and Biotechnology. Todays and tomorrow's Printer and Publishers. New Delhi.

9. Stanbury.P.F and Whitaker.A. 1985. Principles and Fermentation technology pergaman press. Oxford.

10. Wiseman.A.1987. Hand book of enzyme Biotechnology. Ellis Horwood ltd. New York

11. Tejovathi.G, Vimala.Y and Rekha Bhadauria, 1996. A practical manual for plant Biotechnology. CBS publishers and distributors. New Delhi.

12. Narayanan. L.M., Selva Raj, A.M., Mani.A and Arumugam.N.1998. Molecular Biology and Genetic Engineering. Saras publication. Nagercoil. India.

13. Colin Ratledge and Bjorn Kristainsen.2004. Basic Biotechnology. Cambridge University press London.

14. Snyder.L. and Champness, W. 1997. Molecular Genetics of Bacteria. American Society for microbiology. Washington DC.

15. Asenjo, J.A.1990. Separation process in Biotechnology. Marcel Dakker, New York.

4.4 Research methodologies and Techniques in Botany

Teaching Hours per Week: 4
No. of Credits: 4

Research Methodology

UNIT I **13HOURS**

Foundations of Research: Meaning, Objectives, Motivation, Utility, types of research (Descriptive vs analytical; applied vs fundamental; quantitative vs qualitative; conceptual vs empirical). Research methods vs methodology.

Methodology: Literature review, Defining the research question, Approaches and Methodology, Documentation and presentation of data, Analysis and interpretation of data, manuscript preparation.

UNIT II **12 HOURS**

Interpretation of Data and Paper Writing – Layout of a Research Paper, Journals in Botanical Science, Impact factor of Journals, When and where to publish? Ethical issues related to publishing, Plagiarism and Self-Plagiarism.

Techniques in Botany

UNIT III **12HOURS**

Biostatistics: Measures of Central tendencies (Mean, mode, median,) Standard deviation, Dispersion and Variability. The variance and coefficient of variation, Correlation and regression, ANOVA, Chi square test for goodness of fit and independence.

UNIT IV **13HOURS**

Computer application in Biology: bioinformatics, plant databases and their applications.

Culture Technique: Basic laboratory principles and techniques Principles, types, plant media preparation, sterilization, inoculation, Equipment's and instruments -Laminar air flow, autoclaves, thermo bath, and incubators.

References

1. An Introduction to Biometry- Mungikar, A. M. (1997), Saraswati Printing Press Aurangabad.
2. Dawson, C. (2002). Practical research methods. UBS Publishers, New Delhi.
3. Methods in Experimental Biology.-Ralph, R. (1975).Blakie, London
4. Plant Tissue Culture: Theory and Practice, a Revised Edition by S.S. Bhojwani and M.K. Razdan.
5. Research Methodology For Biological Sciences (01 Edition, 2013)- Gurumani, N. (2013), MJP Publishers
6. Ruzin, S.E. (1999). Plant microtechnique and microscopy. Oxford University Press, New York, U.S.A.

7. Stapleton, P., Yondeowei, A., Mukanyange, J., Houten, H. (1995). Scientific writing for agricultural research scientists – a training reference manual. West Africa Rice Development Association, Hong Kong.

Practical-VII Practical's based on 4.1, 4.2 and 4.3

1.Rhziosphere, Rhizoplane, phylloplane studies of fungi.

2. Fungal physiology – Growth on different carbon source media and nutritional studies.

3.. Disease of cereal crops. a) Blast disease of Rice. b) Yellow smut of wheat. c) Loose smut of wheat. d) Downy mildew of sorghum. e) Anthracnose of sorghum

4. Disease of plantation crops. a) Downy mildew of grapes. b) Leaf rust of coffee. c) Tikka disease of ground nut. d) Late blight of potato.

5. Estimation of spore production of fungal pathogens of leaves using Haemocytometer method.

6. Water Analysis: a. Estimation of BOD and COD

7. Estimation of PO4, SO4 and NO3. c.

8.Estimation of Major Cations- Na, K, Ca, Mg and Salinity

9. Field excursion to an industrial area to assess environmental impact.

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B.Sc II Semester Syllabus

ZOOLOGY (Optional) 2017-18 Onwards

Total Marks-80 Total Teaching-50hrs.

Biology of Chordates

UNIT-I

Chordates: General characters and classification. **8 hrs**

1. Sub-phylum:Hemichordata-External Characters & Digestive system of Balanoglossus.
2. Sub-phylum:Urochordata- External Characters & Retrogressive metamorphosis in Herdmania.
3. Subphylum:Cephalochordata-ExternalCharacters & feeding mechanism in Branchiostoma.
4. Cyclostomata: External Characters &general organisation of Petromyzon & Myxine(Hagfish/Slime).

UNIT-II

Pisces: General characters & Classification of Pisces up to orders with examples. General characters of Chondrichthyes and Osteichthyes.Type study **Scoliodon**-Externals Characters, Digestive system, Reproductive system and Fish migration. **5hrs**

Amphibia: General characters & classification up to orders with Examples. Type study **Frog**- Externals characters, Digestive system, Circulatory & Reproductive system. Axolotl larva & its significance. **5hrs**

UNIT-III

Reptilia: General characters & classification up to orders with Examples. Type study **Calotes**-Externals characters, Digestive system, Circulatory & Reproductive system. Indian poisonous & non-poisonous snakes. **5hrs**

Aves - General characters & Classification up to orders with. Examples Type study **Pigeon**-Externals characters, Digestive System, Respiratory & Reproductive system. Bird migration, Flight adaptations, Flightless birds, Beak & Feet modification. **10hrs**

UNIT-IV

Mammalia: General characters & classification up to orders with Examples Type study **Rat**-Externals characters, Digestive System. Circulatory, Nervous, Excretory& Reproductive Systems. **5hrs**

Comparative Anatomy:
Origin, development & structure of Heart, Brain and integument in Fishes, Amphibians, Reptiles,Aves and Mammals. **12 hrs**

PRACTICALS

Total Practicals -12

1. Classification of Urochordata,Cephalochordata,Cyclostomes **01**
   Examples: Balanoglossus, Herdmania, Branchiostoma. Peteromyzon.
2. Classification of **Fishes** - **01**
   Examples: Scoliodon, Pristis, Sphyrna, Catla catla, Labeo rohita, Hippocampus, Eel, Exocoetus & Synaptura.
3. Classification of **Amphibia** - **01**
   Examples: Frog, Toad, Ichthyophis, Ambystoma, Axolotl Larva & Rhacophorous.
4. Classification of **Reptilia**- **01**
   Examples: Calotes, Hemidactylus, Chaemaleon, Mabuya Draco, Naja naja, Python, Viper, Turtle and Crocodile.
5. Classification of **Aves** - **01**
   Examples: Psittacula, Owl, Woodpecker, Pigeon and Passer domesticus.
6. Classification of **Mammalia** - **01**
   Examples: Sorex, Bat, Loris, Pangolin, Hystrix, Herpetes & Funambulus.
7. **Study of Comparative Anatomy**:
   Heart and Brain in Fishes, Amphibians, Reptiles, Aves and Mammals **02**
8. Explanation & Demonstration in Bony fish/Shark. **04**
   a). External characters
   b). Digestive system
   c). Reproductive system
   d). Mounting of Brain

NOTE:

1. With the help of Charts/Models/Diagrams/Printouts & Xerox Sheets are used in practical's demonstration.
2. As per UGC guidelines **Only one** species to be demonstrated by Faculty & students should not do any dissection.
3. Students are supposed to draw neat labelled diagrams & write The explanation in their journal.
4. In practical examination question no I & II are put Charts/ Models/ Diagrams/ Printouts & Xerox Sheets of the system- Students has to identify& write the explanation in their Examination paper.
5. Compulsory Study Tour/ Field visit to study Animal diversity. (Submission of project report carries- 5 marks).

REFERENCE BOOKS

1. Modern Text Book of Zoology Vertebrate-R.L.Kotpal.
2. Chordata – Dhami & Dhami.
3. Vertebrate- Majapuria.
4. Functional Organization of Vertebrate-- H Nigam & R.Sobti- Shoban Lal Nagin Chand & Co.
5. A manual of Zoology Vertebrates- M.Ekambarnath Ayyar & Swaminathan Ayyar S. Vishwanath Publisher.
6. The Vertebrates Pisces to Mammalia, Hyman L.H. McGraw Hill Co
7. The Vertebrates – Hyman et al.
8. Text Book of Zoology – Parker T.J. & Haswell W.A. Macmillan Co. London.
9. Biology of Chordates by Dr Harish .C. Nigam.Vishal Publication Lucknow.

RANI CHANNAMMA UNIVERSITY, BELAGAVI

WEL-COME

TO THE COURSE STRUCTRE AND SYLLABUS OF UNDERGRADUATE PROGRAMMES – B.Sc

V Semester

w.e.f.

Academic Year 2016-17 and onwards

11. ZOOLOGY (OPTIONAL)

BSc-Zoology (Optional) Fifth Semester

Paper 5.1 and 5.2 Outline

STRUCTURE

Semester	Syllabus	Hour's
V Paper I	Ecology, Evolution, Paleontology, Zoogeography & Wild life Conservation	50
V Paper -II	Genetics, Biotechnology & Biostatistics	50

B Sc V Semester (5.1)

Paper-I

ZOOLOGY (optional)

(Ecology, Evolution, Paleontology, Zoogeography, Wild life Conservation)

Total-hours,50

Marks-80

Ecology.

Earth as Living.-Planet. Sub divisions_of ecology, Scope of ecology, Biosphere
1 hr

Abiotic factors ___
Light, Temperature (Effect on Animals and Plants)
2hr

Biotic Factor

Mutualism,Commensalism,Amensialism,Parasitism,Predation
2hrs
,Compitition,Parasitism.

Habitats
4hrs

Freshwater habitat — Lotic and Lentic systems
Zonation of Sea,Marine Biota, Esturine ecology, & Mangrooves
Terrestrial habitat — A brief account of Biomes.

Ecological Adaptations — Freshwater, Marine and Terrestrial.

Biogeochemical Cycles - Principles and concepts of Water, Nitrogen, Carbon,
2hrs
Oxygen cycles

Community Ecology-Community structure, Ecological niches, Edge effect, Stratification, Ecoton.
2hrs

Population Ecology: Density, natality, mortality.Age distribution

Population growth, types and curves.
2hrs

Evolution.

The Solar System
Origin of Earth , Origin of Life and its theories
03hrs

The geological time scale
03hrs

Fossils: Definitioni and Kinds of fossils, How fossils are formed, Methods of Preservation. Connecting links and Living fossils. The importance of fossils
02hrs

Theories of Organic Evolution :
06hrs

Lamarkism, Darwinism, Mutation Theory
And the Modern Synthesis Theory;(population gene Pool, Gene Frequencey . Variations — gene mutation, chromosomal mutation; Isolation and recombination.Genetic drift,Hardiwienberg equilibrium)

Modes of Evolution : Microevolution, Macroevolution and Mega-evolution.
02 hrs

,Evolution of Man and Horse 04 hrs

Paleontology
Mesozoic reptiles with a note on Dinosaurs.
03 hrs

Zoogeography: Zoogeographical realms of world ,
A brief account of Wallace's line
03 hrs

Wildlife Conservation : 09hrs

Wildlife in India,Causes for the depletion of wildlife.
Wild Life Conservation Techniques', methods'and measures
Brief account of ; IUCN, WWF,Bombay Natural History Society, Indian Board for Wild Life, Red Data Book.
Wild Life Act 1972 and its amendments in India,CITES.
Project Tiger and Biosphere Reserve.

Total -11 Practicals

1; Study of fossils (vertebrate(3) and invertebrate(3).
1hrs

2. Mesozoic reptiles (Ichthyosaur, tyrannosaur, brontosaur, triceratops, archaeopteryx .
1hr

3. Evolution of man (Homo-erectus. Hemo-habills. Homo-neandertalences)
1hr

4. Evolution of Horse
1hr

5 ;Connecting links and living fossils (Neopilina, Peripatus, Limulus, Latimaria; Archaeopteryx and Duckbill platypus)
1hr

6 Study of threatened Animals of India (Tiger,Lion,singal horned rhinoceros
1hr
Musk deer,gaur,Golden langur,Loin tailed monkey.Python)
1hr

7 ;Estimation of co_2 from different water samples
1hr

8; Estimation of dissolved oxygen
1hr

9; Estimation of Total hardness
1hr

10;Study of Ecological Adaptations and Morphological peculiarities,;ex-Hermit crab, 1hr
Draco,Stick insect,puffer fish,Exocoetus,Phrynosoma,chamaeleon and Bat.

11;Visit to nearby water body to study Ecosystem
1hr

REFERENCE BOOKS:-

Evolution : Odum

Organic Evolution: N.Arumugam
Evolution, Dobzhansky, Ayala,Stebbins & Valantine
Environmental Biology.Rastogi and Company,Meerut
Evolution of the Vertebrates, Colbert E.H. John Wiley and Sons, New York
Ecology;Principles and Application.chapman,Cambridge university press
Environmental Biology P.R.Trivedi and gurudeep Raj.
Recent Advances in Environmentai Biology –Diwan and D.K.Arora
Environmental Science;Eldon.D.Enger andBradly.F,Smith

Suggestions for Practical Examination

SEM — V-5.I

Q. NO I) Estimation of Carbondioxide/O xgen/Total hardness 8marks

Q.NO II) Evolution (Two spottings) 4 marks

Q NO III) Fossils (Two spottings) 4 marks

Q NO IV) Identification (Zoogeography & Wild life) 4 marks

Q NO V) Project on Local Biodiversity 10 marks

Q NO. VI Viva 5 marks

Q NO. VII Journal 5 marks

Note 1 :- Examiners can alter the Scheme of marks for practical in consultation with the staff of the host college.

Note :2	Theory	Internal	20 marks
		Final	80 marks
	Practical	Internal	10 marks
		Final	40 marks

Note 3: Question paper pattern for THEORY examination

Q No. 1	02 marks	10* 02 = 20 marks	
Q No. II	05 marks	06* 05	= 30 marks
Q No. III	10 marks	01* 10	= 10 marks
Q No. IV	10 marks	01* 10	= 10 marks

1.3.2 Report of the field work done year-wise during last 5 years

2020-21 (Year 1)					
Sl. No	**Program name**	**Program code**	**Name of the Course that include experiential learning through project work/field work / internship**	**Course code**	**Reports Page Numbers**
1	M.Com	MCOM	Project report	4.3	69-137
2	MSc	MSCBOT	Project 4.4	DO51	138-191
3	BSc Chemistry, Botany and Zoology	BSC4	Chemistry Sixth Semester Paper - II (Project)	14BSCCHEP62	192-201
4	BSc Chemistry, Botany and Zoology	BSC4	Chemistry Sixth Semester Paper - II (Study tour)	14BSCCHEP62	202-205

2019-20 (Year 2)					
Sl. No	**Program name**	**Program code**	**Name of the Course that include experiential learning through project work/field work / internship**	**Course code**	**Reports Page Numbers**
1	BSc Chemistry, Botany and Zoology	BSC4	Chemistry Sixth Semester Paper - II	14BSCCHEP62	206-217
2	M.Com	MCOM	Project report	4.3	218-271
3	M.Sc	MSCBOT	Practical based on 4.2	D041	272-284
4	M.Sc	MSCBOT	Project 4.4	D051	285-320
5	BSc Chemistry, Botany and Zoology	BSC5	Biology of Chordates	B380	321-343
6	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	E460	344-351
7	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	F460	352-368
8	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	F460	369-385
9	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	F460	386-406
10	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	F460	407-422
11	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	F460	423-443
12	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	F460	444-452
13	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	F460	453-475
14	BSc Chem Porject VI Sem	Inorganic chemistry	Chemistry Sixth Semester Paper - II	14BSCCHEP62	476-488

2018 - 19 (Year 3)					
Sl. No	**Program name**	**Program code**	**Name of the Course that include experiential learning through project work/field work / internship**	**Course code**	**Reports Page Numbers**
1	BSc VI Sem Chem Tour	BSC4	Chemistry Sixth semester Paper II	14BSCCHEP62	489-493
2	BSC Cemistry, Botany and Zoology	BSC4	Cell biology, histology, animal behaviour	D380	494-501
3	BSc II Sem Zoo	BSC5	Biology of Chordates	B240	502-508
4	MSc	MSCBOT	Practical based on 4.2	D041	509-521
5	M.Com	MCOM	Project report	4.3	522-594

2017- 18 (Year 4)					
Sl. No	**Program name**	**Program code**	**Name of the Course that include experiential learning through project work/field work / internship**	**Course code**	**Reports Page Numbers**
1	Bachelor of Science - Chemistry, Botany and Zoology	BSC4	Chemistry Practical Sixth Semester Paper II	14BSCCHEP62	595-599
2	BSc II Sem Chemistry, Botany and Zoology	BSC5	Biology of Chordates	B240	600-609
3	BSc Chemistry, Botany and Zoology	BSC4	Cell biology, histology, animal behaviour	D380	610-621
4	M.Com	MCOM	Project report	4.3	622-695

2016- 17 (Year 5)					
Sl. No	**Program name**	**Program code**	**Name of the Course that include experiential learning through project work/field work / internship**	**Course code**	**Reports Page Numbers**
1	Bachelor of Science - Chemistry, Botany and Zoology	BSC4	Cell Biology, Histology and Animal Behaviour	D380	696-708
2	Bachelor of Science - Chemistry, Botany and Zoology	BSC4	Chemistry Practical Sixth Semester Paper II	14BSCCHEP62	709-713
3	M.Com	MCOM	Project report, Viva-voce	4.6	714-789

K. L. E. SOCIETY'S

BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE,

CHIKODI-591201

PG DEPARTMENT OF COMMERCE AND MANAGEMENT

A PROJECT REPORT ENTITLED

"A STUDY ON LOANS AND ADVANCES "

AT

SHANTAPPANNA MIRAJI URBAN BANK, CHIKODI

Submitted to

RANI CHANNAMMA UNIVERSITY, BELAGAVI

FOR THE PARTIAL FULFILMENT OF DEGREE IN MASTER OF COMMERCE

DURING THE ACADEMIC YEAR 2020-2021

SUBMITTED BY

Miss. Rajalaxmi Ingavale

M.COM-IV SEMESTER

REGISTER NO: MC191611

UNDER THE GUIDANCE OF

SHRI. S. M. BHOSAGE

K.L.E. SOCIETY'S

BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE, CHIKODI-591201

PG DEPARTMENT OF COMMERCE AND MANAGEMENT

CERTIFICATE

This is to certify that **Miss. Rajalaxmi Ingavale** has satisfactorily completed the Project Report Entitled "A Study on Loans and Advances" At Shantappanna Miraji Urban bank, Chikodi for the partial fulfilment of Degree in **Master of Commerce** in Rani Channamma University, Belagavi during the academic year **2020-2021.**

SHRI.S. M. BHOSAGI
PROJECT GUIDE

SHRI. LAXMIKANTHA NAYAKA T.O
CO-ORDINATOR
P.G. Department of Commerce
B.K. College Chikodi

SHRI. UDAYSINGH RAJPUT
PRINCIPAL
PRINCIPAL
KLES'S Basavaprabhu Kore
Arts, Science and Commerce College
CHIKODI - 591 201

K.L.E.S's BASAVAPRABHU KORE COLLEGE CHIKODI NAAC-A

Estd : 1961
ಶ್ರೀ ಶಾಂತಪ್ಪಣ್ಣಾ ಮಿರಜಿ ಪಟ್ಟಣ ಸಹಕಾರಿ ಬ್ಯಾಂಕ್ ನಿ., ಚಿಕ್ಕೋಡಿ
SHRI SHANTAPPANNA MIRAJI URBAN CO-OP. BANK LTD., CHIKODI
Adm. Office : Guruwar Peth, Chikodi-591 201, Dist. Belagavi, Karnataka State
Phone : 08338-273169, 272549
E-mail : guruchbnk@yahoo.co.in
E-mail shantappanna@mirajibank.com
60
1961-2021

Ref. No. Certificate/203/2021-22

Date: 13-09-2021

TO WHOMSOEVER IT MAY CONCERN

C E R T I F I C A T E

This is to Certify that **Miss: Rajalaxmi R. Ingavale of Chikodi** had completed the Project work from 28th June 2021 to 30th August 2021 on **" A Study on Loans and Advances "**.

During her study she had been provided with the necessary informations.

We wish her every success in her future endeavours.

For Shri Shantappanna Miraji Urban
Co-op. Bank Ltd., Chikodi.

General Manager

ADM. OFFICE CHIKODI

DECLARATION

I declare that the project report entitled"**A Study on Loans and Advances**" At **Shantappanna Miraji Urban Bank, Chikodi** is a record of independent research work carried out by me and submitted in partial fulfilment of the Degree in "**Master of Commerce**" as prescribed by the Rani Channamma University, Belagavi for the academic year**2020-21.**

It has been prepared under the guidance and supervision of **Shri. S. M.Bhosage,** Lecturer in PG Department of Commerce and Management K.L.E. Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi.

The Thesis or a part there of has not been previously submitted for the award of any other degree or diploma.

Date: 25/09/2021

Place: Chikodi

Rajalaxmi Ingavale

Miss. Rajalaxmi Ingavale

Register No: MC191611

Acknowledgement

The success of any project is incomplete without mentioning the names of the people who made it possible.

I am conscious of my indebtedness to each and every individual, who has helped me in many ways in the preparation of this project work. It would be great privileged to express words of gratitude and respect to all those who guided and inspired me throughout the completion of this project.

I sincerely express my deep sense of gratitude and appreciation to Internal Guide **Shri. S. M. Bhosage** for his careful and valuable guidance, never ending patience andconstant encouragement throughout the project.

I am beholden to **Shri. Laxmikantha Nayaka T O,** Co-Ordinator of PG Department of Commerce and Management for constant interest evidenced by him in my academic pursuits.

I express my deep intelligence of appreciation to **Shri. Udaysingh Rajput,** Principal of our collegefor his valuable suggestions and encouragement.

I express my sincere gratitude to**Shri.** K N Kumbar, Manager, Shantappanna Miraji Urban Bank, Chikodi for providing me an opportunity to do a project in their organization.

At the outset, I would like to thank all the teaching faculty of PG Department of Commerce and Management for their valuable suggestions during project work.

My thanks are also to library staff for their cooperation during the course of project work and I am also thankful to Printers for their skillful printing of this project.

Finally I owe my deep sense of gratitude to my parents, friends and relatives for their constant encouragement and support.

Miss. Rajalaxmi Ingavale

INDEX

CHAPTER 1

INTRODUCTION AND RESEARCH DESIGN

CHAPTER-1

INTRODUCTION AND RESEARCH DESIGN

1 Introduction :

nance has been called the life blood of business because it deals with the money and it requires funds for ; day to day activities.A co-operative or credit is an autonomous association of person who voluntarily co- ɔerate for their mutual social, economic, and cultural benefit. In India Co-operative Banks engaged in nking barriers are regulated with the RBI and governed Co-operative Banks Act, 1965.Co-operative anking Systems are also usually more integrated than credit union systems. Local branches of Co-operative anks select their own boards of directors and manage their own operations, but most strategic decisions quire approval from a central office.The Co-operative Banks and societies were established to curb the :tivities of money lenders and unorganized money market agencies.As co-operative bank is retail and ɔmmercial banking organized on a co-operative basis. Co-operative banking institutions take deposits and nd money in most parts of the world. The Banking Industry was once a simple and reliable business that ·ok deposits from investors and lent it to borrowers at a higher rate.In India, Co-operative Banks are orking for nearly hundred years. Co-operative Banks are considered as one of the important financial ıstitutions in the country. The major contributions of these banks are mostly in rural areas where they play ıe most vital role in rural financing and micro financing. The major strength of co-operative banks are their ısy local reach, transparent interaction with the customers and their efficient services to common people.

.2 Review of Literature

ingh and Singh (2010), in their study titled, "Technical and Scale Efficiency in istrict Central Co-operative Banks of Punjab –A Non- Parametric Analysis" had attempted to investigate ıe extent of technical efficiency across 20 DCCBs of Punjab with the help of Data Envelopment Analysis. hey brought out that size of DCCBs and profits had been affecting the measures of technical efficiency ignificantly. The study further revealed that DCCBs of Punjab were suffering from the problems of ıanagerial irregularities and improper production scale. Appropriate policy interventions by state overnment, RBI and NABARD have been suggested by the authors.

)hanappa (2009) in his study titled, "Performance Evaluation of UCBs: A Case

udy of KallappannaAwadeIchalkaranjiJanataSahakari Bank Ltd. Ichalkaranji" made an attempt to examine
e working and financial performance of UCBs. The objective of the study was to examine and analyze the
nd, progress and problems of this bank, and to offer some important suggestions for improving the
mpetency and efficiency of the bank. The related data had been collected for the period from 1995-96 to
07-08. He used various statistical tools such as ratios, percentages, averages, and chi-square test to analyze
e data, to know the performance of the UCBs in respect of share capital, deposits, reserve funds, loans and
vances, investment, profit, and NPAs. He observed that the bank had maintained NPAs under control at
e best stipulated level of RBI norms. There was immense instability in net profit.
ne bank should focus on non- interest income sources (commission based services) to increase the profit
vel and reduce the NPAs. CD ratio of the bank was declining continuously which was not a good signal.
ne economic health of the bank was sound and the Bank was able to compete with other banks. He further
ggested that loans should be provided (at least to regular borrowers) on competitive rates of interest.

he European Association of Co-operative Banks (2009), in its article titled,
European Co-operative Banks in Financial and Economic Turmoil" was of the view that despite extensive
terest rate cuts, liquidity injections and support measures the financial markets were not stable. Figures
owed that global economy will experience a deep recession in 2009 and perhaps also 2010. But as has
en demonstrated, most co-operative bank groups had fortunately been able to weather the financial crisis
latively well so far without any state support. This was due to the fact that they generally had limited
posure to toxic assets, a predominant focus on domestic retail banking with stable results, strong capital
ffers and principally conservative risk management. The co-operative banks that did report losses due to
ne subprime crisis were affected primarily at the level of subsidiaries and at the level of APEX institutions.
he local banks were not hitted directly by the financial crisis.
loreover, they continue to lend money to SMEs and retail customers. Co-operative banks were
onsequently solid and robust at the local level and accordingly demonstrated stability of the retail banking
dustry in Europe.

ayaraman and Srinivasan (2009) in their study titled, "Relative Efficiency of
cheduled Commercial Banks in India (2001-08): A DEA Approach" attempted to measure the scale
fficiency of scheduled commercial banks in India using Data Envelopment Analysis. The study listed out
ne number of efficient banks on the basis of relative performances using efficiency scores. It was found that

e general performance of scheduled commercial banks under study was relatively high during the study riod 2001-08 and the average efficiency score was ranging between 0.919 and 1. More than 60 per cent of e scheduled commercial banks under study were above the average efficiency score for each study period cept for the year 2006, where it was around 53 per cent. The results show that ICICI Bank, IndusInd ank, ABN Amro Bank, Calyon Bank and Citibank were efficient for all years during study period. In dition to above banks, efficiency scores of State Bank of
avancore, Vijaya Bank, Bank of Maharashtra, and Oriental Bank of Commerce,
xis Bank, Federal Bank and Yes Bank were above the average efficiency scores for all the years.

ajamohan and Pasupathy (2009) in their study titled, "Performance Evaluation of AICO (Tamil Nadu Industrial Co-operative Bank Ltd.) – An Application of ructural and Growth Analysis" stated that there were several factors that determined the operating fficiency and profitability of the bank. In this context, the general performance of a bank can be analyzed ore meaningfully and objectively for a given period of time through structural and growth analysis. hrough structural analysis the figures reported in the profit and loss account and balance- sheet are nverted into percentages for each period to ensure uniformity for the purpose of comparison with those of her periods. Macro mean had been used to exhibit the strength and weakness of each factor considered. he results were summarized in capsule form. Macro mean in respect of interest received constituted 5.8% of the total income; it was 81.2 % for interest paid, 18.8% for operating expenses, 91% in the case of pread and 83% for burden. It was found that the net profit recorded a negative growth of 27.8%. Growth te of operating expenses was at 44%, spread at 15%, burden at 29% and advances at 49%. Therefore, it as recommended that the burden rate should be reduced by effecting cost control measures, and the spread te be increased so that the profitability may be at a higher rate.

Cumar (2008), in her thesis, worked on "Management of Non-Performing Advances A Study of District Central Co-operative Banks of Punjab". A sample of ten DCCBs, i.e., five with high evel of NPAs and five with low level of NPAs, was taken for the study. It was found that despite the best fforts, Central Co-operative banks had not succeeded in diversifying their business. The NPAs in crop loan vere found to be the lowest, while these were the highest in non-farm sector loan. On the basis of step-wise

ultiple regressions, it was found that caste, education, amount and adequacy of loan were the main factors fecting repayment performance of the borrowers. She suggested that these banks should form a special cell monitor NPAs and should take services of recovery agents.

urthy (2008), in his paper titled, "Rural Finance: A Remedial Measure for Rural
ıor" focused on the role of financial services as key to enhancing economic development and reducing ıverty in rural areas. Rural finance has often led the way in addressing social, gender and ethnic equity sues which hold families in poverty.
e, however, observed that the access was limited for poor households and for micro, small and medium ıterprises. Despite rapid economic development in India the number of people living below the poverty line ıs decreased only slightly. While there was a numerically strong infrastructure of formal financial stitutions in rural
dia, they often lacked the capacity to provide adequate demand-oriented services.
e recommended that the major constraint of such important rural finance agencies,
:., lack of resources should be removed, by facilitating them to mobilize resources from capital market and her newer sources.

utamu and Ganesan (2008), in their research article titled, "Profit and Profitability of Co-operative banks: he Case of BanquesPopulaires (Peoples' Bank) of Rwanda" stated that financial institutions in general and ınking sector in particular play a strategic role in the financing stage of capital formation. In the banking :ctor, cooperative banks undertake the responsibility of mobilising the scarce savings of the community and ıannelising these savings for productive investment in the economy.
hey discussed the performance of BanquesPopulaires and the determinants of its Profit and Profitability. It ıd been noted that the net profit was not distinguished from Gross Profit in the years 1994-2004. The ıpirical results from the six models mof Profit and Profitability showed that total assets per branch, other ırnings and total deposits per branch were the determinants of profit in BanquesPopulaires, while total ıssets per branch, and the number of branches were the determining variables of profitability of anquesPopulaires. The low return from investment of Banques
opulaires indicated a lack of cost control and unsatisfactory sources of income other nthan interest from dvances. It was, therefore, crucial that BanquesPopulaires should make further effort for the improvement f its efficiency in operations so that the low profitability might be uplifted.

eiko and Martin (2007) of IMF conducted a study on co-operative banks and their financial stability. The udy was based on individual bank data drawn from the Bank Scope Database for 29 major advanced onomies and emerging markets that were members of the Organization for Economic Co-operation and evelopment (OCED

tah (2007) conducted a case study of Single and Bandana District Central Cooperative Banks regarding e financial health of credit co-operatives in Maharashtra and found NPAs or overdoes as the main factors r deterioration in health of these banks. The study revealed that both these banks showed a decline in their nancial health and economic viability during the late nineties as against the early nineties period

agchi (2006), in his study titled "Agriculture and Rural Development are ynonymous in Reality: Suggested Role of CAs in Accelerating Process" analyzed the performance of rimary Agriculture Credit Societies, and observed that PACS could not match up to the increasing equirements of growth dimensions in the Agriculture /Rural development in the Post-independence period, though till the late 50s, they were the only available source of institutional rural finance.

ingh and Singh (2006) in their study titled, "Funds Management in Central Cooperative anks–Analysis of Financial Margin" attempted to estimate the impact of identified variables on the nancial margin of the central co-operative banks in Punjab with the help of correlation and multiple step-ise regression approach.

uryan and Veluraj (2005), in their study titled, "Profitability Analysis of the 'ondicherry State Co-operative Bank", analyzed the performance of the bank from 998-99 to 2002-03. Various ratios, such as cost of management (total expenses) to working capital ratio, rofit to working capital ratio, non-interest income to total income ratio, etc. were used to assess the general erformance of the bank. Spread and burden positions of the bank were also analyzed. They concluded that he profitability performance of the bank was impressive and bank was able to meet its obligations and

rms. The cost of management and establishment expenses got reduced during the period of study which rther strengthened the profitability position of the bank.

air (2004) in his paper titled, "Village Co-operatives – A Century of Service to the Nation" observed that · 2004, the formal institutionalized co-operative sector completed a century of its service to the nation. nalyzing the progress of Primary Agricultural Co-operative Societies, he observed that during the half ntury spread over 1951-2001, the PACs made rapid strides in membership, owned funds, deposits, and iannelising production credit for farmers. They were versatile in the sense; they can take up any type of ral financing and rural service activity at short notice and at lowest transaction cost. But besides :celling on all fronts, the co-operatives are feeling handicapped due to mounting NPAs. The overdue ans of PACs increased to
'5,899.60 million in 2000-01 as compared to '63.79 million indicated in 1950-51, thereby subjecting them · a sustained and systematic process of reviews,
·organisation and restructuring.

:rishana et al. (2003), in their research paper, "Performance of Regiona Rural Banks I Karnataka An pplication of Principal Components and Discriminant

unction Analysis" tried to identify the important discriminating characteristics of the two identified groups f Regional Rural Banks in the state of Karnataka. They used the discriminate function approach and sought ı obtain linear discriminate coefficient, such that the squared difference between the mean Z-score for the ne group and the mean Z-score for the other group was as large as possible in relation to the variation of Z- :ores within the groups. They concluded that the number of employees per branch had maximum iscriminating power to the extent of 55%, followed by amount of borrowings (18%), credit deposit ratio 14%) and income to expenditure ratio (13%).

.odha (2002), in his study titled "Social Lending – Its Relevance in Deregulated
:conomy" studied how far the two extremities, viz. profit maximization and social lending will co-exist in he deregulated market, particularly in a developing economy like India. He concluded that
1) Social lending should continue despite reforms;
2) Economic reforms should continue;
3) Target lending should be abolished;
4) Social lending should be confined to weaker sections only;
5) Time bound lending with least formalities should be ensured;

) Lending decision should be based on cost benefit analysis;

) Subsidy in social lending should be scrapped;

) Loss making rural branches should be converted into satellite offices;

iswanath (2001) in his study titled, "An Analysis of Performance of Agricultural Credit Co-operatives and eir Overdues Problems in India" concluded that during the period 1950-51 to 1995-96, the total loans lvanced by PACs increased from `24crore to `14,201 crore i.e. 587 times, but unfortunately this increase as followed by a corresponding increase in overdues. The results of Development Index in PACs of 16 ates indicated that the performance of only 5 states, i.e., Karnataka, Gujarat, Tripura, Orissa, and aharashtra was above the National average, while that of the remaining 11 states including Punjab were low the average. Using correlation technique, the extent of relationship between overdues and four ariables,

1.3Need for the study

oans and advances are the most important aspect of any banking organization. Loan is a type of debt. Like l debt instruments, a loan entails the redistribution of financial assets over time. The borrower initially ceives an amount of money from the lender, which they repay later. This service is generally provided at a st, referred to as interest on the debt, a sum of borrowed money (principal) is generally repaid with interest hich in turn helps the organizations gain profits and also use these profits for the welfare of the ganization as well as to pay interest on deposits.

his study is mainly concentrated on the lending practices pattern and influence in the organization erformance. It also helps to know the objectives and goals as well as it help to ascertain people's response bank lending. The study is taken on **"A STUDY ON LOANS AND ADVANCES" INTHE hantapannaMirje Urban Bank Ltd. ChikodI.".** The Co-operative credit banks are playing an essential le in the rural development. This study shows us the procedure that are taken place for purpose of oviding loans to customers/borrowers and also with respect to the study of the whole organization and the ocess followed in that organization.

.4 Statement of problem:

here is no project report found on the A study on loans and advances of shrishantappannamiraji urban ank. The title of the project work is "a study on loans and advances" with reference to **The hantappanaMiraji Urban Bank Chikodi**

iis topic was selected to analyze the **Performance of loans and advances** in **"ShrishantapannaMirje rban Bank Ltd Chikodi."**. That has shown good profit and turnover in the recent years. The study is nducted to represents the concept of loans and advances and critically analyse them. Finally provides nclusion relating to Performance of loans and advances ofshrishantappannamiraji urban co-op bank.

5 Scope of the Study:

ıe present case study on **"ShantapannaMirje Urban Bank Ltd Chikodi."** covers a study on 'erformance of Loans and Advances". The study also makes a micro focus in all the major functional areas `the Bank. The various types of loans are studied by analyzing the financial statement of the Bank.

6 Objectives of the Study:

- To study the concept of loans and advances.
- To study different types of loans given by the bank.
- To know the period of repayment for varies provided by The Co-operative Bank Ltd .
- To know the overall performance of Loans and Advances.
- To suggest measures for better performance.

.7 Research Methodology:

he present study mainly based on the primary and secondary data i.e., annual reports of the bank for the spective years is from 2015 to 2016. The necessary primary data is collected through informal discussion ith the secretary, founder and also with the members of the bank.

- **Tools for data collection:**

he tools for data collection are divided into two parts i.e.

Primary data

his data is being collected by the help and guidance of **ShriK.N.KUMBAR**who is the manager of **hantapannaMirje Urban Bank Ltd Chikodi."**. The conversation helped to have a idea about the Bank, s functions andother aspects of the Bank.

- **Source of Primary data:**
  - Observation
  - Discussion

Secondary Data:

econdary Data which includes the annual reports of the Bank for the past years helped to study the financial spects of the Banks. This data shows about gain/loss in the financial statement of the bank. It is the data, hich gives relevant information in the different fields of **"THE ShantapannaMirje Urban Bank Ltd hikodi".**

he secondary data also includes the data collected from other sources mentioned below:

- Annual Reports and magazines of the shrishantappannamirajiurban Co-operative Bank.
- The part of required data has also been collected through browsing.
- Books
- Reference materials.

.8 Limitations of Study:

- Due to strict confidential policy of the bank the accounts departments provided only screened information.
- Accuracy of the data provided cannot be guaranteed which does not give a clear idea about the actual functioning of the Bank
- Due to busy schedule of secretary, the company's financial statements obtain secondary data.
- Time of constraint
- The present study is confined only for a period of five years from 2015-16 to 2019-20.

9 Chapter scheme

NIT I; INTRODUCTION AND RESEARCH DESIGN;

ıe first chapter gives details of introduction, review of literature, Statement of problem, need for the study, ›jective of study ,scope of study, research methodology and limitations.

NIT II-CONCEPTUAL FRAMEWORK

gives the profit of the bank where the project is conducted It also explains about future plan of the bank.

NIT III-BANK PROFILE:

gives the profile of the bank where the project is conducted. It also explain about future plan of the ›ciety.

NIT-IV: DATA ANALYSIS AND INTERPRETATION

his chapter gives detail regarding the analysis and interpretation of data. It also consists of the table, graphs ıd its interpretation.

NIT-V: FINDINGS, SUGGESTIONS AND CONCLUSION

his chapter concluded the project report it comprises of the findings, conclusion draw from above analysis ases on the data collected and also included suggestions.

CHAPTER 2

CONCEPTUAL FRAMEWORK

2.1Introduction of loans and advances

2.2Role of loans and advances

2.3 Types of loans

2.4Classifications of loans and advances

2.5 Principles of lending

2.6 Various types of loans given by the Bank

CHAPTER-2

CONCEPTUAL FRAMEWORK

2.1 INTRODUCTION OF LOANS AND ADVANCES

Loans and advances are the most important aspects of any banking organizations. Loan is a type of debt, Like all debt instruments, a loan entails the redistribution of financial assets over time.

Meaning of loan :

When money is given to another party in exchange of or repayment of the loan principal amount plus interest.

Meaning of advances :

When fund provided by the bank to an entity for a specific purpose to be repayble after a short duration is known as advances.

Loans vs Advances Comparison Table

Below is the 5 topmost Comparisons Between Loans vs Advances

The Basic of Comparison	LOANS	ADVANCES
* About	Funds lent by one entity to another for a purpose	Lent by a bank to firms to meet their short-term financial requirements
*Nature	A loan is a debt by nature	Advances for a credit facility by
*Time Duration	Loans are for a long-term	Advances are for a short-term (maximum one year)
*Collateral Security	A loan may or may not be secured (Secured and Unsecured Loans)	Facilitated only against primary security or a guarantee

1.2 We can discuss the role played by the bank in the business world by way of loans and advances as follows;

- Loans and advances can be arranged from banks in keeping with the flexibility in business operations. Traders may borrow money for day today financial needs availing of facility of cash credit, bank overdraft and discounting of bills. The amount raised as loan may be repaid within a short period suit the convenience of the borrower. The business may be run efficiently with borrowed funds from banks for financing its working capital requirements.

- Loans and advances are utilized for making payments of current liabilities, wages and salaries of employees, and also the tax liability of the business.

- Loans and advances from banks are found to be economical for traders and businessman; banks charge a reasonable rate of interest on such loans or advances. For loans from money lenders, the rate of interest charged is very high. The interest charged by commercial banks is regulated by the RBI of India.

- Banks generally do not interfere with the use, management and control of the borrowed money. But it takes care to ensure that the money lent is used for business purpose.

- Banks loans and advances are found to be convenient as far as its repayment is concerned. This facilitates planning for future and timely repayment loans. Otherwise business activities would have come to a halt.

- Loans and advances by banks generally carry element of secrecy with it. Banks are duty – bond to maintain secrecy of their transactions with customers. This enhances people faith in the banking system.

2.3 TYPES OF LOANS:

The loans can be broadly classified as follows;

. Short term loan as demand loan.

. Long term loan

Short Term Loan means it is granted for a short period of a year or less than one year.

Long Term loan: Term Loan is of two types

. Medium term loan being repayable in 1 to 3 years.

. Long-term loan is being repayable in above 3 to 5 years.

A Loan is granted either against collateral securities, or against the personal security of the barrowers. In the case of a loan, interest is charged on the whole amount of the borrower at different intervals, but the rate of interest charged on a loan is slightly lower than that charged on overdraft, cash credit. Generally a banker prefers to make an advance in the form of a loan for two reasons.

He can collect interest on the entire amount of the loan sanctioned.

A loan involves very little accounting work as the granting & the repayment of the loan are generally done in the lump-sum. But the borrower does not prefer that type of advances, as he is required to pay interest on the full amount of the loan sanctioned to him irrespective of the amount of the loan sanctioned to him irrespective of the amount actually withdrawn by him.

2.4 FurtherLoans and advances are classified into two main categories mentioned below:

- **Secured Loan or Advance:-**

Secured loan or advance means a "Loan or Advance made on the security of assets. The market value of which is not at any time less than the amount of such loan or advance."

These are the loans granted by the bankers/society by obtaining security equal or more than the loan amount. In other words, a secured loan is the one in which specific property is pledged to secure payment of the loan. The security may be in the form of shares, debentures, LIC policies, goods, Fixed Deposit receipts, etc.

Advantages of Secured Loans:

- Take possession of security,
- Validity of title,
- Marketability,
- Stability of price,
- Durability,
- Easy ascertainment of value,
- Easy transfer of title,
- Margin,
- Approved securities,
- Lower cost of storage and supervision.

Unsecured Loan or Advance: -

An unsecured loan or advances means a "Loan or advance not so secured. A partly covered loan or advance is partly covered by the security of assets, the market value of such securities being less than the amount that has been lend or outstanding at any time."These are the loans granted without any security or on personal security of the borrower. Unsecured loans are often more expensive and less flexible than secured loans, but suitable if you want a short-term loan (one to five years).

Advantages of Unsecured Loans:

- Unsecured loans can be obtained without collateral.
- This loan is involved time factor.
- This loan is suits the various financial needs of its borrowers.
- In unsecured loans cannot create any legal charges.
- In unsecured loan personal liability come first

.5 Principles of lending

When a banker is approached for a loan he has to keep his eyes and earns wide open. Apart from appraisal of ndividual loan proposal, there are some general principles, which should guide him determine whether a roposed loan is desirable, irrespective of whether or not securities is offered. It has been stressed throughout hat a banker does not lend only because the advance will be secured many other consideration influence his ecision. Following are some of the principles of the loans and advances.

- **Safety:**

For a banker, the celebrated principle in holding asset is "safety first" nothing is more important to him than the preservation of the principle some advanced. In fact by safety is meant the ability of the borrower to repay the principle and the interest their own according to term and conditions provided in the loan agreement.

Liquidity:

The next principle of the bank lending is that the advances should be liquid. The assets should be readily into cash without much loss of the value, which temporary advances granted to finance some purchased of stock, raw materials etc.

Diversification of risk:

t is another important principle of the sound lending is that they should hold loan assets of diversified haracter. So as to reduce the degree of credit risk. It should be one of the banker's ax Ions to advance elatively moderate sums to many customers rather than large sums to few customers. Loans are also tied to be liversified with respect to maturity, security and type of the borrower.

- **Profitability:**

A significant matter for consideration is the remunerative of the advance i.e., the yield which the particulars advance is going to give to the banker. The rate of interest to be charged has to be commensurate with the risk involved in loan. The object of the profitability has to be moderate by safety and liquidity of funds and than by national policies as lay down by the government and the central bank.

Purpose oriented:

Normally the bank should not finance unproductive, consumption loans, else extend short- term credit for movement of goods and other productive purposes. The banks are generally expected to make

available ways and means of accommodation working capital advantage and not to finance fixed assets formation just as the disbursement of the repayment of the loan is made in one lump sum.

Benefits to the Lender

- The lender of the loan gets the desired rate of interest on the amount he/she have borrowed.
- The lender can plan his investment and can earn good return on the investment to be utilized in the future and can build a good reputation in the market.

Benefits to the Borrower

- The Advantage with loans is that you can design your repayment period as well as monthly installments according to your financial capacity. A secured business loan comes at lower interest rates when compared with other business loans. As these loans are taken against collateral, any default in repayment can put the commercial property at risk.
- Interest rates offered on secured business loan is variable and easily affordable. Such opportunities are provided entrepreneurs to encourage them and ultimately enhance the economy of the region. By promising business or industries, local government can even eradicate unemployment and improve overall standard of living.

Drawbacks of Loan: -

- **Inflexibility: -**

  Every time a loan is required, it is to be negotiated with the banker. To avoid it, borrower may borrow in excess of their exact requirement to provide for any contingency.

- **Abuse of funds: -**

  Banks have no control over the use of funds borrowed by the customers. However, banks insist on hypothecation of the assets purchased with loan amount.

- **Indistinct period:**

  Though the loans are for fixed period but in practice roll over, i.e. they are renewed frequently.

- **Complexity for document:**

  Loan documentation is more comprehensive as compared to each credit system.

Procedure for Granting Loans: Duties and Responsibilities of Guarantors

- The guarantor is equally responsible for the loan to which he becomes guarantor.Before signing as the guarantor, member should ensure payment capacity and credit worthiness of the loanee.

Members Should Know:

- Any member without the prior permission of sahakari remains absent for 3 consecutive AGM's are liable for disqualification of the membership and may lose their membership.
- Every member should have minimum transactions with SBSCS.
- Members who do not receive the dividend within 3 years, the amount will be transferred to reserve fund and any query in this regard will not be entertained.
- In case of any changes in the address, members should intimate in writing to the office for the proper payment of dividend. Any problem arising due to the impress address SBSCS will not be responsible.
- Nomination facility is provided to all the services. All members should are to avail this facility to avoid the legal complications.
- As per KCS & KSS Act the member of one Cooperative bank cannot become the member of another Cooperative bank engaged in same trade of business.
- **2.6 The following are the various types of loans given by the Bank:**
- Mortgage Loan
- Salary secured loan
- Surety loan
- Salary credit loan
- Fixed deposit loan
- Vehicle loan
- Housing laon
- Motor cycle loan
- Plant and machinery loan
- Medium term loan
- NSC loan

CHAPTER 3

BANK PROFILE

3.1co operative banks overview

3.2 History of co-op banks in india

3.3 Meaning and Definition of Bank

3.4 Features of Co-operative Bank

3.5Characteristics of Co-operative Bank

3.6 Advantages of Co-operative Bank

3.7 Limitations of Co–operative Bank

3.8 Types of Co-operative Banks

3.9 Bank profile

3.10 The address of the bank

3.11 Mckensys 7S frame work with respect to shrishantappanna miraji urban bank chikodi

3.12 Models for leadership

3.13 Swot Analysis

3.14 List of Department and functions

3.15 Information Technology

CHAPTER-3

BANK PROFILE

INDIAN BANKING STRUCTURE:-

RESERVE BANK OF INDIA

(CENTRAL BANKING AND SUPREME MONETARY AUTHO

SCHEDULED BANKS

COMMERCIAL BANKS

CO-OPERATIVE BANKS

ALL INDIA FINANCIAL INSTITUTIONS

FOREIGN BANKS

STATE CO-OPERATIVES

NABARD

REGIONAL RURAL BANKS

CENTRAL CO-OPERATIVES

SIDBI

PRIMARY CREDIT SOCIETIE

EXIM

PRIVATE SECTOR BANKS

OLD

IDBI

.1 CO-OPERATIVE BANKS OVERVIEW:

'he Co-operative Banks has a history of more than100 years. The Co-operative Banks are an important part ı the Indian financial systems. The Co-operative movement originated in the West but the importance that uch banks assumed in India is rarely paralleled anywhere else in the world. Their role in rural financing ontinues even today and their business in urban areas also has increased phenomenally in recent years ıainly due to sharp increase in the number of primary Co-operative Banks.

Vhile the Co-operative Banks in rural areas mainly finance agriculture based activities including farming, ıersonal finance, Hatchery along with some Small Scale Industries and Self-employment driven activities. 'he Co-operative Banks in urban area mainly finance various categories of people for self - employment ndustries, Small Scale Units, Home finance, Consumer finance, Personal finance etc. Co-operative ıovement is quite established in India. The first legislation on Co-operation was passed in 1904.In the ıeginning of the 20th Century availability of Credit in India more particularly in rural areas was almost .bsent. The rural folk have to depend on the money lenders, who lent often at various rate of interest.

Co-operative Banks are organized and managed on the principal of Co-operation, self help and mutual help. They function with the rule of "One Member, One Vote" Co-operative Banks perform all the main banking functions of deposits, supply of Credit and provision of remittance facilities. Co-operative Banks provide imited banking products and are functionally specialist in agriculture related products. Co-operative Banks ıow provide Housing loans, Vehicle loans, Industrial loans, Hypothecation loans etc.
A co-operative bank promotes economic activity and provides banking facilities and service to the rural ıeople. The significant role of co-operative banks in the agricultural economy impacts a lesson to commercial banks and dispels from their minds the age old inertia and the gloom of conservatism by shifting emphasis from credit worthiness of the purpose and from tangible security to the character of the business.

2 HISTORY OF CO-OPERATIVE BANKS IN INDIA

he beginning of co-operative banking in India dates back to 1904. The Institutional source of credit for griculture and related activities was very inadequate at that time. The money lenders would provide some redit at very high rates of interest. The co-operative banks were expected to substitute such unorganized oney market agencies and provide short and long term credit at reasonable rates of interest. It was expected at they would co-ordinate the activities of unorganized and organized segments of Indian money market. ubsequent to the adoption of economic planning in 1951, co-operative banks were expected to play a rucial role in achieving agricultural and rural development. Before the nationalization of commercial banks ie cooperative banks were the only substitute for money lenders and other informal sector lenders. But after ationalization and creation of Regional Rural Banks and NABARD their relative share declined.
o-operative Banks in India, (with their network; spread over remote rural areas and a large number of naller towns), have historically played a major role in mobilization of domestic savings for economic evelopment of the country. They have provided the farmers and non-farm entrepreneurs with the needed redit support. These institutions have also contributed significantly to private capital formation in griculture and accelerated the pace of distribution of farm inputs NABARD 2002).
'o-operative banks are promoted to meet the banking requirements of consumers. They are established not nly in the urban areas but also in the rural areas. In rural areas these banks supply finance to agriculture, /hile in the urban areas they are started to provide finance to buy consumer goods. They provided short and ıedium term loans. They provide loans at a lower rate comparatively. They are formed on the co-operative ank principles and as such are more service oriented than profit oriented.

.3 Meaning and Definition of Bank:

\ bank is a financial institution licensed to receive deposits and make loans. Banks may also provide inancial services, such as wealth management, currency exchange and safe deposit boxes. There are two ypes of banks commercial/retail banks and investment banks.
\ bank is financial institution that accepts deposits from the public and creates credit. Lending activities can ie performed either directly or indirectly through capital markets.
Banking business in India is largely governed by the Banking Regulation Act, 1949. According to Section (b) of this Act, banking means "the acceptance for the purpose of lending or investment of deposits of noney from the public repayable on demand, order or otherwise and withdraw able by cheque, draft, order ır otherwise.

efinition and meaning of co-operative banks:

1 the words of HENRY WOLFF "co-operative banking is an agency which is in a position to deal with the nall means on his own terms accepting the security he has and without drawing ion the protection of the ch.

'EVINE defines "a mutual Bank formed composed and governed by working people themselves for ncouraging regular saving and generating miniature loans on easy terms of interest and repayments".

In the analysis of above definitions, one can say that co-operative banks is a co-operative organization 'here persons Voluntarily associate together as human being on the basis of equality for the Promotion of conomic interest of themselves engaged in the banking functions of acceptance of deposits and lending the redit. In short, co-operative bank is an institution, which performs the banking functions of accepting eposits and borrowing of funds and lending of credit.

.4 Features of Co-operative Bank:

. They are organized and managed on the principle of co-operation self help and mutual help. They function 'ith the rule of "one member one vote".

. Co-operative banks perform all the main banking function of deposit mobilization, supply of credit and rovision for remittance facilities.

. Co-operative banks are perhaps the first government supported agency in India.

. Co-operative banks belong to the money market as well as the capital markets.

. Co-operative banks accept current saving, fixed and other types of time deposits from individuals and nstitutions including banks.

. Co-operative banks do banking business mainly in the agricultural and rural sector.

'. Some co-operative banks are schedule co-operative banks while others are non-schedule co-operative anks.

3. Co-operative banks also required to comply with requirement of statutory liquidity ratio (SLR) and cash eserve ratio (CRR) liquidity requirements as other scheduled and non-scheduled banks.

The co-operative banking is federal in character with three tie linkages between state, district and village evel institutions. At the state level, we have development banks (SLDBs) at the district level, the central co-

perative banks(CCBs) or the District Central co-operative banks (CLDBs), then at the village level, the imary agricultural credit societies (PACs), and the primary land development banks (PLDB's and the anches of SLDBs).

he lower ties are members and the shareholders of the immediate higher ties. Besides, there are urban co-perative banks (UCBs) or the primary co-operative banks (PCBs) which are outside this federal structure. hough federal in its nature the system is integrated vertically on the basis of functional responsibilities of arious components of the system. The SCBs, CCBs, & PACs from the short term and medium term credit ructure and it is the same in all states. The LDBs at various levels make the long term credit structure hich is not uniform in all states.

he state level co-operative banks are said to be the apex institution in their federal structure. However, the pex institutions from the point of view of promotion, supply of resources and supervision are controlled by ie government. NABARD and National co-operative bank of India, SCBs and SLDBs are in the immediate osition between the institution just mentioned on the one hand and co-operative banks on the other.

he SCBs co-ordinate and regulate the working of CCBs. They act as custodians of surplus funds of the CBs and supplement them by attracting deposits and by obtaining loans from the RBI. The CCBs mobilize sources in districts to finance their members and they also channelized funds from the SCB to primary redit societies.

he primary co-operative banks at the village level from the base of the co-operative banking. Although they re expected to be multipurpose societies, they mostly deal in credit unlike the short and medium term credit ructure.

he PACs at the village level form the base of the co-operative banking. Although they are expected to be ultipurpose societies, they mostly deal in credit. Unlike the short and medium term credit structure, the rrangements for the provision of long term are not uniform in all the states however a majority states have a ederal set up for this purpose also. These states have SLDBs at the states level affiliated to primary land evelopment banks at the district and taluk levels. In other states the operational units below the SLBDs are ranches of SLDBs. The SLDBs obtain funds by issuing ordinary debentures and special development ebentures.

.5 Characteristics of Co-operative Bank

. Co-operative Bank is a special type of business organisation different from other forms of organisation ou have learnt earlier. Let us discuss its characteristics.

Open membership

he membership of a Co-operative Bank is open to all those who have a common interest. A minimum of n members are required to form a co-operative Bank. The Co--operative Bank Act does not specify the aximum number of members for any Co-operative Bank. However, after the formation of the Bank, the iember may specify the maximum number of members.

. Voluntary Association

lembers join the Co-operative Bank voluntarily, that is, by choice. A member can join the Bank as and hen he likes, continue for as long as he likes, and leave the Bank at will.

i. State control

o protect the interest of members, Co-operative Banks are placed under state control through registration. Vhile getting registered, a Bank has to submit details about the members and the business it is to undertake. has to maintain books of accounts, which are to be audited by government auditors.

. Sources of Finance

1 a Co-operative Bank capital is contributed by all the members. However, it can easily raise loans and ecure grants from government after its registration.

. Democratic Management

'o-operative Banks are managed on democratic lines. The Bank is managed by a group known as "Board of lirectors". The members of the board of directors are the elected representatives of the Bank. Each member as a single vote, irrespective of the number of shares held. For example, in a village credit Bank the small rmer having one share has equal voting right as that of a landlord having 20 shares.

. Service motive

o-operatives are not formed to maximize profit like other forms of business organization. The main urpose of a Co-operative Bank is to provide service to its members. For example, in a Consumer Co-perative Store, goods are sold to its members at a reasonable price by retaining a small margin of profit.

. Separate Legal Entity

. Co-operative Bank is registered under the Co-operative Banks Act. After registration a Bank becomes a eparate legal entity, with limited liability of its members. Death, insolvency or lunacy of a member does not ffect the existence of a Bank. It can enter into agreements with others and can purchase or sell properties in s own name.

i. Distribution of Surplus

he income of the Co-operative Banks is distributed among the members on the basis of their capital ontribution. According to Co-operative Banks Act, 1919 the rate of divided is limited to 9 percent.

ii. Self-help through mutual cooperation

o-operative Banks thrive on the principle of mutual help. They are the organisations of financially weaker ections of Bank. Co-operative Banks convert the weakness of members into strength by adopting the rinciple of self-help through mutual Co-operation. It is only by working jointly on the principle of "Each or all and all for each", the members can fight exploitation and secure a place in Bank.

.6 Advantages of Co-operative Bank

. Co-operative form of business organisation has the following advantages:

Easy Formation

ormation of a Co-operative Bank is very easy compared to a joint stock company. Any ten adults can oluntarily form an association and get it registered with the Registrar of Co-operative Banks.

. Open Membership

ersons having common interest can form a Co-operative Bank. Any competent person can become a ıember at any time he/she likes and can leave the Bank at will.

i. Democratic Control

. Co-operative Bank is controlled in a democratic manner. The members cast their vote to elect their epresentatives to form a committee that looks after the day-to-day administration. This committee is ccountable to all the members of the Bank.

/. Limited Liability

'he liability of members of a Co-operative Bank is limited to the extent of capital contributed by them. Inlike sole proprietors and partners the personal properties of members of the Co-operative Banks are free 'om any kind of risk because of business liabilities.

. Elimination of Middlemen's Profit

'hrough Co-operatives the members or consumers control their own supplies and thus, middlemen's profit is liminated.

i. State Assistance

ioth Central and State governments provide all kinds of help to the Banks. Such help may be provided in ıe form of capital contribution, loans at low rates of interest, exemption in tax, subsidies in repayment of oans, etc.

ii. Stable Life

\ Co-operative Bank has a fairly stable life and it continues to exist for a long period of time. Its existence is ot affected by the death, insolvency, lunacy or resignation of any of its members.

.7 Limitations of Co–operative Bank

esides the above advantages, the Co-operative form of business organisation also suffers from various mitations. Let us learn these limitations.

Limited Capital

he amount of capital that a cooperative Bank can raise from its member is very limited because the iembership is generally confined to a particular section of the Bank. Again due to low rate of return the iembers do not invest more capital. Government's assistance is often inadequate for most of the Co-perative Banks.

. Problems in Management

ienerally it is seen that Co-operative Banks do not function efficiently due to lack of managerial talent. The iembers or their elected representatives are not experienced enough to manage the Bank. Again, because of mited capital they are not able to get the benefits of professional management.

i. Lack of Motivation

very Co-operative Bank is formed to render service to its members rather than to earn profit. This does not rovide enough motivation to the members to put in their best effort and manage the Bank efficiently.

. Lack of Co-operation

he Co-operative Banks are formed with the idea of mutual Cooperation. But it is often seen that there is a ıt of friction between the members because of personality differences, ego clash, etc. The selfish attitude of iembers may sometimes bring an end to the Bank.

. Dependence on own Capital & Members

he inadequacy of capital and various other limitations make cooperative Banks dependant on the overnment for support and patronage in terms of grants, loans subsidies, etc. Due to this, the government ɔmetimes directly interferes in the management of the Bank and also audits their annual accounts.

.8 Types of Co-operative Banks

. Producer's Co-operative Banks

he producer's Co-operative Banks are established by the small producers. The members of the Bank roduced goods in their houses or a common place. The raw material, tools money etc. is provided to them y the Bank. The output is collected by the Bank and sold in the market at the wholesale rate. The profit is istributed among the member in proportion to the goods supplied by each member.

. Consumer's Co-operative Banks

'onsumer's Co-operative Banks are established to remove middleman from the field of trade. These Banks urchase goods at him wholesale prices and sell these goods to the members at cheaper rates than the market rice. However, the goods are sold to the non members at the market rates. The profit, if any, is distributed mong the members in the shape of bonus according to their purchases ratio.

. Marketing Co-operative Banks

'he marketing Co-operative Banks are formed by the mall produces for the promotion of trade. The two ıain objectives of these Banks are, to sell the good at reasonable prices by eliminating middlemen and to ıake the ready for the product of the member. These types of Banks are formed by the small agriculturalist nd artisans. These Banks collect the product of its members and make its grading and keep them in 'arehouses and sell them in the market at whole sale rate when the market is ready for this product. The rofit is distributed among the member according to the ratio of goods supplied by them.

. Farming Co-operative Banks

'hese solicits are formed by the small agriculturalist to get then benefits of large scale forming. These Banks rovide help to the farmer for the improve method of cultivations by providing large scale forming tools uch as tractors, threshers and harvesters etc.

. Housing Co-operative Banks

'hese Banks are formed for the procurement of land for the construction of houses on homogeneous basis. 'hese Banks are formed by those members who are intended to construct their own home. These Banks rovides loan to the members for the construction of houses. These also purchase construction material in ulk and provide this material to its member at cheaper rates.

. Insurance Co-operative Banks

hese Banks make contract with insurance companies for the purchase of different insurance policies for its ıember at lower premium. This Bank may take a group insurance policy for its members. The main object f the Bank is to minimize the risk of its member.

. Transport Co-operative Banks

hese Banks are formed to provide the services of its members at lower rates welfare bus scheme is an sample of this type of Banks. A pass handed over to the member for travelling on approved routes.

. Storage Co-operative Banks

hese Banks are formed for the provision of storage facilities to its member for perishable and non erishable goods at lower rates. These Banks also provide grading and distribution services to its members.

. Labour Co-operative Banks

hese Banks are formed by unskilled labour for selling their services at reasonable wage rate. This type of ank makes a contract with different firm for the provision of labour to them.

0. Miscellaneous Banks

ome other important Banks, in addition to the major form of Banks discussed above are, Processing Co-perative Banks, Fisheries Co-operative Banks, Forestry Co-operative Banks and Poultry Forming etc

1. Credit Co-operative Banks

hese Co-operative Banks are formed for the financial help of the members. These Banks provide loans to ıe members at low rate of interests. In rural area these provides loans to the farmers for the purchase of :eds, fertilizers and cattle. In urban area these Banks provide loan to its members for the purchase of raw ıaterial and tool.

'hese are the various types of Co-operative Banks which are formed to achieve economic objectives of the ıembers. Hence the further study is related to **"Loans & Advances"** of **"Co-operative Credit Bank.**

.9 BANK PROFILE

he name of the bank is shrishantappannamiraji urban bank ltd chikodi Established in the year 1961.The ank is situated in chikodi. the bank register NO. C/ARCD/6193/77-78 AND Reserve bank license number. IBD/KAN/1499P.

he ShriShantappanaMiraji Urban Bank Limited is head quartered at chikodi is professionally managed ank. Started 3 decades back, at a time when banking was less known to the people. The bank grew in rength over the years. The shrishantappannamirajiurban bank three branches spread over in Belgaum. The ank has ambitious plans for growth in branches total business and profits. The bank has achieved ubstantial sophistication in the various banking services provided.

he bank is managed by a group of professionals' administrators and businessman. From the starting the ank has been going in 'A' as an audit classification. And also it is giving 14% as dividend to the share olders.

EGISTERED OFFICE:

he address of the registered office of the bank shall be shrishantappannamiraji urban bank . If any change above address shall be intimated to the Reserve Bank of India and registrar of co-operative societies ithin fourteen days from the date of occurrence of such a

hange. Such a change of address shall also be immediately published in a local news papers and displayed n the banks notice board.

ISION AND MISSION:

ISSION:-

- Understanding the needs of customers & offering them superior product and services.
- Leveraging technology to service customers quickly and conveniently
- **Mission:**
  - Customer Service and Product Innovation tuned to diverse needs of individual and corporate clientele.
  - Continuous technology up gradation while maintaining human values
  - Efficiency and effectiveness built on ethical practices

Name of the bank	The shantapannamirje urban co-operative bank ltd chikodi.
Year of Establishment	1961
Nature of Business	Banking service
Location	944,945 Guruwar peth CHIKODI Tq: ChikodiDist: Belgaum Karnataka 591201(India)
RBI register number	ACD\KA\271\P27-S-1981
Registered number of bank	8206 DATE 23-6-1961
Telephone number	08338-272149
E-mail	Shantappannamirajibank.com
Working hours	10 AM to 6 PM

3.10 THE ADDRESS OF THE BANK

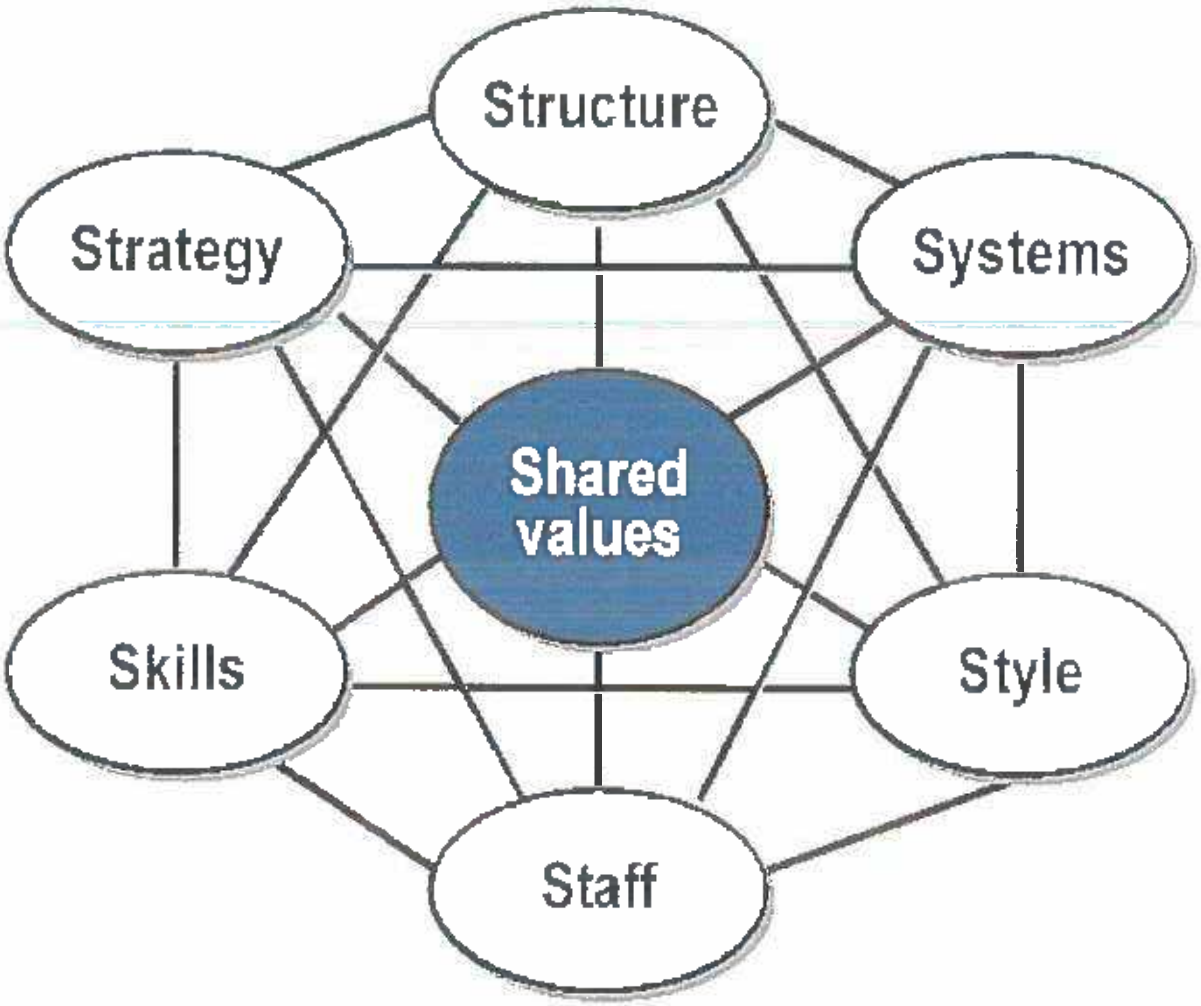
ROGRESS OF THE BANK : (In lakhs)

Sl No	Particulars	2015-16	2016-17	2017-18	2018-19	2019-20
1	No of members	3116	3085	4025.33	4095.20	5025.23
2	Share Capital	261.45	289.85	305.25	405.30	4950.90
3	Reserve and Surplus	875.38	934.19	1020.30	1017.33	1080.25
4	Deposits	8255.74	9170.98	1010.50	1090.33	11025.66
7	Investment	4007.98	4351.65	4695.63	5020.30	5525.95
8	Net Profit	97.44	101.10	120.00	180.25	210.55
9	Dividend	14%	14%	14%	14%	14%

STAFF

SL.NO	NAME	DESIGNATION
1	K . N. KUMBAR	chief accountant
2	B .A. BHOJAKAR	general manager
3	D. J .MUNNOLLI	charted accountant
4	YASHWANT	Pigmy Agent
5	KUMAR KUPANATTI	Watchman

.11 MCKENSY'S 7S FRAMEWORK WITH RESPECT TO SHRI SHANTAPPANNA MIRAJI URBAN BANK CHIKODI



TRATEGY:

a set of decision and action aimed at gaining a sustainable competitive advantage. It includes mission and ision of the Bank

he term strategy is derived from the Greek word 'strategies' which means general. Strategy can be defined s the general programs of action and deployment of resource to attain comprehensive objectives. Strategy is he route that the organization has chosen for its future growth, and plan an organization formulates to gain a ustainable competitive advantage.

TRUCTURE:

'he structure of an organization is what follows from division of work, the tasks and responsibilities, both orizontally and vertically. It is the total of various ways in which the work is divided into separate tasks and ie way in which these tasks are co-ordinated. It also includes how the policies and procedures, govern the vay in which the organization acts within itself and within its environment. Structure of any organization is ie frame work in which the activities of the organizations members are co-ordinated.

'TYLE:

tyle refers to the employees shared and common way of thinking and behaving -unwritten norms of ehaviour and thought. The managerial approach is more projects focused than process focused. The nanagement is likely mixture of self-management for customer facing activities and task management for rganizational activities.

'or ex: if the staff is to treat customers as individuals, then they themselves will need to be managed as ndividuals, this suggests a self-management style.

.12 Models for leadership:

Sharing leadership is key to the white stag philosophy of leadership because overtly promotes the listribution of the function of the leader among the group. Competitive styles of leadership are less and less esponsive to complex Bank today. Participative of cooperative styles of interaction are the keys to our uture. An individual's style in interacting with others is an outward sign of the substance within. With xperience, we can really tell a lot about people's capabilities by looking at them, but it is better to watch hem in action. How does a good leader behave when the group is confronted with the need for decision.

Leadership Styles in shrishantappannamirajiurban bank:

t has been observed in **Shrishantappannamiraji Urban Urban Bank** that the behaviour of superior owards the subordinates is pleasant. They motivate fresher who are working under them. The superior tells he subordinates what he has to do. The objective of the work is clearly defined to them. Otherwise the superior talks to the subordinate, ask the difficulties that the subordinate is facing, and tries to solve his problems.It is also been observed that in the organization that while speaking to their subordinates, superiors will be very friendly and affectionate to the subordinates.

Systems:

The systems refers to the procedure, processes and routine that characterize how important works has to be lone like financial systems, hiring, promotion and performance appraisal systems, information .Systems equire capabilities in both information technology and in organizational process methods and controls. The capabilities are required in:

. Information Technology & Information System:

t is used for Designing a user interface, analysis and design techniques, Development of prototype, new roduct development, database, System delivery like distribution to multiple users, locations, media type and ombinations and operation of wide area network management, security management.

. Sales and service:

Design, development and delivery of new responsive processes to support intimate customer relationships. And operation sales, services, claims, 24/7 day support.

. Legal:

For like personalization and customization of products/services. The decision-making system within the organization can range from management institution, to structured computer system to complex expert system an artificial intelligence. It includes

Computer system

Operational System

Human Resource System

Marketing

Finance

taff:

his refers to organizations human resources. How organizations human resource is developed, trained, ocialized, integrated, motivated and how their career development is managed.

hriShantappannaMirajiurban Bankencourages every member of the Bank to practice the Indian rinciples of work: service with devotion. Sound management practices, professionalism of a high calibre, a ohesive group policy which charters of independence in individual operations are the strengths of the hantapannamiraji urban bank.

t **ShriShantappannaMiraji Urban Bank**believe that people are the key resources - especially in a high ech competitive environment. It is the people behind the work, behind the product and behind the service hat make the difference. That is the reason we take exceptional care to hire the best - both in terms of ualification and attitudes, and constantly train and upgrade their skills.

he company has employed able people, trained them well and assigned them to the right jobs. Selection, raining, reward and recognition, retention, motivation and assignment to appropriate work are all key issues.

kills:

kills refer to distinctive capabilities of personnel or of the organization as a whole. Skills are that for which he staff to develop appropriate new skills, for which it requires a learning environment. If the staff managers re to acquire the skills, then there needs to be an appropriate learning environment. One that:

- Is driven by desire to realize the vision.
- Has a sharing culture with mutual support.
- Provides space and time for learning. Preferably closely linked to specific tasks and objectives (just in time learning).
- Allows risk
- Tolerates failure, provided it is part of the learning process.
- Has visible recognition for success that is built on new learning.

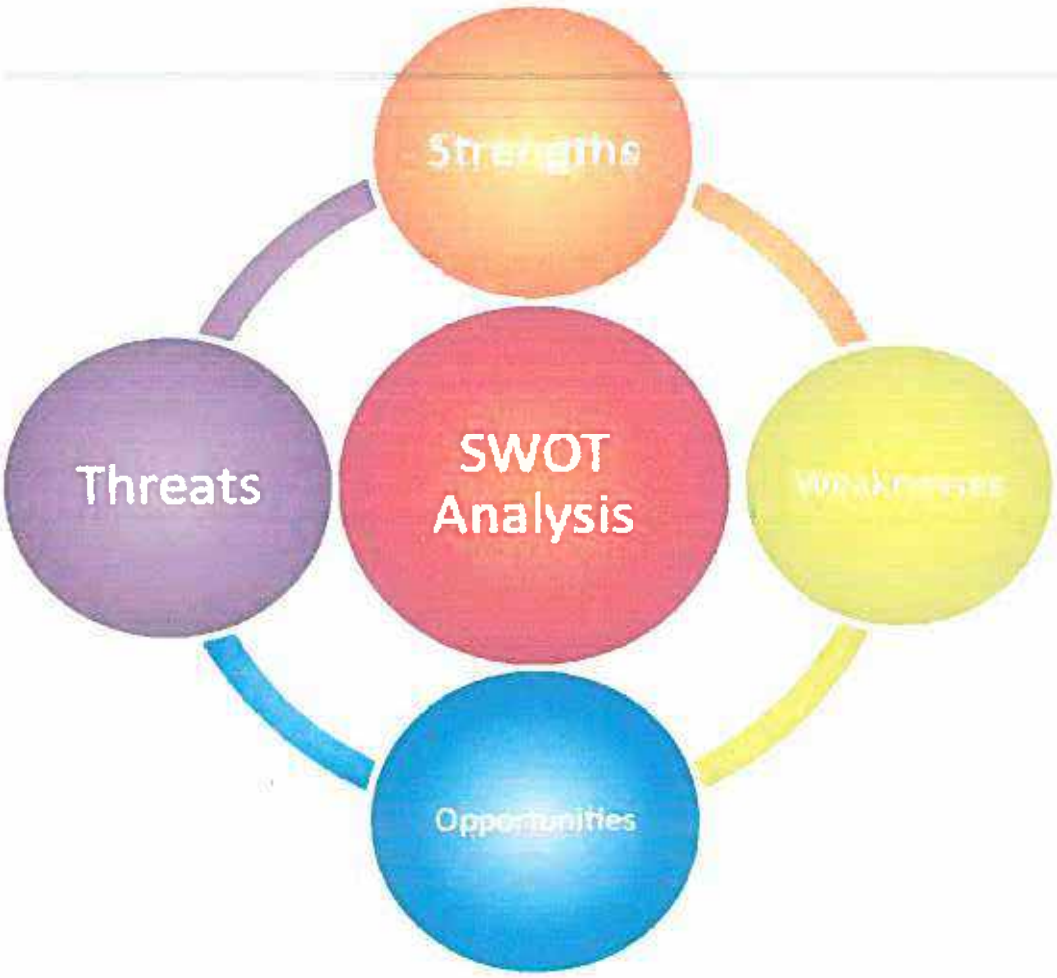
Where skills and experience cannot be resourced or developed internally within the required timescales then external companies will need to be retained.

In short skills refer to the fact that employees have the skills needed to carry out the company's strategy. Training and development ensuring people know how to do their jobs and stay up to date the latest techniques.

Shared Values: -Customer Satisfaction through

- Providing quality service effectively and efficiently
- Smile, it enhances your face value" is a service quality stressed on
- Periodic Customer Service Audits
- Maximization of Stakeholder value

.13SWOT Analysis:



Strengths

- Shrishantappannmiraji urban Bank has been in the banking industry since 1989. It has successfully completed SILVER JUBLI CEREMONY.
- The bank has a sound network i.e. it providing mobile SMS service to their customer.
- The bank is having well experienced, trained, most dedicated and committed staff.
- In has a strong customer base.

Weakness

- Tedious procedures have to be followed before advancing loans causing inconvenience to customers.
- Bank has less resource as compare to nationalized bank.
- No internet banking, mobile ATM banking.

Opportunities

- The bank can optimize the growth opportunities arising out of retail banking and small and medium enterprises (SMEs).
- Further expansion of business networks and possible arrangements of sharing networks of other banks by issuing mutual funds and insurance

Threats

- Bank is facing competition from its other Private Sector Banks
- Changing economic policies of Government will have serious impact on interest rates and reserve ratio maintained with RBI.

3.14 List of Department and functions:

Department of the Bank

- Credit department
- Operation department
- Marketing department
- Cash department
- Clearing department
- Customers Relation
- Cash Management service

. Credit Department:

'his department mainly concentrates on lending activities to its customers and client. For smoothing of its ctivities it has further sub department. This department provides different loan like personal loan, housing oan, education loan, agriculture loan etc. While providing loan it evaluate the capability, back ground of lient and analyze the risk involved in recollecting the same. To operate its activity it has given maximum ecision power by management which will help to run organization successfully. As it is credit department it nvolves more risk and uncertainty towards its client and customers, so that the contribution to other epartment for achieving targets usually less. And it has also its future plans for achieving its goals.

'unctions:

- Examining the proposals.
- Documentations.
- Disbursements of loans.
- Recovering the loan.
- Credit appraisal.

!. Operation Department:

t is department which is taking care of daily banking activities for smooth running of organization. The peration has been delegated average decision authority bin their routine work by management. It full co-peration with other department and also it is necessary for other department for smooth running. The lepartment has been apprised by the management with different criteria, like by customer satisfaction, by ranch performance. As it is an operation department, so it will contribute to all departments in achieving heir planned targets.

'unctions:

Out-station cheque realization.

- Attending customer's queries.
- ATN office in charge.
- Handling day to day transactions.
- Cash and clearance.
- Handling govt. business.

- RTGS (Real Time Gross Settlement System).

. Marketing Department:

t is the department, which will take care of organization expansion by way of achieving targeted goals. Aeans in this department it mainly concentrate on selling security, acquiring more number of deposits, ccounts etc. The marketing department has been given decision power 50-90% by the management to chieve their target and, make it success. For achieving of this success department has supporting and go perate with this department. Hence the marketing department performance has appraised with technique ike, by customer satisfaction, by branch performance, by self appraisal, by giving targets. Therefore to chieve this target marketing department has its own plan and strategies like,

By obtaining new customers.
By generating new business through existed customers.

Functions:

- Coordinating with sales executives.
- Customer service.
- Opening of new account (building of new relation).

4. Cash Department:

n this department it evaluates the daily requirements of cash, based on this it is going to maintain liquidity. f the bank having heavy cash liquidity, this department will keep all cash in to higher authority bank. The lepartment has been given 50-80% of decision power by management to their routine activities. It has given nore contribution to other departments in achieving their goals in terms of co-operation. As it is cash lepartment there are no any future plans. But as per present scenario market it is going to act.

Functions:

- Handling daily cash transaction.
- Balancing cash figure at the end of day.
- Maintaining cash level of the bank.

Maintaining liquidity.

. Clearing Department:

t is department which is taking care of customer work regarding receiving out station cheques and Odds. 'he department has given average decision power by the management. Regarding go-operation it has ontributing to other department as much as possible. As it is clearing department it had no any future plans ut it is ready accept all positive changes towards improvement.

'unctions:

Clearance of out stations cheque.

Clearance of locals cheque

CBSS (software name used for giving information to the current

\ccount holders).

).15 Information Technology:

'he bank is continuously focusing on improvement in IT related functions to have an edge over other market layers. The bank continues to leverage information technology as a strategic tool for its business operations, o gain competitive advantage by offering customer convenience and improved services as well as mproving productivity and efficiency. UTI Bank technology strategy emphasis enhanced level of customer ervices through multi channel banking and straight through processing, and cost efficiency through wider nd focus market reach and opportunities for cross selling.

\s a measure to reduce operational cost, increase the deposit base and enhance customer service, the bank in ncreasing the number of ATMs. The bank has introduced the Intranet banking facility-titled connect.

'roduct and Services

Consumer banking

Shrishantappanamiraji urban Bank is providing in consumer banking the following products and services:-

- Savings Account
- Salary Power

- Power Salute
- Priority Banking
- Senior Privilege
- Fixed Deposits
- lockers

Services

- Corporate banking
- Cash Management Services
- Trade Service
- Lending/Financing

Corporate banking

In corporate banking shantappana miraji urban Bank is providing following services.

- Cash Management Services
- Lending/Financing
- Trade Service
- Current Account
- Fixed Deposits

Cash Management Services

Through bank cash management service, bank brings to customers a wide array of collection and payment services for improved liquidity through faster access to their funds and total control on their fund movements through customized MIS reports. Banks cash management service solutions include

- Collection services that offer local cheques collection (LCC) at more than 100 locations and upcountry cheques collection (UCC) for more than 800 locations.

Lending/Financing

Working capital finance

- Cash credit / working capital demand loan
- Term lending
- Channel finance
- Asset securitizat

CHAPTER-4

DATA ANALYSIS AND INTERPRETATION

Table 4.1 shows mortgage loan

Table 4.2 shows salary secured loan

Table 4.3 surety loan

Table 4.4 salary credit loan

Table 4.5 fixed deposit loan

Table 4.6 vehicle loan

Table 4.7 housing loan

Table 4.8 motor cycle loan

Table 4.9 plant machinery loan

Table 4.10 medium term loan

Table 4.11 pigmy deposit loan

Table 4.12 nsc loan

Table 4.13 recurring deposit loan

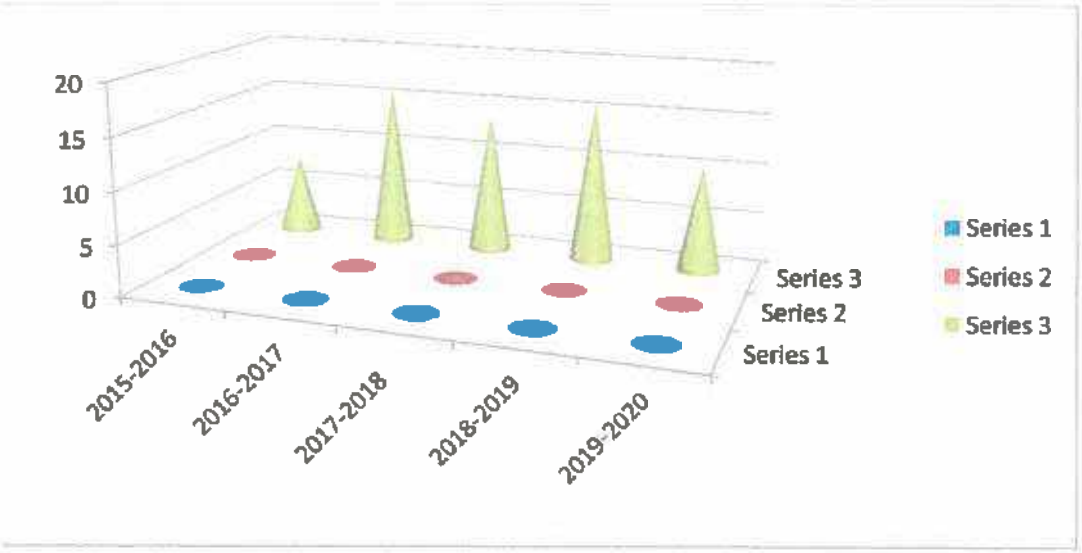
CHAPTER-4

DATA ANALYSIS AND INTERPRETATION

'ABLE NO. 4.1 SHOWS MORTGAGE LOAN

'ears	Loan Amounts	Total Loans	Amount in Percentage
015-2016	51,36,091.00	6,35,10,515.61	8.08
016-2017	1,13,12,207.00	6,85,04,118.00	16.51
017-2018	1,00,65,962.00	7,02,92,709.20	14.32
018-2019	1,33,09,476.00	8,19,97,399.21	16.23
019-2020	88,07,667.00	8,25,63,619.21	10.67

Graph4.1



nterpretation:

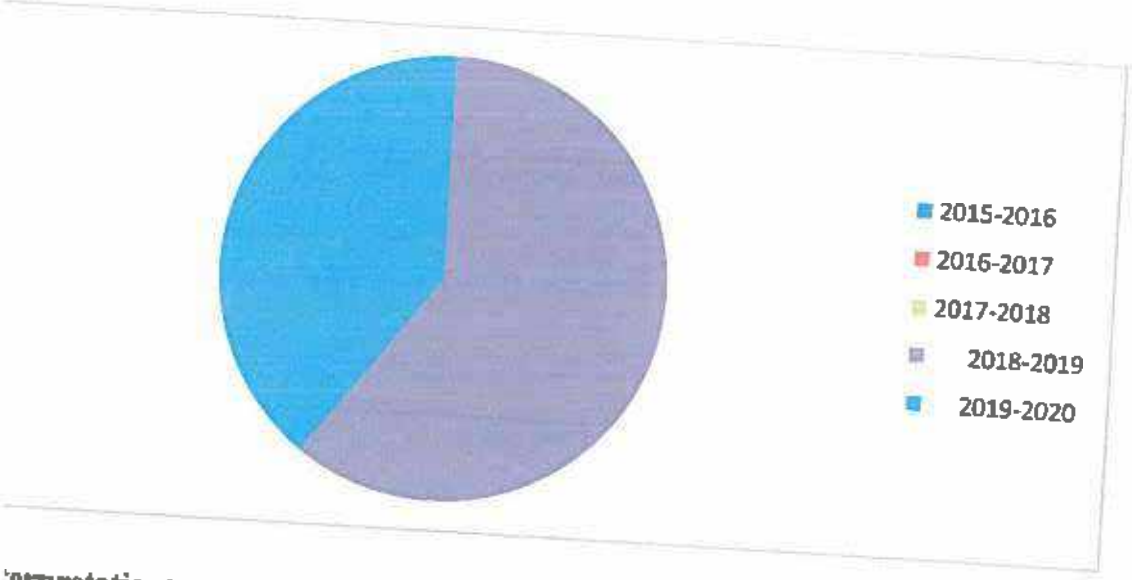
Given graph shows that the Mortgage Loan has increased from 8.08% to 16.51% in the year 2016-2017 as ompared to the year 2015-2016. And it has decreased to 14.32% in the year 2017-2018And it has increased o 16.23% in the year 2018-2019 and it has decreased 10.67% in the year 2019-2020 as compared to the revious year

TABLE NO. 4.2 SHOWS SALARY SECURED LOAN

Years	Loan Amounts	Total Loans	Amount in Percentage
2015-2016	1,17,482.00	6,35,10,515.61	0.18
2016-2017	1,09,191.00	6,85,04,118.00	0.16
2017-2018	1,86,048.00	7,02,92,709.20	0.26
2018-2019	74,895.00	8,19,97,399.21	0.09
2019-2020	**49,531.00**	8,25,63,619.21	**0.05**

Source: Annual Reports of the Bank from the year 2015-16 to 2019-20

Graph 4.2



erpretation:

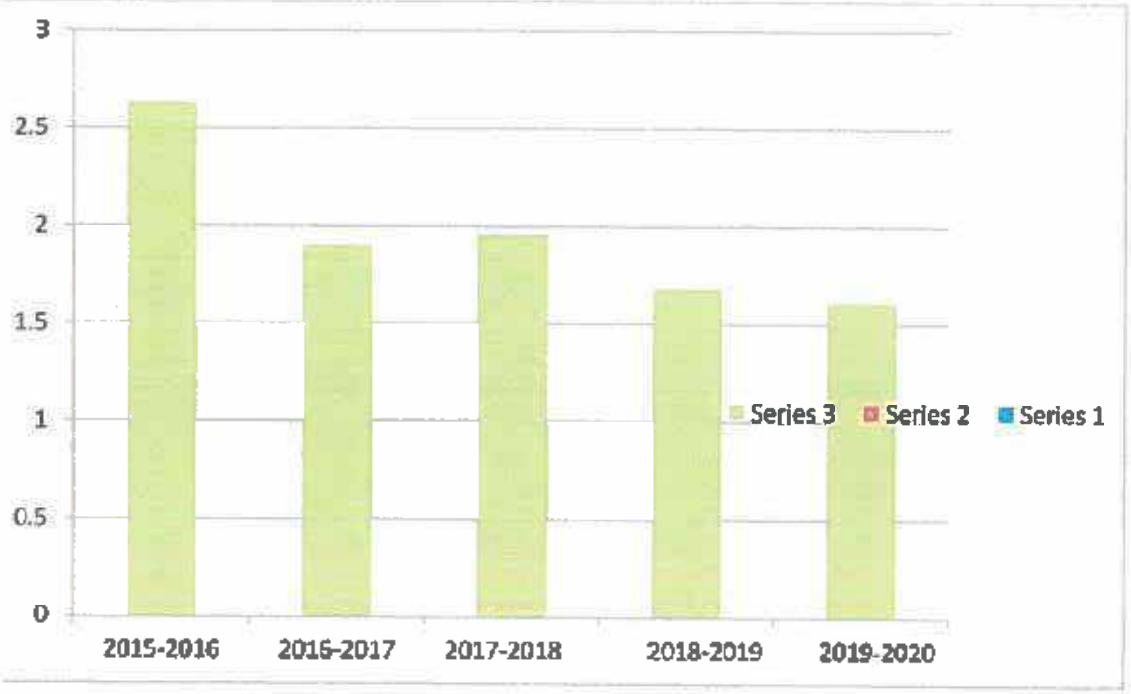
ove graph shows the salary based loan has decreased from 0.18% to 0.16% in the year 2016-2017 as pared to the year 2015-2016. And it was highest in the year 2017-2018, 0.26% and again it decreased to % in the year 2018-2019 and 0.05% in the year 2019-2020.

TABLE NO.4.3 SHOWS SURETY LOAN

Years	Loan Amount	Total Loans	Amount in percentage
2015-2016	16,69,182.00	6,35,10,515.61	2.63
2016-2017	13,06,868.00	6,85,04,118.00	1.90
2017-2018	13,81,921.00	7,02,92,709.20	1.96
2018-2019	13,80,558.00	8,19,97,399.21	1.68
2019-2020	13,29,541.00	**8,25,63,619.21**	**1.61**

Source: Annual Reports of the Bank from the year 2015-16 to 2019-20

Graph no 4.3



Interpretation:

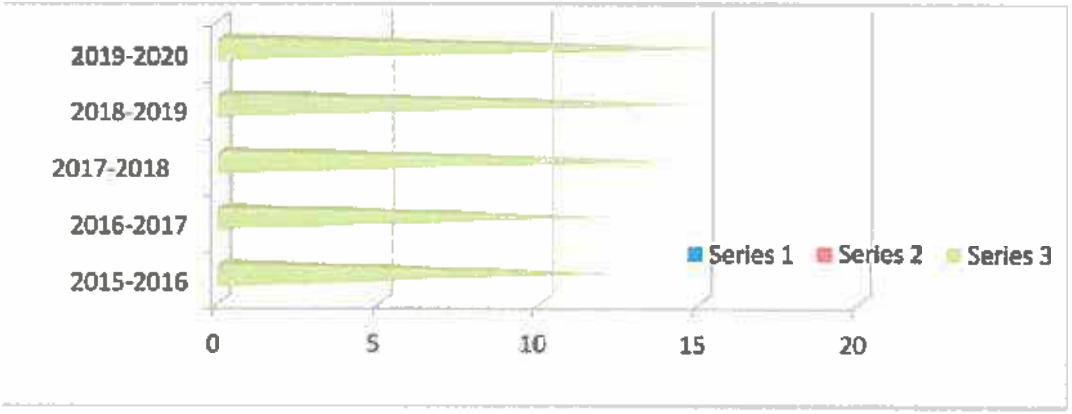
Given graph shows that the surety loan has decreased from 2.63% to 1.90% in the year 2016-2017 as compared to the previous year 2015-2016. And it has gradually increased 1.96% in the year 2017-2018. And it has decreased 1.61% in the year 2019-2020.

TABLE NO.4.4 SHOWS SALARY CREDIT LOAN

Years	Loan Amount	Total Loans	Percentage
2015-2016	80,96,070.61	6,35,10,515.61	12.75
2016-2017	86,46,392.00	6,85,04,118.00	12.62
2017-2018	1,03,97,537.20	7,02,92,709.20	14.79
2018-2019	1,28,58,029.80	8,19,97,399.21	15.68
2019-2020	1,35,49,787.80	8,25,63,619.21	16.41

Source: Annual Repots of the Bank from the year 2015-16 to 2019-20

Graph 4.4



Interpretation:

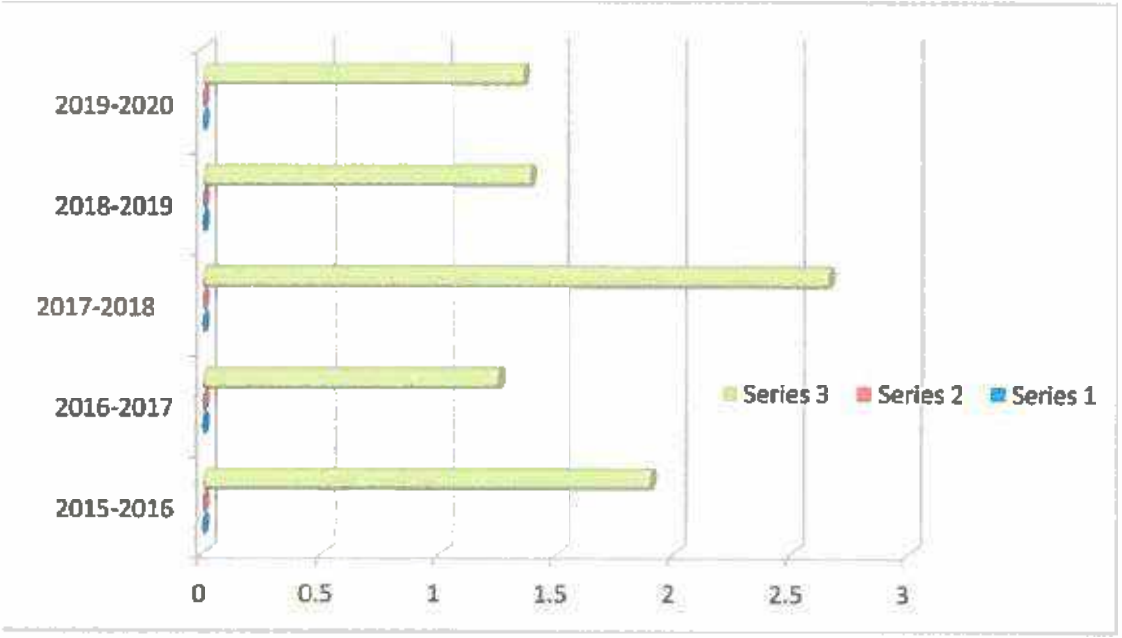
The above graph shows us the cash credit loan was 12.75% in the year 2015-2016. And it has gradually decreased 12.62% in the year 2016-2017.But it has continuously increased from 14.79% to 16.41% in the year 2019-2020 as compared to the previous years.

TABLE NO.4.5 SHOWS FIXED DEPOSIT LOAN

Years	Loan Amounts	Total Loans	Amount in Percentage
2015-2016	12,08,112.00	6,35,10,515.61	1.90
2016-2017	8,57,686.00	6,85,04,118.00	1.25
2017-2018	18,69,000.00	7,02,92,709.20	2.66
2018-2019	11,46,500.00	8,19,97,399.21	1.39
2019-2020	11,24,000.00	8,25,63,619.21	1.36

Source: Annual Reports of the Bank from the year 2015-16 to 2019-20

Graph 4.5



Interpretation:

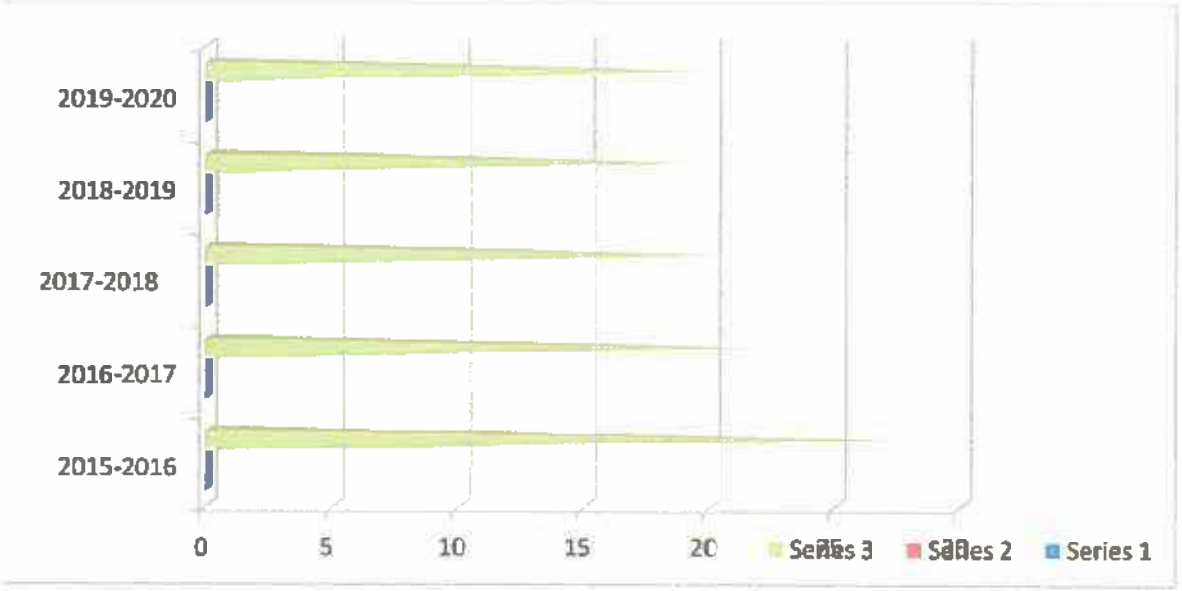
Given graph shows the fixed deposit loan has gradually decreased from 1.90% to 1.25% in the year 2016-2017as compared to the year 2015-2016. And it has increased 2.66% in the year 2014-2015 and it has decreased to1.36% in the year 2019-2020.

TABLE NO.4.6 SHOWS VEHICLE LOAN

Years	Loan Amount	Total Loans	Amount in Percentage
2015-2016	1,82,64,382.00	6,35,10,515.61	28.75
2016-2017	1,55,81,784.00	6,85,04,118.00	22.75
2017-2018	1,51,26,911.00	7,02,92,709.20	21.52
2018-2019	1,64,29,915.00	8,19,97,399.21	20.03
2019-2020	1,72,21,437.00	8,25,63,619.21	20.85

Source: Annual Reports of the Bank from the year 2015-16 to 2019-20

Graph 4.6



Interpretation:

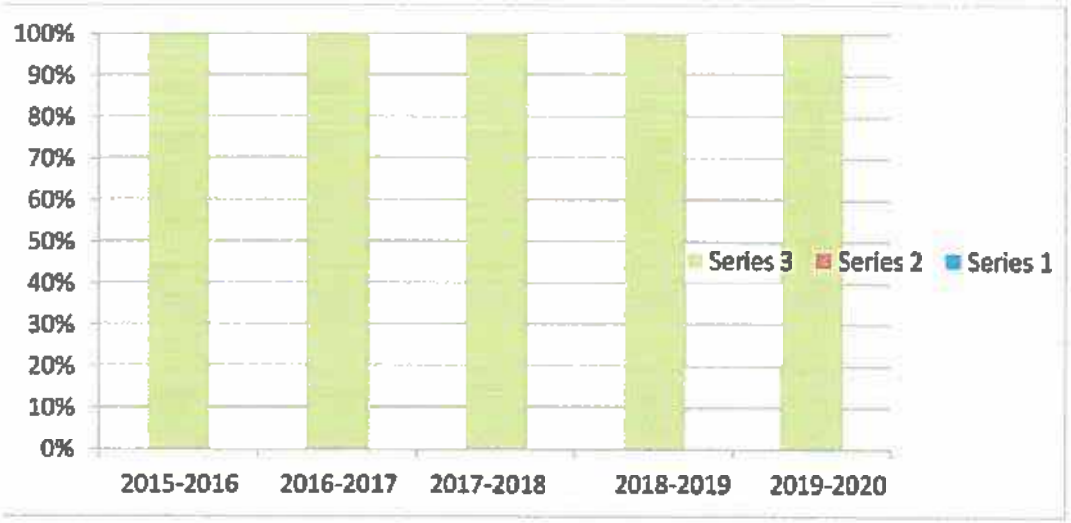
The vehicle loan continuously decreased from 28.75% to 20.85% in the year 2019-2020 as compared to the previous year 2015-2016.

TABLE NO.4.7 SHOWS HOUSING LOAN

Years	Loan Amount	Total Loans	Amount in Percentage
2015-2016	1,08,60,915.00	6,35,10,515.61	17.10
2016-2017	1,16,40,062.00	6,85,04,118.00	16.99
2017-2018	1,30,29,756.00	7,02,92,709.20	18.54
2018-2019	1,66,22,201.00	8,19,97,399.21	20.27
2019-2020	2,20,79,585.00	**8,25,63,619.21**	**26.74**

Source: Annual Reports of the Bank from the year 2015-16 to 2019-20

Graph 4.7



Interpretation:

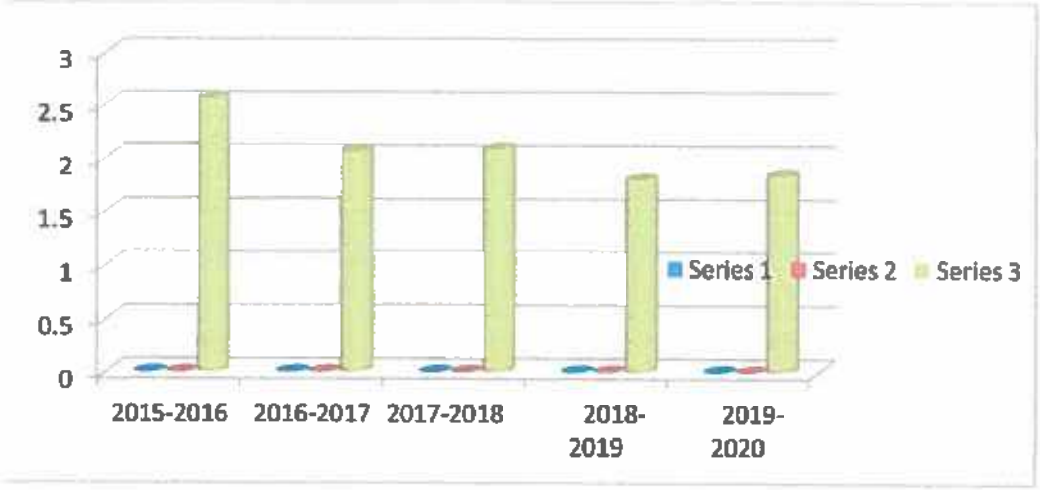
The above graph shows that the housing loan has decreased from 17.10% to 16.99% in the year 2016-2017 as compared to the previous year 2015-2016. And it has continuously increased from 18.54% to 26.74% in the year 2019-2020.

TABLE NO.4.8 SHOWS MOTOR CYCLE LOAN

Years	Loan Amount	Total Loans	Amount in Percentage
2015-2016	16,35,208.00	6,35,10,515.61	2.57
2016-2017	14,20,394.00	6,85,04,118.00	2.07
2017-2018	14,74,387.00	7,02,92,709.20	2.09
2018-2019	14,90,299.00	8,19,97,399.21	1.81
2019-2020	15,31,861.00	8,25,63,619.21	1.85

Source: Annual Reports of the Bank from the year 2015-16 to 2019-20

Graph 4.8



Interpretation:

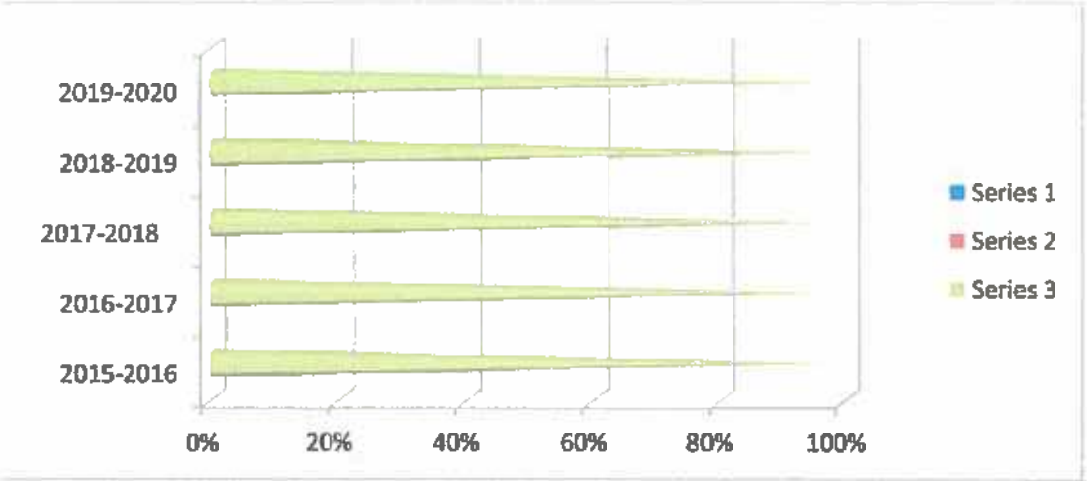
Given graph shows that the motor cycle loan has decreased from 2.57% to 2.07%in the year 2016-2017 as compared to the previous year 2015-2016. And it gradually increased to 2.09% in the year 2017-2018. And it has decreased 1.81% in the year 2015-2016 and it has increased 1.85% in the year 2016-2017.

'ABLE NO.4.9 SHOWS PLANT MACHINERY LOAN

'ears	Loan Amounts	Total Loans	Amount in Percentage
015-2016	96,51,066.00	6,35,10,515.61	15.20
016-2017	80,49,681.00	6,85,04,118.00	11.75
017-2018	61,29,562.00	7,02,92,709.20	8.72
018-2019	53,30,462.00	8,19,97,399.21	6.50
019-2020	40,64,308.00	8,25,63,619.21	4.92

iource: Annual Reports of the Bank from the year 2015-16 to 2019-20

Graph 4.9



nterpretation:

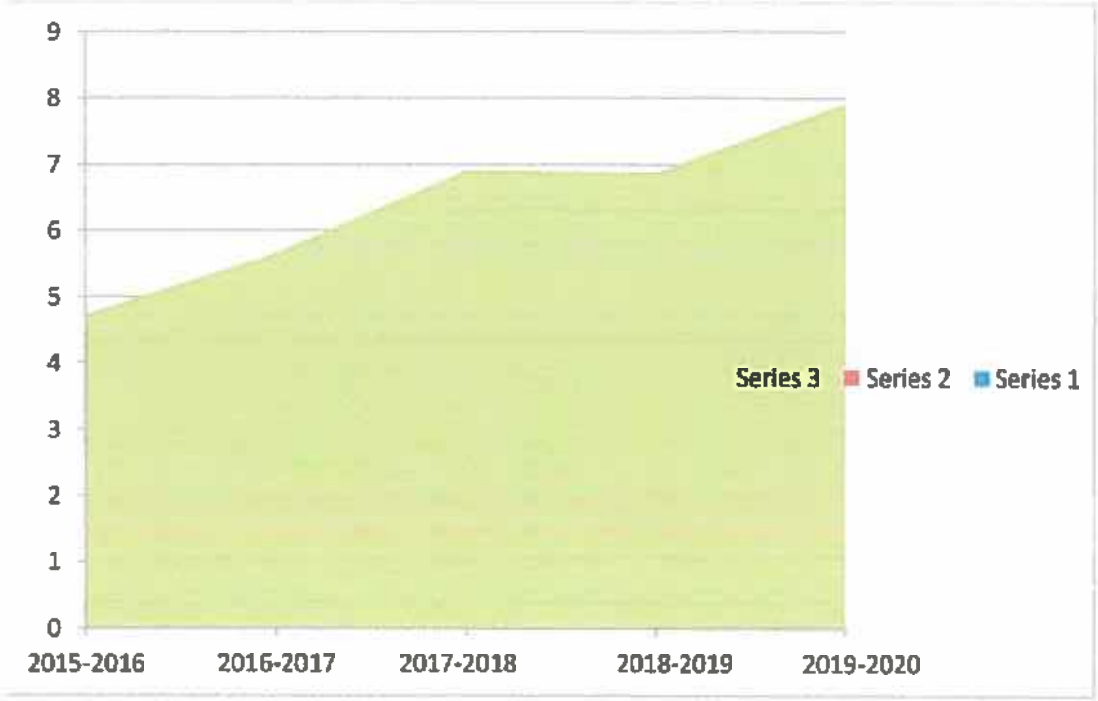
The above graph shows that the plant and machinery loan was 15.20% in the year 2015-2016 And it :ontinuously decreased from 15.20% to 4.92% during the study period.

'ABLE NO.4.10 SHOWS MEDIUM TERM LOAN

'ears	Loan Amount	Total Loans	Amount in Percentage
015-2016	30,11,459.00	6,35,10,515.61	4.74
016-2017	38,60,471.00	6,85,04,118.00	5.66
017-2018	48,64,987.00	7,02,92,709.20	6.92
018-2019	56,45,425.41	8,19,97,399.21	6.88
019-2020	65,47,167.41	8,25,63,619.21	7.93

ource: Annual Reports of the Bank from the year 2015-16 to 2019-20

Graph 4.10



nterpretation:

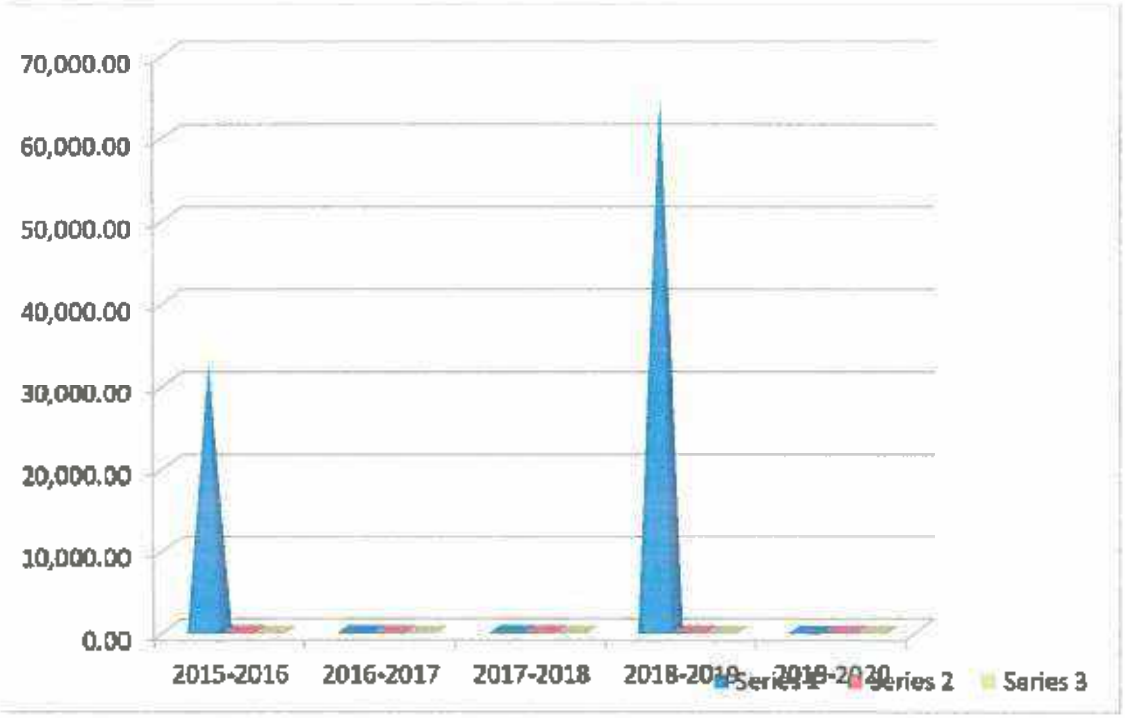
'he above graph shows that the medium term loan was 4.74% in the year 2015-2016. And it has ontinuously or
imultaneously increased from 4.74% to 7.93% during the stage

'ABLE NO.4.11 SHOWS PIGMY DEPOSIT LOAN

'ear	Loan Amount	Total Loan	Amount in percentage
015-2016	32,500.00	6,35,10,515.61	0.09
016-2017	4,69,000.00	6,85,04,118.00	0.68
017-2018	1,68,000.00	7,02,92,709.20	0.26
018-2019	65,137.00	8,19,97,399.21	0.07
019-2020	2,57,000.00	8,25,63,619.21	0.31

ource: Annual Reports of the Bank from the year 2015-16 to 2019-20

Graph 4.11



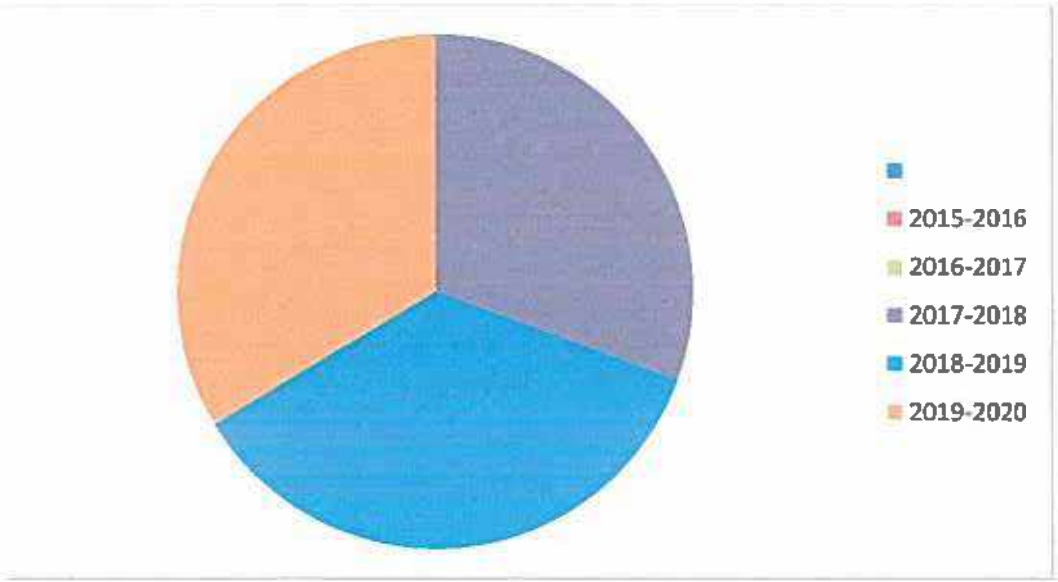
nterpretation: Given graph shows that the pigmy deposit loan was increased from 0.09% to 0.68% in the 'ear 2015-2016 as compared to the previous year and it has decreased 0.26% in the year 2018-2019. And gain it has decreased 0.07% in the year 2015-2016. But it increased 0.31% in the year 2016-2017

'ABLE NO.4.12 SHOWS NSC LOAN

'ear	Loan Amount	Total Loan	Amount in percentage
015-2016	3,40,903.00	6,35,10,515.61	0.52
016-2017	2,60,754.00	6,85,04,118.00	0.38
017-2018	82,300.00	7,02,92,709.20	0.12
018-2019	95,908.00	8,19,97,399.21	0.11
019-2020	90,296.00	8,25,63,619.21	0.10

ource: Annual Reports of the Bank from the year 2015-16 to 2019-20

Graph 4.12



nterpretation:

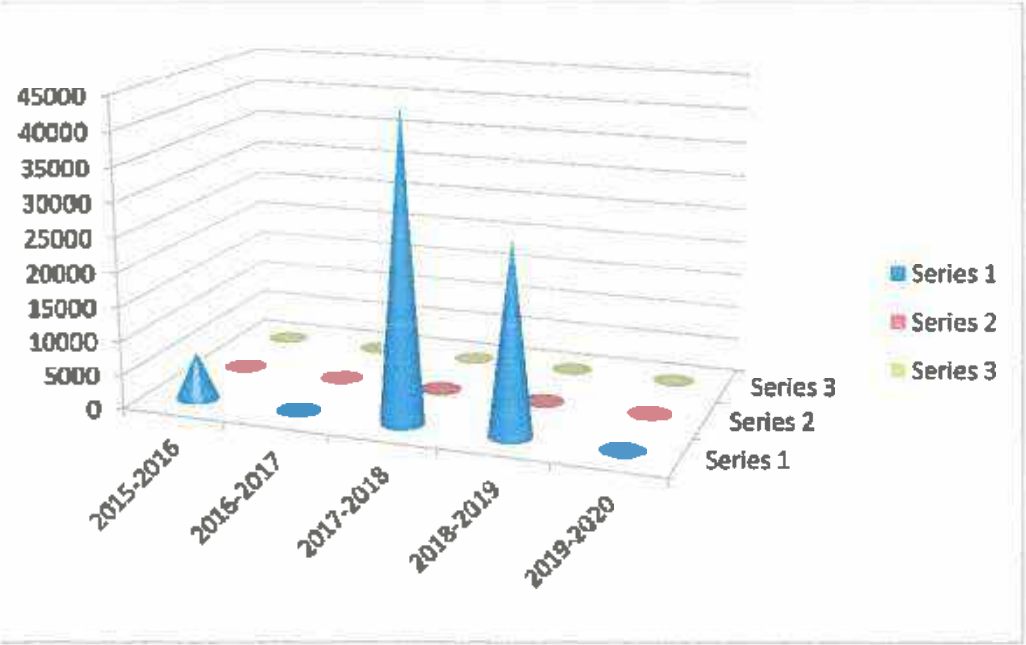
The above graph shows that the National Saving Certificate Loan continuously decreased from 0.52% to 0.10%
during the study period.

'ABLE NO.4.13 SHOWS RECURRING DEPOSIT LOAN

'ear	Loan Amount	Total Loan	Amount in percentage
015-2016	7000.00	6,35,10,515.61	0.01
016-2017	Nil	6,85,04,118.00	Nil
017-2018	45000.00	7,02,92,709.20	0.06
018-2019	28000.00	8,19,97,399.21	0.03
019-2020	2,16,000.00	8,25,63,619.21	0.26

iource: Annual Reports of the Bank from the year 2015-16 to 2019-20

Graph 4.13



nterpretation:

Given graph shows that the recurring deposit loan 0.01% in the year 2015-2016 and in the year 2016-2017 it vas nil and it increased 0.06% and again it was increased to 0.26% in the year2016-2

CHAPTER -5

FINDINGS, SUGGESTIONS AND CONCLUSION

5.1 Findings

5.2 Suggestions

5.3 Conclusion

CHAPTER -5

FINDINGS, SUGGESTIONS AND CONCLUSION

.1FINDINGS:

rom the study we can see that the number of members has increased from 2985 in the year 2015-2016 to 116 in the year 2016-2017.

'rom the study we can see that the amount of deposits in the 2015-2016 was Rs. 6013.33 lakhs and it ıcreased to Rs.8255.74 lakhs by the year 2019-2020.

'he Loans sanctioned in the year 2015-2016 were Rs. 3734.90 lakhs and it has reached to Rs. 4386.56 lakhs ı the 2019-2020.

'he Mortgage loan initial it was stood at Rs. 51, 36,091.00 when it is compared to total loans it was just .08%. It reveals that in the subsequent years rate is increased from 0.08% to10.67% in last year's.

'he loans like salary secured loan and surety loan have shown decreasing trend over the study period.

)uring the study it was found that the cash credit loan was Rs.80, 96,070.61 when it is compared to total oans it was just 12.75%. But it increased from 12.75% to 16.41% in the year 2019-2020.

)uring the study period it was found that the vehicle loan shows continuously decreasing trend over the tudy period. Initial it was Rs.1, 82, 64,382 when it is compared to total loans it was 28.75%. But it lecreased to 20.85% in the year 2019-2020.

'he Housing loan have shown increasing trend over the study period. The Housing loan was 17.10% in the ear 2015-2016 and it was increased to 26.74% in the year 2019-2020.

'he Medium Term Loan was increased year by year. Initial it was 4.74%, over the year it increased to 7.93%.

'he Motor Cycle Loan was decreasing year by year. In the year 2019-2020 it was 2.57% but it decreased to 1.85% in the year 2019-2020.

'he Plant and Machinery Loan initial was stood Rs 62, 55,064 when it is compared to total loans it was just 15.20%. It reveals that in the subsequent years rate is decreased from 15.20% to 4.92% in the year 2019-2020.

The BLCC Loan was lowest 4.74% in the year 2015-2016. But it was highest 9.17% in the year 2017-2018.

Few others loans like Fixed Deposit Loan and Pigmy Deposit Loan have been fluctuating over the study period.

The NSC Loan has been shows decreasing trend. Initial it was 0.52% but it was decreased to 0.10% in the year 2019-2020.

ı Recurring Deposit Loan initial was stood at Rs. 7000. When it is compared to total loans it was just .01%. It reveals that in the subsequent years rate is increased from 0.01% to 0.26% in last year. It predicts ıe recovery tool is not utilized in effective manner.

ıfter the financial statement analysis of the SHRI SHATAPPANNA MIRAJI URBAN BANK LTD :HIKODI. It is observe that the Federal Bank Ltd is doing business very good in banking sector. The bank ; providing

:redit Card, Debit card and Online banking facility to customer.

From the balance sheet it observes that the Asset of bank is increase year to year. It indicates that the bank is having good position of Asset as compare to liability.

2 SUGGESTIONS

l through the banks performance is very good and at par with industry, here is the some humble ggestions.

- The trend of surety loan is decreasing year by year by observing this I would like to suggest that bank should maintain the increasing in future.
- The trend of cash credit loan and housing loan increasing year by year by observing this I would like to suggest that the bank should maintain the increasing in future.
- The trend of Vehicle loan and Motor cycle loan decreasing year by year by observing this I would like to suggest that the bank should maintain increasing in future.
- It is suggested to the bank to arrange more training and development programs for the workers of the bank.
- The success of any loan scheme depends on how the bank can identify eligible borrower. Therefore appropriate action should be taken by field officers.
- Bank should open its branches at various rural areas places in the district. ATM facility should be provided to the account holders. Insist PAN Cards while operating the bank accounts. Prov ide facilities regarding recent developments like, Mobile Banking System, Core banking system, Tele

Banking System and Anywhere Banking System. The bank should try to increase its interest spread ratio significantly by increasing its credit deposit ratio.

- The bank must also try to increase its other income ratio by introducing more and more other lucrative services to its customers.
- The procedure for sanctioning loans and advances needs to be customer friendly and not too rigid.
- The bank has to improve their infrastructure facilities.
- Finally, the bank should Endeavour to reduce its other expenditure by implementing stringent controls on all types of expenses.

5.3 CONCLUSION:

The study conduct on Performance of Loans and Advances of"shriShantappannaMiraji Urban co-op.Bank LTD has shown concern for the growth of rural economy by providing required amount of credit facilities to the rural artisans, small and medium business units.

The bank is doing very good job and providing various types of loans to the customer. This bank is in the growth path because loans and advances are increasing year by year. The loan amount advanced to the needy borrower is increasing from year to year during the study period which indicates greater benefit to the members and customers. The amount of deposits is also showing increasing trend from year to year which reflects the confidence and trust of the public on the management of the bank and efficiency of the staff members. The amount of profit earned is found increasing from year to year. The increasing rate of dividend at the rate 14% distributed from year to year represents the operational efficiency of the bank.

However the researcher feel that the staff members need to be updated with new technology of banking business which facilities the management in introducing new business services to the present and potential customers.

To conduct a project work was a great experience at "shriShantappannaMiraji Urban co-op.Bank LTD I really come to know what are the procedure and formalities required to take loans and advances even the problem faced while recovery of such loans taken.

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ALGAE OF MARKANDEYA RIVER AT YOGIKOLLA

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RANI CHANNAMMA UNIVERSITY BELAGAVI

FOR PARTIAL FULFILLMENT OF THE AWARD OF THE DEGREE OF

MASTER OF SCIENCE

IN

BOTANY

SUBMITTED BY

MISS. SHREYA V. GAIKWAD
MISS.VIDYASHREE UGRANI

UNDER THE GUIDANCE OF

DR. RAHUL PATIL M.Sc., Ph.D.

DEPARTMENT OF POST GRADUATE STUDIES IN BOTANY
KLE SOCIETY'S, BASAVAPRABHU KORE ART'S, SCIENCE AND COMMERCE COLLEGE, CHIKODI, BELAGAVI- 591 201

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2021

DECLARATION

We declare the work in this dissertation entitled “Algae of Markandeya River at Yogikolla” has been carried out by us in the P.G. Department of Botany, Basavaprabhu Kore College, Chikodi. The information derived from the literature has been duly acknowledged in the text and list of references provided. No part of this dissertation was previously presented for another degree or diploma at this or any other institution.

MISS. SHREYA V. GAIKWAD
Reg. no-BT191418

MISS. VIDYASHREE UGRANI
Reg. no-BT191421

Place: Chikodi.
Date:

RANI CHANNAMMA UNIVERSITY BELAGAVI

CERTIFICATE

This is to certify that; this project entitled "**Algae of Markandeya River at Yogikolla, Gokak, Belagavi"** is being submitted herewith for the partial fulfillment of award of the Degree of Master of Science in Botany, Rani Channamma University Belagavi. The work reported in this dissertation is based upon the results of the original work carried out by **Miss. Shreya V. Gaikwad** and **Miss. Vidyashree Ugrani** under my supervision and guidance.

Place: Chikodi
Date: 9|9|2021

Dr. Rahul R. Patil
Research Supervisor

Co-ordinator
Department of Post Graduate Studies in Botany

25.9.2021

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During the studies that resulted in this document, we realized that there are a few things in life that we can claim as being truly our own. At each step during this journey, we were influenced and supported by many individuals, each contributing to our studies, personal views and interpretations of science and the world as a whole. Many of our family members supported with prayer at times when motivation dwindled or when seemingly dead ends stared us.

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Finally, we are grateful to all our well-wishers.

Miss. Vidyashree Ugrani

Miss. Shreya V Gaikwad

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Chapter-1
INTRODUCTION

1.1 General introduction

Biodiversity means the variability among living organisms from all sources and the ecological complexes of which they are part and include diversity within species or between species and of eco-systems (UNEP 1992). India is one of the twelve mega bio diversity countries in the world. In aquatic biodiversity, the density and diversity of organisms depend on availability and quality of water. As water is an essence and elixir of life on the earth and that water totally dominates the chemical composition of all organisms, it is obvious that the quality of water affects the species composition, abundance, productivity and physiological conditions especially, the indigenous population of aquatic organisms. Therefore, the nature and health of any aquatic community is an expression of quality of the water (Reynolds, 1996). The aquatic microphytes play a significant ecological role and are being extensively used as an indicator of water pollution as they are natural inhabitants of aquatic ecosystem that harbours a variety of communities which constitutes the characteristics and functioning of the ecosystem in terms of maintaining the production of food chain. The density and diversity of phytoplankton and their association as biological indicators is very crucial for the assessment of water quality. Algae constitute a major part of primary producers in a aquatic ecosystems and are ubiquitous components of the biosphere (Kavitha et al., 2005). They are cosmopolitan in distribution. Algae along with the other higher plants are the primary source of energy in the biosphere and form the basic of all life on land, fresh and marine water environment. These organisms along with the other aquatic as well as terrestrial plants make up the

biodiversity and also sustain life by providing food, shelter, oxygen and play a fundamental role in regulating global climate (Dwivedi et al., 2005). Algal diversity and species composition respond to change of water quality in all perennial water bodies. The composition of algal diversity serves as an important tool to analyse the water quality

(Jena et al., 2008). Phytoplankton plays an important role in the biosynthesis of organic matter (primary production) in aquatic systems, which directly or indirectly serve all the living organisms of a water body as food (Kumar and Dutta, 1991), (Verma and Mohanty, 1995). Generally, the different planktonic species can tolerate different ranges of temperature as well as light and nutrient limitations. These tolerance levels determine the dominance of species at different localities and seasons. In a multi species algal community, the growth of different species is likely to be limited by the resources, including different nutrients

(Wetzel, 2001). The structure of aquatic communities is important in monitoring the water quality. Planktons also strongly influence certain non-biological aspects of water quality such as pH, colour, taste and odour. Benthic algae are critical components in most stream food webs (Stevenson, 1996; Wehr and Sheath, 2003). These organisms help stabilize substrata and provide food and habitat for many other organisms, especially invertebrates. Because benthic algal assemblages are attached to substrata, they serve as “micro environmental-loggers” for physical, chemical, and biological disturbances that occur in stream reaches during the time in which the assemblages develop. Diatoms are especially good indicators of the environmental integrity of lotic ecosystems because they are common in most streams and provide the primary food source for many invertebrates and some juvenile fishes that reside in these systems (Dixit et al., 1992; Lowe and Pan, 1996; Stevenson and Pan, 1999). In

addition, diatoms are useful monitors of change because: 1) they are readily dispersed and can invade a variety of habitats; 2) they are relatively easy to sample and create minimal impact to resident biota during collections; 3) their response time (generation time) lies between bacteria (hourly) and macro invertebrates (triannual); and 4) diatoms are sensitive to subtle changes in environmental conditions and/or disturbances that may not visibly affect other communities, or may only affect other communities at greater levels of disturbance (Bahls, 1993; Stevenson and Pan, 1999 ; Stevenson and Bahls, 1999). In addition, the identification of diatoms is based on morphological features of their rigid walls (frustules) made of silicon dioxide (glass). This provides an opportunity to prepare permanent reference slides of diatom assemblages under different environmental regimes for use in assessing water conditions. Many investigators have used various diatom metrics to determine environmental conditions in streams including discharge and hydraulic fluctuations (Duncan and Blinn, 1989; Biggs and Hicky, 1994; Benenati et al., 1998), light (Hardwick et al., 1992), temperature (Squires et al., 1979; Blinn et al., 1989), salinity (Blinn and Bailey, 2001), nutrients (Patrick, 1977; Bahls et al., 1992; van Dam et al., 1994, Hill et al., 2000, Blinn and Bailey, 2001), and herbivory (Colletti et al., 1987, Steinman et al., 1987).

1.2 Objectives of the study:

1. To document the algal taxa, present in the habitat
2. To assess the pollution status based on algal diversity

Chapter-2
REVIEW OF LITERATURE

All over the world extensive and appreciable work has been carried out on freshwater algal diversity, and limnology. An account on the status of algal diversity in World, India and Karnataka is given below.

2.1 International Status

It was in 1754, Linnaeus gave the name of Algae to a group of plants and Jussieu (1789) was the first person to delimit the algae as known today. After a long period of silence, Link (1820-1833) studied the algal flora of Germany and Agardh worked on Scandinavian algal flora (1817-1824). Agardh (1824) arranged algae in six well defined orders: Diatomaceae (including Desmids), Nostochineae, Confervoideae, Ulvaceae, Florideae and Fucoideae while describing a group of 20 genera. The work of Kuetzing (1843-1849) however, was most significant as he described a bit more number of algal genera than any other contemporary phycologists. Hassal (1842-1845) was another scientist who made an outstanding contribution towards the field of algology. Borger (1894-1936) carried out some work on algae in Sweden, Australia, Argentina, Bolivia and China. Berger (1898-1936) carried out extensive research on freshwater algae of Sweden and examined numerous samples sent to him from collectors of Australia, South Patagonia. Lagerheim (1883-1902) studied the algal flora of Sweden and collections from Equador, India and Abyssinia. Lemmerman (1891-1910) worked on the algal flora of Germany and collections received from China and Paraguay. Nordstedt (1873-1897) described few species of algae from Argentina, Patagonia, Cameroon, Newzealand and Australia. A specific study on Cyanophyta

was initiated by Borzi (1878 - 1894), De Toni (1888-1905).

British researchers were also among the pioneers of algal research. G.S. West (1899- 1916) and W. West (1889-1909) made an exclusive study on freshwater algae and discovered a number of new species and also examined specimens sent to them by collectors from Tanganyika, Victoria, Egypt, Southwest Africa, Madagascar, West Indies, Ceylon, Burma, Bengal and Madras. Another remarkable contribution was made by Fritsch and Rich (1907- 1937) on the freshwater algae of South Africa. Strom (1920-1926) described some new species of algae from Turkey, Norway and Iceland.

Interest in Diatoms increased manifold from the very day of its discovery. Their taxonomic position has still been unsettled. Being a pioneer worker, Agardh (1824) published his work on Diatoms including Desmids. Schutt (1896) divided diatoms into two groups Centricae and Pennatae. Islam and Haroon (1975) and Islam and Morshed (1985) worked out the taxonomy, systematic and other aspects of the group diatom. Krishnamurthy (1954) and Gandhi (1955) have worked on diatom flora of India.

Fritsch (1935 & 1945) studied algae in detail, describing their morphology and reproduction in two volumes of his works under the name of "The Structure and Reproduction of the Algae", which was an incredible contribution to the field of algology and is considered as one of the most important treasure in the field of phycology. Thienemann (1954) studied the tropical freshwater plankton. Bold and Wynne (1978) also worked on the structure and reproduction of freshwater algae. John et al. (2002) in their book, provided the first modem account and identification guide to more than 2200 species of freshwater algae.

Coker (1954) studied the ecology of streams, lakes and ponds of United States. Lund (1965) studied the ecology of freshwater. Regarding the freshwater ecology of algae remarkable contributions had come from many renowned workers. Arnold (1969) studied the ecological status of Lake Erie. Bennett (1970) studied the ecology of lakes and ponds of New York.

Algae as indicator of environmental quality are one of the important topics in the contemporary world. Prescott (1962), after an extensive study in Michigan and Wisconsin reported that blue green algae are rare or absent in lakes with pH below 5. Presence of algae as disturbance indicator of biological equilibrium in tanks was studied by Fogg et al. (1973).

Ecology of some freshwater phytoplankton was also studied by Hutchinson (1957). While working on ecology of freshwater phytoplankton, Lund (1965) described algal productivity in lakes and its related factors.

Economic value of algae and algal products are uncountable. Algae are very useful as food either directly or as food products but still their use are limited. Tilden (1935), Johnston (1970, 1976), Dixon (1973) gave extensive account of algae used as food and food products. *Spirulina* has achieved the highest position in case of protein content, as it has 60- 70% of protein of its total biomass. Now a day's *Spirulina* is used for curing of anemia (Takeuchi, 1978), antiviral activity (Gustafson, 1989), treatment of nutritional deficiency (Belay et al., 1993). Moreover, it is rich in vitamins, minerals and β-carotene, thus truly declared as the best future food for mankind by UN at the world food conference in 1979.

2.2 National Status

Phycology in Indian context was started much later than that of world standard. Most of the pioneering works were done by British colonial workers. The works of Indian authors can be clearly grouped into three periods. During the first period *i.e.* from 1798 to 1854 some classical works like description of seaweed.

The second period extended from 1858 to 1907. In this period some classic and valuable works came from a group of professional workers. Lagerheim (1888) described 52 desmids from Bengal. Turner (1883) published an account of "The Freshwater Algae of East India" which included detailed contribution of algal dora recorded so far. He included 22 species of Myxophyceae, 542 of Desmids. Other contemporary phycologists of that period were Hobson (1863), Martens (1871), Dickie (1882) and many more.

It was from 1919 onwards, third phase of algal study started in India where Indian phycologists came forward and performed a great deal of appreciable works. lyenger (1920-1954) worked a lot on Volvocales, Chaetophorales, Zygnemales and Blue green algae of India. lyenger et al. (1940, 1941, 1944, 1981) studied morphological details of *Cylindrocapsa geminella, polysiphonia platicarpa, Microdictyon tenuis.* Due to such an immense contribution, he is truly called as "Father of Modern Algology in India". Bruhl and Biswas (1929) was the pioneer in studying algae in Eastern India. Bharadwaja (1928-1936) contributed towards the knowledge of BGA and he along with his followers established a base of algal research at Bananas Hindu University. Another outstanding contribution came from the great Indian algologist Randhawa, who published his works as research articles on species of Zygnemaceae, Oedogoniales and Vaucheriaceae. And his

monograph on Zygnemaceae is a valuable ethic. Prasad (1952) described some new forms of Nostocaceae from river of Baranasi. Krishnamurthi (1954) described for the first time the freshwater diatom flora of South India and reported a number of new forms. Gandhi (1959, 1960) presented a detail account of diatoms collected from Sagar and also the diatom flora of temporary ponds of India and reported many new taxa. Desikachary (1959) published his monograph "The Cyanophyta" which was an exclusive document for the workers till today. Vasistha (1960) working on Myxophyceae of India and reported two new species and one new variety. The morpho-taxonomic studies of Eastern Himalayan algal flora have contributed by Das (1961), Santra and Adhya (1973, 1976) and Alfred (1978).

Singh and Saha (1982) described 16 new species of pond diatoms from Bihar. Gurudeva et al. (1983) illustrated the systematic position of 72 taxa of desmids and eight out of them were new records from India. Hosmani and Bharati (1983) described 42 species of Euglenineae from Madgaon. Kou1 et al. (1983) described 44 species of algae from Dal Lake in Kashmir, of them eight species were new to India and one to world algal database *(Scenedesmus longus* var *naegelli* f. srinagari). Somashekar (1983) collected 50 desmids, 35 Chlorococcales and 104 blue greens from river Cauvery concluding that the polluted stations of river are mostly dominated by Cyanophyceae.

Hedge (1986a) reported five new taxa of desmids belonging to *Cosmarium corda.* Hedge (1986b) added 24 new freshwater pond dwelling desmids to the algal flora of Karnataka. Isaacs and Hedge (1989) collected 72 freshwater algae from permanent ponds of Kannada dist. of Karnataka. Regarding the contribution to the North Indian algal flora the noteworthy literatures have been made by Kant and

Anand (1978), Habib (1996, 1997), Kant and Gupta (1998), Singh and Gupta (2000), Suseela and Dwivedi (2001), and Mishra et al. (2002, 2005).

Other than these general topics on algae, many authors contributed a lot on algal cytology, physiology, taxonomy, ecology, evolution, productivity, response to toxicity, response to environmental changes, role in economy etc. Munawar (1970) during his extensive limnological studies on freshwater ponds of Hyderabad described the biocenose, distribution and seasonal abundance of unicellular and colonial phytoplankton in polluted and unpolluted environment. Zutshi and Vaas (1978) studied the limnological studies in Dal Lake. Kiran et al. (1998) carried out a comparative water quality assessment of Yediyur and Bannergatta lakes of Bangalore.

Bharati and Hedge (1982) studied the freshwater algae from 52 different ponds of Karnataka and Goa and recorded 47 desmids. Chadha and Pandey (1982) explored the algal taxa growing in exposed walls of buildings and recorded 24 taxa and also noted some peculiar variations on their distributional patterns on different kinds of walls.

Bongale (1987a) studied the distribution of algae in acidic paddy field soils of Karnataka and reported 63 species of Cyanophyceae, 17 Chlorophyceae and 26 Bacillariophyceae which includes seven new taxa of Chroococcales. Patel and Jawale (1985) studied the morphological and cytological features of *Lychnothamnus barbatus* (Meyen.) Leonh. Saha (1986) reported 280 algal taxa from freshwater ponds of Bhagalpur. Studies on phytoplankton diversity in response to abiotic factors in Veeranam Lake in the Cuddalore district of Tamil Nadu was studied by Senthilkumar and Sivakumar (2008). Seasonal variation of phytoplankton in a

freshwater tank of Maharashtra was studied by Milind and Hujare (2008).

Many more workers and researchers made contributions to the Indian phycology. Prominent contributors were Mishra (1937), Allen (1925, 1928, 1961), Kundu (1929, 1934), Dixit (1937), Venkataramana (1953-1957), Desikachary (1939-1949), Vaidya (1963 & 1968), Kodhari (1967), Ramanathan (1964, 1968), Prasad and Godward (1963), Prasad and Mehrotra (1970), Prasad and Jain (1973), Kant (1971), Patel and Isabella (1974), Verma (1981), Prasad and Srivastava (1992), Singh et al. (1982), Trivedy (1982), Patel and Patel (1982), Jha and Kaushal (1983), Mehrotra and Jaitly (1983), Maity and Santra (1985), Pal and Santra (1985 & 1987), Prasad and Jaitly (1985), Jha et al. (1986), Prasad and Chowdhury (1986), Shukla et al. (1988), Vohra (1991), Rawla and Rattan (1989), Bharati (1990), Nirmala et al. (1990) Kant and Vohra (1991), Srivastava and Odhwani (1992), Kant and Gupta (1998), Gandhi (1999), Subha and Chandra (2005), Muthukumar *et al*. (2007), Arulmurugan et al. (2010).

The variations of algal variety in pure and polluted water bodies were studied in India by Seenaya (1972), Rama Rao et al. 1978), Mishra and Saksena (1993) have offered the noteworthy contributions towards this field of algae related to aquatic pollution. Verma and Dalela (1975) during their study in Kalindi River designated *Oscillatoria, Spirogyra* and *Stigeoclonium* as pollution marker. Similar results were also obtained by other workers during their own study in different aquatic systems (Patrick, 1948 & 1965, Rama Rao et al., 1978, Jeeji Bai and Rajendraran, 1980). Zutshi et al. (1980) made a comprehensive limnological study on nine lakes of Jammu and Kashmir and concluded that the tropic evolution of lakes occurred due to human interference.

Mishra and Saksena (1993) during their studies in Moras river in Madhya Pradesh stated that *Anabaena, Scenedesmus, Closteriuin, Navicula, Euglena gracilis, Phacus* were pollution indicator algae. Achaee et al. (1995) studied the phytoplankton species diversity in Deeghali beel and recorded 60 genera. Ragothaman and Patil (1995) made a study in Narmada Estuary and counted the algal number as 60 units/ml to 18000 units/ml which may be due to seasonal variation in the extent of agricultural runoff.

Indian contributions towards the ecology and productivity of freshwater bodies started from Roy (1955) who studied the phytoplankton ecology of river Hoogly and observer that some species of algae are tolerant to pollution and some are very much sensitive. Zafar (1968) studied the ecology of algae in some fish ponds of Hyderabad and their physicochemical complex.

Kumar and Singh (1974) observed that Cyanophyceae and Euglenoid flagellates were mostly associated with organically rich water bodies with having low oxygen content. Research regarding the ecology of blue green algae was done by a number of Indian authors. Munawar (1974) performed limnological studies on fresh water ponds of Hyderabad. Kaur et al. (1996) studied the biotic components of a fresh water pond in Patiala and confirmed its eutrophic condition.

2.3 Status in Karnataka

Hosmani and Bharathi (1982) worked on the waterbodies (Yemekeri pond, Keigeri lake and Naggikeri lake) of Dharwad of Karnataka and reported *Euglena, Phacus, Scenedesmus, Closterium, Pediastrum* and *Navicula* as the most frequent genera. Somashekar (1983) recorded 21 genera and 32 species of algae in the river Cauvery of Karnataka. Hegde and Bharathi (1986) reported 61 taxa of fresh water

algae belonging to 26 genera from Bijapur district, Karnataka. Bharathi and Hosmani (1975, 1977, 1982) extensively worked on the limnological aspects of ponds and lakes in Karnataka. Considerable work has been done on the use of algae as bioindicators of the ecosystem by Hosmani (1973-2014). Giriyappanavar and Patil (2013) used algal diversity to assess the state of the lake ecosystem in Karnataka. Patil et al. (2021) suggested the use of algal assemblages and multimetric indices and functional grouping of algae to asses the health of aquatic ecosystem.

Chapter-3
MATERIALS AND METHODS

3.1 General Topography of the study site:

Yogikolla is a small village in Gokak taluk of Belgavi district of Karnataka State, India. It is located 51km towards North from district headquarters Belgavi., 5km from Gokak. The place derives its name from a valley, which is between horse-shoe shaped rocky hill.

3.2 Collection and Processing of Sample:

Composite surface water sampling method was followed to reduce variations in qualitative estimates of algal attributes, due to spatial variations in habitat conditions (Stevenson and Smol, 2003). The collection of sample was done between 7 am to 9 am on first week after every 2 months during the course of the study period (September to March). Black plastic carbuoys of one litre capacity were used for collecting the samples. For transportation of samples to laboratory, dark coloured bag was used in order to avoid the exposure of samples to sunlight, variations in temperature.

Benthic diatom samples were collected from the surface of the rocks, boulders by scraping the sample with brush in a plastic tray and stored in glass vials.

3.2.1 Processing and Preservation of Phytoplanktons:

Planktonic samples were bought to the laboratory soon after collection and preserved by adding Lugol's Iodine into Glass Column in dark for 48 hours as described by Welch (1948) to sediment the Phytoplanktons. The sample was

concentrated to 30 to 50ml with the help of centrifuge. Finally, the planktonic samples were preserved in 50ml plastic reagent bottles.

3.2.2 Processing and Preservation of Benthic Diatoms:

Benthic diatom samples were processed to remove the dirt and clear the diatom frustules by hot HCl and $KMnO_4$ method described by Hasle (1978) and adapted by Round et al. (1990). Following are the steps followed during processing:

- ✓ 10ml of sample was taken in a heat-resistant beaker.
- ✓ The beaker was marked clearly with the sample number in several places.
- ✓ Then 10ml of potassium permanganate ($KMnO_4$) solution was added, mixed well and was left for 48 hours.
- ✓ Later 10ml of concentrated HCl (32%) was added, taking care by not to inhale the gases released. Then covered the beaker with a watch glass and was heated on a hot plate at 90 degrees for 1 hour. Later the solution was turned to yellow in colour. Proper care was taken to avoid cross contamination of samples during violent bubbling while heating with acid.
- ✓ After the oxidation of organic materials, carefully 1ml of hydrogen peroxide was added to check if the oxidation process is complete.
- ✓ Then this sample was allowed to cool and was transferred to 10ml centrifuge tube. The beakers were vigorously swirled, to re-suspend the diatoms and the stone and sand particles were settled down.
- ✓ Then sample was rinsed by centrifuging with distilled water at 1000rpm for 20mins.
- ✓ Then the supernatant was poured off in a single movement, while not to lose any diatom material.

- ✓ Finally, supernatant was decanted and centrifugation was repeated and further observation was done.

3.3 Identification of Algae:

For the identification of both the plankton as well as benthic diatoms concentrated sample was used. For identification, one drop of sample was taken with the help of dropper on a clean glass slide. A clean cover slip was placed over the glass slide so that the sample remains intact and free from other particles like dust particles, and the slide was observed under the microscope of different magnifications like 10X, 40X and 100X. Photomicrographs of the Algae observed were taken. Algal identification was done by referring the standard monographs. Desikachary (1959), Phillipose (1967), Prescott (1982), Scott and Prescott (1961), Sarode and Kamath (1984), Karthick et al. (2013), John et al. (2011), Ramanathan (1964), Iyengar and Desikachary (1981), Randhawa (1959), Krishnamurthy (2000).

Chapter-4
RESULTS AND DISCUSSION

Aquatic biological assemblages are useful indicators for environmental monitoring of lakes and rivers because they integrate the effects of natural variation and anthropogenic stressors. Algal indicators have some advantages over other biotic assemblage indicators of water quality. Unlike fish and macro-invertebrates, algal communities are usually present before disturbance and generally persist in some form after most disturbances. Algal assemblages are generally more sensitive to nutrients than other assemblages (Whitton and Kelly, 1995). Taxonomic composition community structure and metabolic characteristics of algae have long been used to monitor and identify human impacts on aquatic ecosystems (McCormick and Cairns, 1994) and application of algal indicators to lakes and rivers is increasing (Whitton et al., 1991; Whitton and Rott, 1996; Prygiel et al., 1999).

Phytoplankton and its seasonal successions can be a better predictor of long-term environmental changes in the aquatic systems than the more usual descriptors of biomass and productivity indices (Moline and Prezelin, 1996). Studies on polluted system with reference to various pollutants have thrown light on the effectiveness of plankton as bio-indicators. Water pollution causes not only changes in physical and chemical variables, and also in algal species composition (Mercado, 2003). Algae are sensitive to pollution or other events and are therefore commonly used for monitoring environmental contamination. Moreover, algal growth in tropical inland water constitutes one of the principal causes in deteriorating the potability of water and hence a study of it is significant to assess the quality of freshwater. Algae serve as bio-indicator of water quality and pollution analysis.

A total of 42 species of algae belonging to Bacillariophyceae, Chlorophyceae, Dinophyceae, Cynophyceae and Euglenophyceae were recorded during the present investigation. The list of the recorded algal taxa is represented in the Table 4.1 and percent contribution of each class of algae from the study site is represented in figure 4.1. Microphotographs of selected algal taxa are represented in Plate 4.1 and 4.2.

Fig 4.1: Percent contribution of algal groups form Markandeya River at Yogikolla

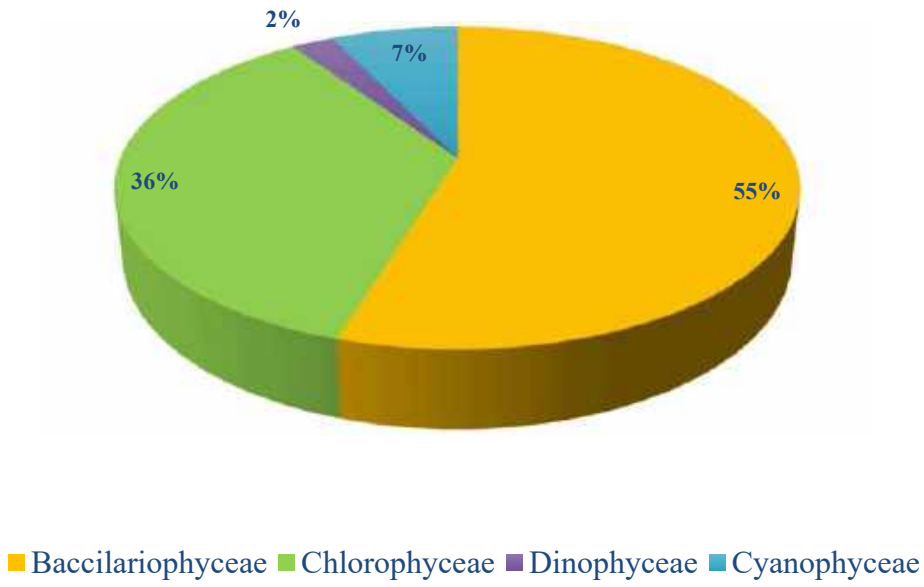

Table 4.1: List of Algae found in Markandeya River at Yogikolla

Sl. NO	Algal taxa
	Class-BACCILAROPHYCEAE
1.	*Achnanthes lanceolata* (Breb.) Grun.
2.	*Amphora ovalis* Kutz.
3.	*Aulacoseria granulate* (Ehrenberg) Simonsen
4.	*Cocconies placentula v.lineate* (Ehrenberg) Van Heurck
5.	*Cyclotella meneghiniana* Kutzing
6.	*Cymbella tumida* (Brebisson)
7.	*Diatoma vulgaris* Bory
8.	*Fragilaria tenera* (WM Smith) Lange- Bertalot
9.	*Gomphonema lagenula* Kutzing
10.	*Gomphoneis herculeana* var. *loweii*
11.	*Gyrosigma acuminatum* (Kutzing) Rabenhorst
12.	*Hantzschia* spp.
13.	*Melosira granulate* (Ehrenberg) Ralfs
14.	*Meridion circulare* (Greville) C.A. Agardh
15.	*Navicula cryptocephala* Kutzing
16.	*Nitzschia amphibia* Grunow
17.	*Nitzschia umbonata* (Ehrenberg) Lange-Bertalot
18.	*Pleurosigma lange-bertalotii* Karthik & Kociolek
19.	*Rhoicosphenia abbreviata* (C.agardh) langebertalot
20.	*Sellaphora stroemii* (Hust.)
21.	*Stauroneis anceps* Ehrenberg

22. *Surirella capronioides* Gandhi

23. *Ulnaria ulna* (Nitzch) Compere

Class-CHLOROPHYCEAE

Order- Zygnematales

24. *Mougeotiopsis calospora* Palla

25. *Spirogyra stictica* (Engl. Bot) Willa

Sub order- Desmidinae

26. *Cosmarium* spp

27. *Desmidium aptogonium* Brebisson ex Kutzing

28. *Pleurotenium trabecula* (Ehrenberg) Nageli

29. *Staurastrum anceps* Meyen

Order- Oedogoniales

30. *Oedogonium* spp.

Order- Volvocales

31. *Eudorina elegans* Ehrenberg

Order- Chlorococcales

32. *Actinastrum hantzschii* Lagerheim

33. *Chlorella vulgaris* Beyerinck

34. *Crucigenia tetrapedia* (Kirchner) West et G.S.West

35. *Pediastrum duplex* Meyen

36. *Scenedesmus quadricauda* (Turpin) Brebisosn

37. *Schroederia setigera* (Schroed.) Lemmermann

38. *Selenastrum gracile* Reinsch

Class-DINOPHYCEAE

39. *Ceratium hirundinella* (O.F.Muller) Dujardin

CYNOPHYCEAE

Order- Chroococcales

40. *Aphanocapsa elachista* West et G.S.West

41. *Merismopedia glauca* (Ehrenberg) Kutzing

Order- Nostocales

42. *Spirulina platensis* (Nordst.) Gomont

Descriptions of the taxa:

Class- BACCILAROPHYCEAE.

***Achnanthes lanceolata* (Breb.) Grun.**

Is a common species which occurs on stalks, epiphytizing filamentous algae. These frustules are symmetrical in valve view but not when seen from the side. They are, in general, elliptic or fusiform in valve view, undulate- rectangular and bent in girdle view. The epivalve shows a pseudoraphae, the hypho valve raphae. There may be a distinctive lateral, horseshoe- shaped clear area in the mid region of the valve which has the pseudo raphe. The cells may be free, or more commonly attached by gelatinous stalk to various substates, sometimes forming packets or filaments. There are over 30 species which have been reported from the UNITED STATES.

***Amphora ovalis* Kutz.**

Frustules in this genus are crescent -shaped in valve view but broadly elliptic with truncate poles in girdle view. The raphae present two curved lines near the central margin of the valve, the two curves meeting over the central nodule which lies next to the central margin of the cell. The cells usually are found lying with the concave surface of the hypovalve upper most when viewed under the microscope, but in nature occurs with the concave face against the substrate (often filamentous algae) H-shaped chloroplast with central bridge, flanked by two conscious droplets, one towards each cell apex.

***Aulacoseira granulate* (Ehrenberg) Simonest**

Frustules adjoined end to end by elongated linking spines to form long filaments. Smaller spines may be also present around the margin of valve. Valves mostly viewed in girdle view. Valves with coarse areole.The valve face has areolae distributed

randomly,but in many specimens the areolae are concentrated or almost exclusively restricted to the margin. Found in benthos and plankton of eutrophic waterbodies.

***Cocconies placentula v. lineata* (Ehrenberg) Van Heurck**

Valves relatively flat,elliptical to linear-elliptical in outline.Raphe valve with hyaline rim marginally placed,bordered towards the centre of the valve by striae that are interrupted near the margin.Axial area vary narrow,with a small,rounded central area formed in the centre of the valve.The raphe is straight,filiform,and the external proximal raphe ends are dilated slightly.Striae are punctuate,composed of dash-like areolae and radiate.Occurs in meso-to eutrophic flowing and standing waters.Found in abundance on plants,wood and stone.

***Cyclotella meneghiniana* Kutzing**

Frustules are drum-shaped with tangential undulations or flat valve face. Marginal zone with strongly radial striae, broader at the margin and tapering towards the center. Central region with 1-5 valve face fultoportulae. The fascicles are not clearly visible in LM, but separated by interfascicular costae. This taxon has a cosmopolitan distribution and occurs as benthos and plankton of eutrophic, electrolyte rich rivers, streams and lakes.

***Cymbella tumida* (Brebisson)**

Valves strongly dorsiventral, dorsal margin strongly convex, ventral margin convex, always with characteristic swollen or tumid mid-region. Apices protracted, rostrate. Axial area narrow, with linear margins. Central area distinct, rounded to rhombic in shape. Raphe lateral, proximal endings distinct and ventrally deflected.

A cosmopolitan species found in oligo-to mesotrophic waters with moderate electrolyte content. Found to epiphytes.

***Diatoma vulgaris* Bory**

Valves linear in outline, apices rounded. Costae robust. This taxon is characterized by thickened transverse costae. Central sternum straight, distinct. A labiate process is present near one apex of the valve. This cosmopolitan taxon is found in mesotrophic to eutrophic waters with average electrolyte content. The cells are joined at the corners forming zig-zag colonies. Specimens presented here are from sample collected from lower Himalayas. It appears that this taxon occurs mostly in cold water streams.

***Fragilaria tenera* (WM Smith) Lange- Bertalot**

Valves are needle shaped with narrow rounded apices. A well defined hyaline area is present at the centre of the cell in which ghost striae may be visible. Cosmopolitan species found in benthos. Mostly found in mesotrophic to eutrophic waters.

***Gomphonema lagenula* Kutzing**

Valves broadly elliptical, weakly heteropolar club shaped, lanceolate to elliptical to oval. Apices strongly protracted with capitates, rostrate ends. Central area is narrow with short striae on one side and stigma present. A poorly delineated form, with little information on ecology but widely reported in moderate to high eutrophic conditions.

***Gomphoneis herculeana* var. loweii**

Valves are broadly trullate, with broadly rounded apices. Initial valves are unknown. The axial area is narrow, straight, forming relatively small, irregularly rounded central area. A single stigma is present in the central area. The raphe is lateral, weakly undulate and with a small external proximal ends. Striae are distinctly biseriate, with the areolae arranged alteranately. From the central nodule to the head-pole striae are radiate. From the central nodule to the foot pole striae are radiate, become parallel and near the footpole become strongly radiate. Longitudinal lines are positioned approximately one-half the way between the axial area and margin. The apical pore fields are distinctly bi-lobed but reduced in size.

***Gyrosigma acuminatum* (Kutzing) Rabenhorst**

Valves liner-lanceolate at centre, sigmoidly deflected into broad, bluntly rounded apices. Raphe slit central,central fissures deflected in opposite directions. Terminal fissures curved over valve apices. Transverse striae more or less parallel, crossed by longitudinal striae that follow curvature of the raphe.This species prefers slow flowing or stagnant water and capable of tolerating high levels of pollution.

***Hantzschia* spp.**

Valves dosrsiventral, margins linear, ventral margin concave in the middle. Apices protracted, rostrate. Striae slightly radial. The short, irregularly shaped fibulae are interrupted at the middle. A cosmopolitan species favouring periodically dry habitats, including soils and rock crevices. Widespread in a range of rivers, but probably introduced from soils.

***Melosira granulate* (Ehrenberg) Ralfs 1861**

Barrel-shaped frustules are heavily silicified. The valve faces are flat and joined together to form long, filamentous colonies. In girdle view, the mantles are unevenly thickened internally, creating an undulating appearance. A ring of evenly-spaced rimoportulae encircles the mantle, near thr valve edge. Several rimoportulae are also present on the surface of the valve. Striae on the valve face are dichotomously branched and radiate from a hyaline central area. Areolae number 13-19 in 10µm.

***Meridion circulare* (Greville) C.A. Agardh**

Cells attached closely by their valve faces to form straight or fan-shaped colonies. Heteropolar taxa cuneate in valve and girdle views; some taxa isopolar, more or less linear in valve view, reactangular in girdle view. Prominent ribs across the valves visible in both valve and girdle view. Plastids numerous (+8-12), rather irregularly discoid, lying along the valve face. Other abundant in calcarious springs and streams, particularly in the springs in cool water.

***Navicula cryptocephala* Kutzing**

Valves lanceolate to narrowly lanceolate, poles gradually narrowing, apices weakly rostrate, subcapitate or obtusely rounded. Central area is large and circular, rounded to transversely elliptical, a little asymmetrical. Raphe filiform, axial area narrow, with drop-like expanded proximal ends. Striae strongly radiate to weakly convergent at the poles. The areolae are sometimes visible under LM.

***Nitzschia amphibia* Grunow**

Frustules isopolar, bilaterally symmetrical. Valves linear to lanceolate with sharply rounded apices. The central part of the valve sometimes has very slightly concave margins. Fibulae forked and aligned with the striae. Central pair of fibulae (not always) are more widely spaced. Stria are punctuate in LM. Cosmopolitan taxa found in a wide range of waters from electrolytic poor to electrolytic rich waters.

***Nitzschia umbonata* (Ehrenberg) Lange- Bertalot**

Valves linear, with weak concave central region. Poles apiculate, apices protracted or slightly capitates. Raphe marginal, supported by irregularly spaced fibulae and interrupted in the middle of the valve. Stria undulating, clearly visible in LM. This taxa occurs in polluted water and is tolerant of extreme pollution.

***Pleurosigma lange-bertalotii* Karthik & Kociolek**

Valves large, sigmoid-lanceolate, apices narrow, rounded, curved in opposite directions. Axial area narrow, thickened, and forming a weak "S". Central area elliptical with a thick central nodule. Raphe filiform, curved, with internal proximal fissures straight. Striae straight, parallel throught, other orientation not notable in light microscopy.

This species occurs in circumneutral streams, at low conductivity conditions in pristine streams.

***Rhoicosphenia abbreviata* (C. Agardh) Langebertalot 1980**

Several populations of this species have been observed during the study, but only to populations are depicted here. In girdle view, frustules have a bent wedge shaped. Valves are heteropolar, linear to narrowly clavate with a narrowly rounded head pole and attenuated base pole. Valve length varies from 14 to 52µm, and the valve width is 5-7µm. The concave R-valve has a fully developed raphe with large central pores, while the convex D-valve has a reduced raphe system with short raphe slits line close to poles. Striae on both valves are parallel to weakly radiate throughout the valve length, and distantly spaced, 9-12 in 10µm.

***Sellaphora stroemii* (Hust.) H. Kobayasi in Mayama et al. 2002**

Basionym: *Navicula stroemii* Hust

Valves linear with rounded ends, sometimes slightly subcapitate in the bigger forms. Length (8)10-18µm, width 4-5 µm. Raphe filiform, straight ,with the external ends bent towards the primary side of the valve. The raphe sternum is flanked by parallel furrows, continuous or interrupted at the level of central area, often visible under LM as longitudinal lines. Narrow axial area often expanded in the middle giving a bow-tie-shaped central area. Striae often visible in LM, radiate,24-29 in 10µm, becoming sparser and sometimes alternating irreguraly, shorter and longer in the central area.

***Stauroneis anceps* Ehrenberg**

Chloroplasts with approximately four pyrenoids each, nucleus often slightly off-centre with a conspicuous nucleolus; valves lanceolate with rostrate apices, 40-60 µm long, 6-10 µm wide.

***Surirella capronioides* Gandhi**

Valves heteropolar, obovoid with rounded head pole and narrowly rounded foot pole.Wing projection vertical and away from valve face.Alar canals and fenestrae distinct.Siliceous plaques across valve surface distinguishable in LM.Median area

narrowly lanceolate terminating well before apices.Striae indistinct in LM.The median ridge forms a fin-spine at head pole terminus.The taxa is endemic to the Western ghats in oligotropic to slightly mesotropic streams.

***Ulnaria ulna* (Nitzch) Compere**

Valves linear, with margins parallel, tapering to protracted to rostrate apices. Central sternum narrow, straight. Central area transversly expanded reactangular area, nearly square in shape. There may be short or "ghost"striae present at the margins of the central area. Streiae parallel. A single labiates process is located near the apex of oneend of the valve.

Cells linked cell-to-cell form a stellate colony.This taxa has a wide geographic distribution and often in mesotrophic to eutrophic, alkaline waters.

Class- CHLOROPHYCEAE

Order – Zygnematales

***Mougeotiopsis calospora* Palla 1894**

Filaments light green,long and loosely entangled. Cells short cylindric, sometimes quadrate in the vegetative state, becoming elongate in conjugation,12-14 µ in diameter,14-18 µ long. Chloroplast a broad, folded axial plate,almost as long as the cell. Zygospores formed in the connecting tube by scalariform conjugation, and extending into the gametangia; oblong or reactangular- oblong; outer spore wall smooth, middle wall with deep pits; 22-25 µ in diameter, 33-38 µ long(rarely longer). This species was once described as Mesogerron fluitans Brand and included in the Ulotrichaceae because of its Ulothrix-like chloroplast. Our specimens where found only in the vegetative condition, but this plant is so distinctive that it can be assigned to M. calospora. Rare in several lakes and sphagnum bogs. The plants seems to be confined to soft water habitats.

Spirogyra stictica* (Engl.Bot) Willa *1884,

Filaments of short or long cells,38-56µ in diameter, 80-300µ long, with plane end walls; chloroplast 2-6,straight or making ½ turn, conjugating by geniculate bending of filaments; . connecting tubes not formed; the fertile cells becoming slightly swollen. Zygospores; ellipsoid; median spore wall smooth; 41-64µ in diameter, 75-118µ long.

In shallow water of the lake margins, and in swamps.

Sub. Order- Desmidine

Cosmarium spp.

Margin of cell without spines, smooth, or granular, the granules sometimes sharp or conical. Cosmarium includes thousands of species, more than any other genus in the chlorophyta. There is accordingly considerable variation in shape, size and wall ornamentation Whatever the shape of the semicell in face view usually is compressed, oval or elliptic when seen in vertical view. The sinus may be deep or only a slight invagination. Like all members of the conjugates, the chloroplasts are few, large and showy, 1 or 2(4) in the semicell and each with a paranoids.

Desmidium aptogonium Brebisson ex Kutzing 1849

Cells 21-31 µm wide, 13-19 µm long,moderately constricted with an acute, open sinus; 15-24.5 µm wide; semicells transversely oblong with small inflation on each side of isthmus beyond with lateral margins are slightly concave then converging to apex, 21-24 µm wide; apices concave in mid-region but at each angle form moderately long connecting processes producing a distinct cavity between adjacent cells;in vertical view mostly 3(-4)-angular.

Pleurotaenium trabecula (Ehrenberg) Nageli 1849

Cells sub cylindrical,24-46 µm broad, 350-600 µm long; semicellswith one or two basal inflations above which lateral margins are slightly convex, then tapering gradually to smooth subtruncate apices, 16-32 µm broad, perforated by several terminal pores; walls colourless, smooth with scattered spores; chloroplasts parietal ribbons with numerous pyrenoids along length.

Staurastrum anceps

Semi cells with 2 extended arms at their apices as seen in front view, narrowly elliptic or fusiform when seen from the top. The species illustration is an example of those members of the genus *Staurastrum* which have arms of the semicell directed in 1 plane. Most species are eu plank tonic in soft-water lakes.

Order- Oedogoniales

Oedogonium spp.

Filaments unbranched, composed of cylindrical, capitellate or occasionally almost hexagonal cells, terminal cell rounded but sometimes acute or drawn out into a long hair; chloroplast parietal and net-like network, usually with several pyrenoids; sexual reproduction oogamous; oogonia arise by division of supporting, sometimes inflated, suffultory cell, occasionally bearing projections such as ribs or warts, spermatozoids

enter the oogonium through either a simple pore or cleft- like opening (rimiform), or a split in the wall that forms a lid-like operculum, opening positioned in middle of oogonium (median), above middle (supermedian), below middle (inframedian) or high up on oogonium (superior), occasionally opening at very top and immediately below a following cell (supreme); spermatozoids in macrandrous species, 1 or 2 in each antheridiun, formed by a horizontal or vertical division; dwarf males in nannandrous species vary in size, shape of the stipe and number of cells; oospores often different in shape from the oogonia and not always completely filling them, smooth-walled or having ribs, pores or another type of wall ornamentation.

Order – Volvocales

Eudorina elegans Ehrenberg 1832b

Colony spherical or ovate with 16-32 ovoid cells evenly disposed within a gelatinous envelope, or arranged in transverse series, the cells usually lying near thre periphery of the envelope but sometimes crowded toward the interior. Cells 10-20µ in diameter, colonies upto 200µm in diameter.

This species shows a great deal of variation in the size and shape of the colony. In liquid-preserved material the envelope shows the form of E. unicocca G.M.Smith, with posterior mammlliate projections. Commom in euplankton of hard water lakes.

Order- Chlorococcales

Actinastrum hantzschii Lagerheim 1882

Coenobia 4- or 8- celled; cells (1.5)2-6 µm wide,(7-)10-25µm long, spindle-shaped, club-shaped or cylindrical towards base and tapering to a rounded or bluntly pointed apex; chloroplast with a single pyrenoid, often not reaching extremities of cell. Probably cosmopolitan; usually occurs throughtout the year in the plankton of rivers, ditches, ponds.

Chlorella vulgaris Beyerinck 1890

Cells spherical, scattered among other algae or sometimes occur ring in almost pure growths; chloroplast a parietal cup, sometimes without a pyrenoid; cells 5-8.5-(10) µ in diameter. In small lakes and pools, especially where there is a concentration of organic matter.

***Crucigenia tetrapedia* (Kirchner) West et G.S.West 1902**

Coenobia regularly quadrate, about (8-)10.5-15.5 µm across,with internal space minute, often forming colonies (syncoenobia) of 16 or more cells;cells (2.5-)4-9.5(-12) µm, tightly packed,triangular, with straight or slightly concave sides and rounded ends.

***Pediastrum duplex* Meyen 1829**

Colony 8-128 celled, the walls smooth, with lens-shaped spaces between the inner cells, which are quadrate, the outer margin concave; peripheral cells quadrate, the outer margin extended into 2 tapering, blunt-tipped processes, distance between processes of one cell about one-half the the distance between processes of adjacent cells; cells 15.6µ in diameter; 36-celled colony 105µ in diameter. Common in the eu- and tychoplankton of many lakes and swamps.

***Scenedesmus quadricauda* (Turpin) Brebisson**

Coenobia of 4 linearly arranged or sometimes slightly alternately arranged, tightly packed cells; cells 35.4µm wide 7.8-12.3µm long, long-ellipsoidal to ovoid-cylindrical, with rounded spices and a diagonally symmetrical spine on one apex of each marginal cell, walls smooth and without ornamentation. Sometimes a small tooth may be present at cell apex.

***Schroederia setigera* (Schroed.) Lemmermann 1898**

Cells fusiform, mostly acicular, the poles extended into long, fine setae, one of which is bifurcate near the tip, forming recurved bristles; chloroplast plate-like, covering most of the cell wall, usually with 1 pyrenoid; cells 3-6µ in diameter, 60-85µ long, including the setae, which are13-17µ long.

***Selenastrum gracile* Reinsch 1867**

The chloroplasts is laminate and parietal, covering most of the wall gracefully curved cells occur in clusters of from 4 to 32, with a tendency to have the convex or 'outer' and 'inner' walls of the crescent are more nearly equal than in the somewhat similarly shaped cells of Kirchneriell, a genus which has cells irregularly arranged within a gelatinous envelope. Five species are commonly found in the United States, mostly differentiated by size of cell and degree of curvature. Mixtures of algae from shallow water often include Selenastrum, but they may occur in the euplankton.

Class- DINOPHYCEAE

***Ceratium hirundinella* (O.F.Muller) Dujardin 1841**

Cells broadly or narrow spindle shaped depending on degree of horn divergence, strongly dorsiventrally flatene, 28-55µm wide, 40-450µm long, one apical and 2or 3 antapical horns; epitheca with distinct shoulders just above cingulum and tapering to a long horn; hypotheca broad and short, divided into 2-3 posterior horns; cingulum horns; plates smooth and with net-like ornamentation on cell body, coarsening on horns;plate formula: chloroplasts numerous, parietal, oval and yellow-brown; red corpuscular bodies oftenseen; hypnozygotes, smooth, triangular and with one horn at each corner.

Class- CYANOPHACEAE

Order- Chroococcales

***Aphanocapsa elachista* West et G.S. West 1914**

Colony spherical or ellipsoidal, up to100muem in the largest dimension, through typically smaller, with outer layer of the colourless mucilage weakly difined or even becoming diffluent. Cells 1.5-3 µm, single or in pairs, well spaced in the mucilage.

***Merismopedia glauca* (Ehrenberg) Kutzing**

This genus is readily distinguished by the definite, rectilinear arrangement of spherical or oval cells in rectangular plates. Colonies increase in size by fission of cells in 2 directions. Merismopedia convoluta been is an uncommon species in which the colonies become very large sheets with enrolled margins. There are several species in the United States, differentiated by cell size, presence or absence of pseudo vacuoles, and by size of the colony.

Order- Nostocales

***Spirulina platensis* (Nordst.) Gomont**

Thallus blue-green; trichomes slightly constricted at the cross-walls, 6-8µ broad, not attenuated at the ends or only a little attenuated, more or less regularly spirally coiled; spirals 26-36µ broad, distances between the spirals 43-57µ; cells nearly as long as broad, or shorter than broad, 2-6µ long, cross-walls granulated; end- cells broadly rounded.

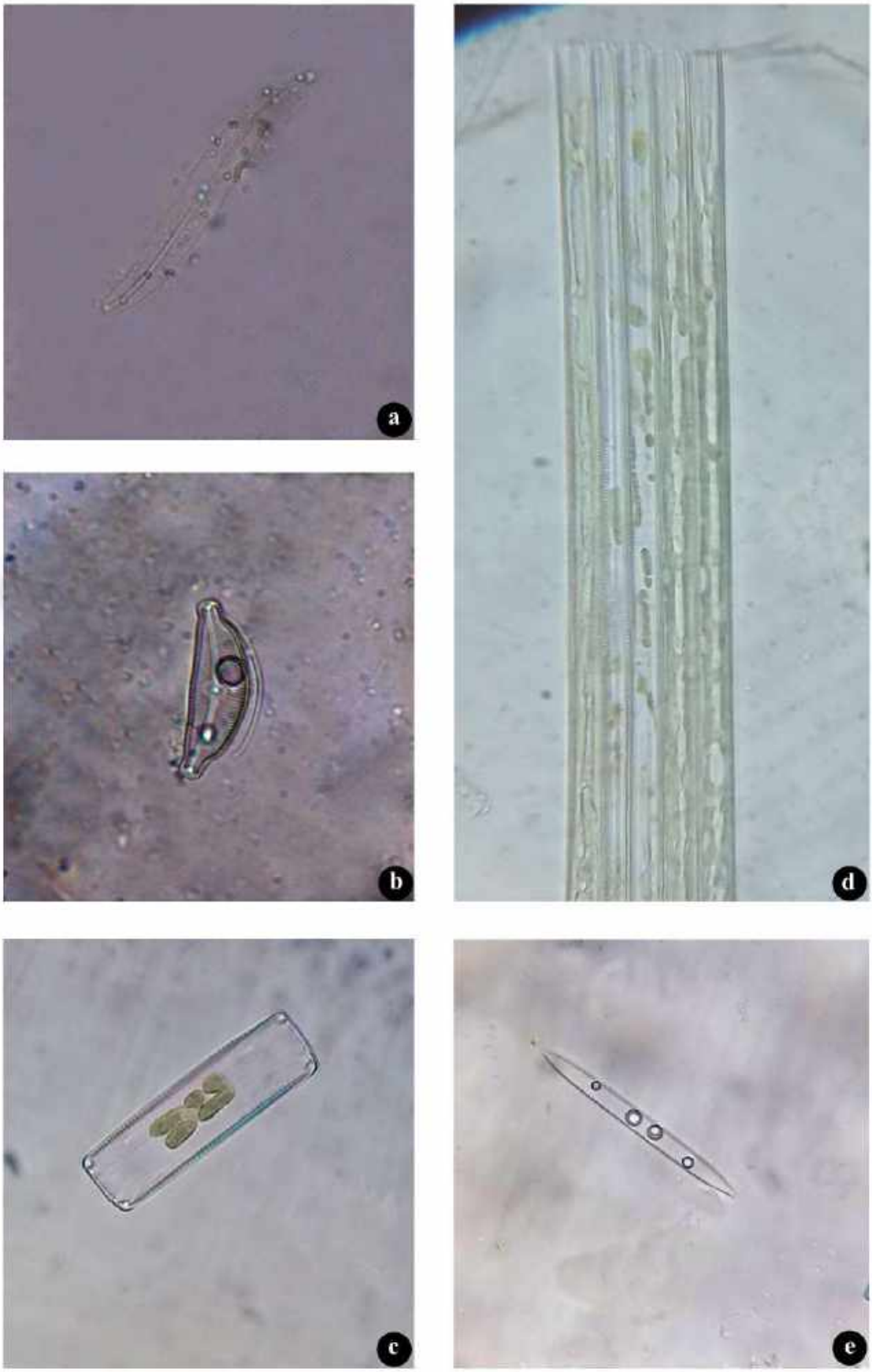

Plate 4.2: Members of BACILLARIOPHYCEAE recorded from Yogi Kolla a. Gyrosigma acuminatum b. *Cymbella tumida* c. *Diatoma vulgaris* d. *Meridion circulare* e. *Ulnaria ulna*

Chapter-6
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Fig 3.2: Panoramic view of Markandeya River at YogiKolla, Gokak

Fig. 3.1.1: Map showing location of study sites

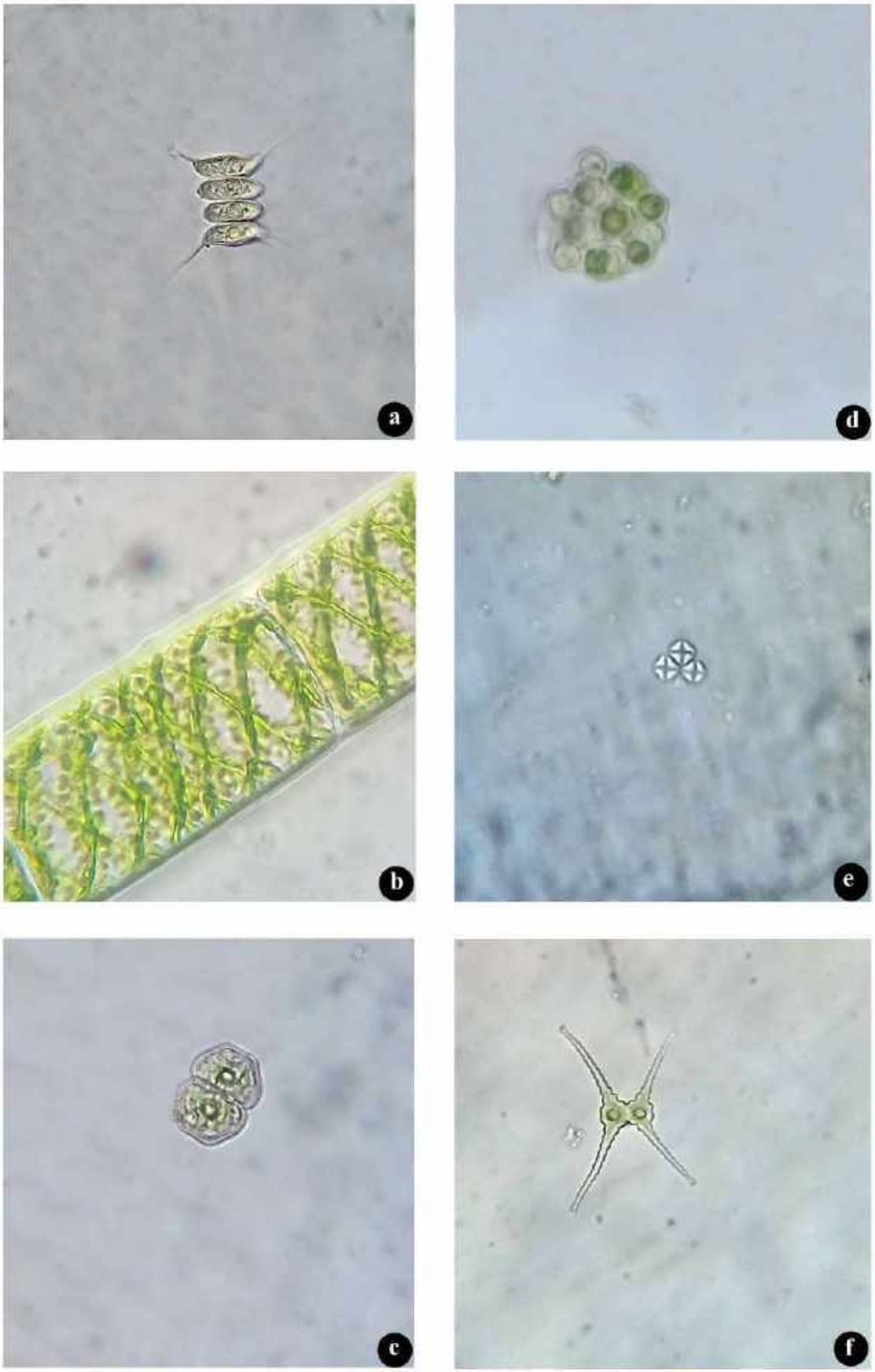

Plate 4.1: Members of CHLOROPHYCEAE recorded from Markandeya River at Yogi Kolla a. *Scenedesmus quadricauda* b. *Spirogyra stictica* c. Cosmarium spp. *d. Crucigenia tetrapedia* *e. Staurodesmus convergens* *f. Staurastrum anceps*

Chapter-5
CONCLUSION

The present investigation to explore algal diversity of Markandeya River at Yogi Kolla, Karnataka was conducted to assess its present ecological status.

Belgaum district provides an excellent topography with a large number of lakes and ponds, both natural and man-made, throughout its extension. Each of these habitats differ in size and shape, usage pattern and support exclusive aquatic vegetation. To justify the hypothesis, Planktonic as well as Benthic algae were collected from the study site over a period of 6 months. Appropriate methods were used for the collection, preservation, identification and enumeration of the algae.

Phytoplankton form the life communities and play a significant role in lake ecosystems. Members of the Bacillariophyceae contributed (55%). The distribution of algae enables us to learn peculiarities of sensitive communities to the environment. Long term studies on plankton component in relation to fluctuations of water quality parameters is useful in developing and evaluating significant ecological indices. The present study recorded 42 algal taxa. Bacillariophyceae and Chlorophyceae showed a marked appearance whereas Cyanophyceae and Dinophyceae, were poorly represented by the habitat.

The levels of degradation of the aquatic habitat was found to be moderate. Algal genera *Gyrosigma, Amphora, Scenedesmus* are the common indicators of organic

pollution. Diatoms serve as excellent tools when conservation strategies are to be developed.

The outcome of the study on Algae of Markandeya River at Yogikolla, Karnataka clearly depicts massive diversity of algae representing the moderate to high level of pollution. Further longterm monitoring using algal assemblage data is required to plan the conservation strategies for the habitat.

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Basavaprabhu Kore Arts, Science and Commerce College, Chikodi – 591 201.

(Accredited at 'A' with 3.26 CGPA in 3rd Cycle of A & A)

Department of Chemistry

A PROJECT REPORT

ON

"Chocolate Analysis"

Submitted by

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CERTIFICATE

Date: 19-04-2021

This is to certify that the B.Sc. VI semester students, Department of Chemistry of K.L.E S' Basavaprabhu Kore Arts, Science and Commerce College Chikodi, have successfully completed the project work titled **"Chocolate Analysis"** during the year 2020-2021.

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CONTENT

Introduction:

Chocolate is one of the most popular food types and flavors in the world, and many food steps involving chocolate exist, particularly desserts, including cakes, pudding. , chocolate brownies and chocolate chip cookies. Many candies are filled with or coated with sweetened chocolate.

Chocolate is a highly commercialized and money making program. Chocolates are made from the seeds of COCOA trees. Spanish mythology consider these trees were grown in the garden of the PARADISE and believed that chocolate drink was divine. The cocoa tree is tropical plant, sometimes living and producing for more than 200 years. There are many varieties cultivated today and this farming is highly profitable.

Chocolates can be categorized into one of the following group.

1. Bitter
2. Bitter sweets
3. Unsweetened
4. Dark sweetened
5. Milk chocolates
6. Cocoa powder
7. Cocoa sauce/syrup.

Apparatus Required: Test tubes, water bath, iron stand, glass rod, watch glass, test tube holder etc .

Milky bar, dark chocolate, Cadbury bar Chocolate etc.

Chemicals required:

1. Sodium Hydroxide(NaOH)
2. Copper sulphate(CuSO4)
3. Moliscli's reagent(C10H7OH)
4. Fehling's solution
5. Sulphuric acid(H2SO4)
6. Tollen's reagent
7. Ammonium chloride(NH4Cl)
8. Ammonium hydroxide (NH4OH)
9. Sodium Phospate(Na3PO4) etc.

Aim:

To find out the presence of

- Proteins
- Sugars
- Calcium
- Iron
- Magnesium
- Nickel

Procedure:

Organic tests and inorganic tests done to for identification of Protein, sugar and also tests for identification of calcium, magnesium, iron and nickel.

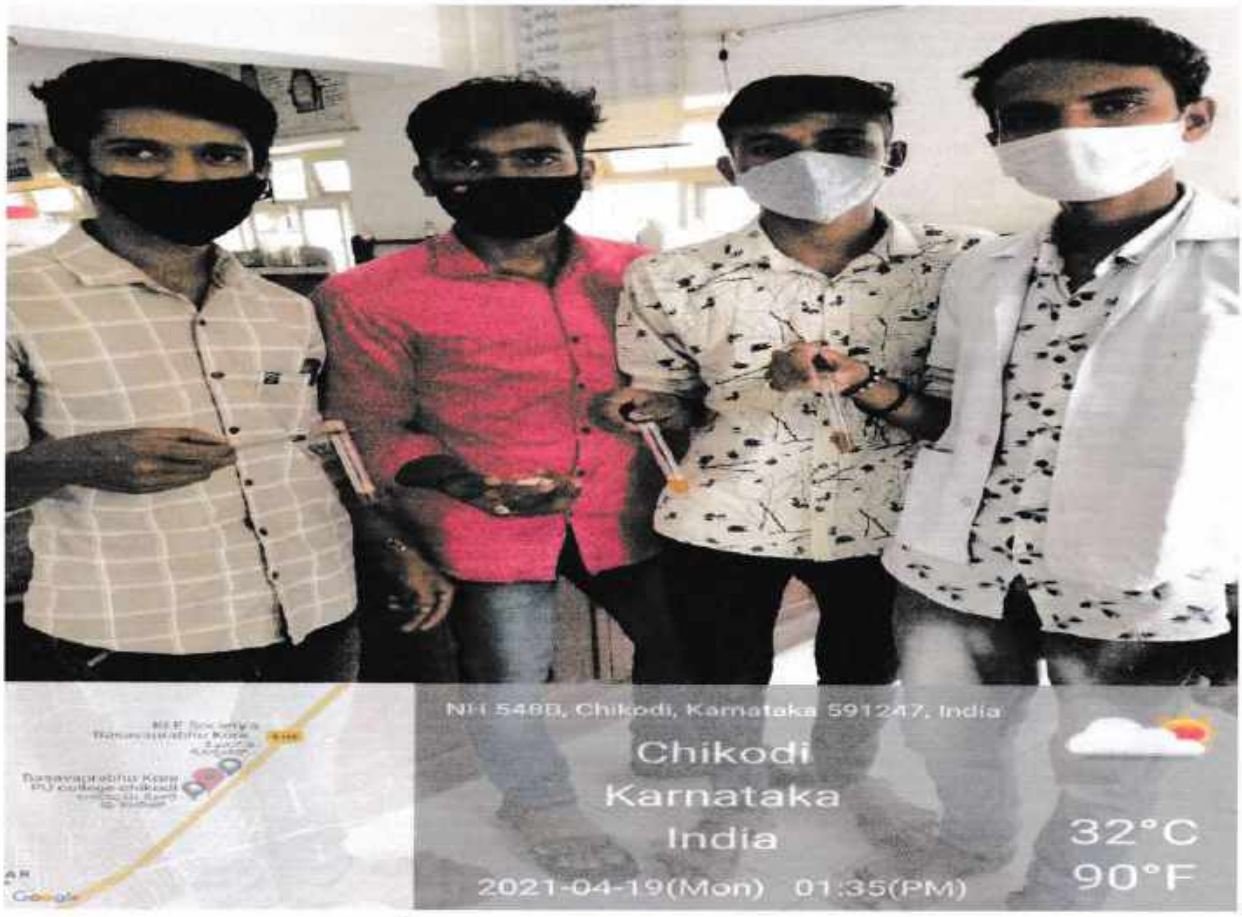
TEST FOR PROTEIN			
	EXPERIMENT	OBSERVATION	INFERENCE
1	5 ml of each sample if chocolate taken in different test tube.Add 1 pellet of NaOH to each Add 1 to 2 drops of copper sulphate solution to each.	Appearance of violet coloration	Presence of PROTEIN in the sample.

Result: All samples studied showed that they contain PROTEIN.
(Milky bar, Cadburys bar, Dark chocolate)

TEST FOR SUGAR			
	EXPERIMENT	OBSERVATION	INFERENCE
1	2 ml Tollen's reagent taken in different test tube and pinch of the chocolate into the each test tube. keep the solution in the water bath.	Silver mirror surface is formed.	Presence of SUGAR in the sample.
2	Mix 2 ml of Fehling's solution in different tet tubes. Add pinch of the chocolates into the each test tube. . keep the solution in the water bath.	Red brown precipitate obtained.	Presence of SUGAR in the sample.

Result:

All samples studied showed that they contain SUGAR.
(Milky bar, Cadburys bar, Dark chocolate)



TEST FOR CALCIUM			
	EXPERIMENT	OBSERVATION	INFERENCE
1	A mixture of $NH_4Cl+NH_4OH+(NH_4)_2CO_3$ add sample of chocolate.	A white precipitate obtained	Presence of CALCIUM in the sample
2	With help of glass rod each sample of chocolate solution placed on different watch glass.Add drop of con.HCl and a paste is made on each sample. this paste is taken on the glass rod and burned on non luminous flame.	Brick red color flame obtained.	Presence of CALCIUM in the sample.

Result:

All samples studied showed that they contain CALCIUM.

(Milky bar, Cadburys bar, Dark chocolate)

TEST FOR IRON			
	EXPERIMENT	OBSERVATION	INFERENCE
1	A mixture of NH4Cl+NH4OH is made. This is added to each sample of chocolate solution taken in different test tubes.	No brown precipitate	Absence of IRON in the sample.

Result: All samples studied showed that they do not contain IRON.(Milky bar, Cadburys bar, Dark chocolate)

TEST FOR MAGNESIUM			
	EXPERIMENT	OBSERVATION	INFERENCE
1	A mixture of NH4Cl+NH4OH+Na3PO4 is made. This is added to each sample of chocolate solution taken in different test tubes.	No white precipitate	Absence of MAGNESIUM in the sample.

Result:

All samples studied showed that they do not contain MAGNESIUM.

(Milky bar, Cadburys bar, Dark chocolate)

TEST FOR NICKEL			
	EXPERIMENT	OBSERVATION	INFERENCE
1	A mixture of NH4Cl+NH4OH is made. This is added to each sample of chocolate solution taken in different test tubes.Pass H2S gas to the solution.	No black precipitate	Absence of NICKEL in the sample.

Result:

All samples studied showed that they do not contain NICKEL.

(Milky bar, Cadburys bar, Dark chocolate)

Conclusion:

Sl.No	Substance	Present/Absent
1	Proteins	Present
2	Sugars	Present
3	Calcium	Present
4	Iron	Absent
5	Magnesium	Absent
6	Nickel	Absent

References:

www.foodhealthinnovation.com
Internet
Vogel's qualitative analysis

K.L.E. Society's
BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE, CHIKODI – 591 201.
(Accredited at 'A' with 3.26 CGPA in 3rd Cycle)

Website: www.klesbkcollegechikodi.edu.in e-mail: kles_bkcc@rediffmail.com ☎ : 08338 – 272176

DEPARTMENT OF CHEMISTRY

REPORT

On

INDUSTRIAL VISIT

To

Chidanand Basaprabhu Kore Sahakari Sakkare Karkhane Niyamit Chikodi, Examba Nanadi Road, Nanadiwadi, Belagavi, Karnatak State, India

On

25/08/2021

Arranged for
B.Sc. VI Semester Students

INDUSTRIAL VISIT REPORT

One Day Educational Industrial Visit To **Chidanand Basaprabhu Kore Sahakari Sakkare Karkhane Niyamit Chikodi, Examba Nanadi Road, Nanadiwadi, Belagavi-591247, Karnatak State, India.**

Our college arranged one day Educational visit to **Chidanand Basaprabhu Kore Sahakari Sakkare Karkhane Niyamit Chikodi, Examba Nanadi road, Nanadiwadi**, on 25th August 2021 for B.Sc final year (VI semester) students of Chemistry Department . This industrial tour was helpful to impart the practical knowledge of sugar production amongst the students and the faculty members.

Name of Company	**Chidanand Basaprabhu Kore Sahakari Sakkare Karkhane Niyamit Chikodi.**
Address of Company	Post: Chikodi, Examba Nanadi road, Nanadiwadi, Belagavi-591247, Karnatak State , India.
Chairman of Company	Shri. Bharatesh Banavane
Established year	1974
Nature of business	Producing sugar , Spirits(alcohol).
Capacity	5500 TCD TO 10000 , 30 KLPD Ethanol & Cogeneration Power Plant 20.5 MWhr to 50 MWhr.
Date of visit	25th August 2021
Branch involved	Department of chemistry (B.Sc. PCM And CBZ VIsem)

Concerned subject	B. Sc. VI sem Chemistry Paper –II Practical Curriculum
Total students	167
Transport facility	College bus
Faculty coordinators	1.Prof. U. R. Rajput 2.Prof. S. S. Patil 3. Dr. S. M. Patil 4. Mrs. G. B. Jambagi 5.Mr. S. S. Latte 6. Miss. S. D. Kotabagi 7.Mrs. D. S. Kanagali 8.Mr. S. S. Kumbar 9.Mr.V. B. Kole
Objectives	• Study tour is considered as a part of college curriculum and objectives of industrial visit is to provide students an insight regarding internal working of industries. • Industrial visit provides student a practical perspective on the world of work and an excellent opportunity for the students to interact with industries and know more about industrial environment. • Main objective of industrial visit is to provide an exposure to students about practical working environment.

Outcome	• Industrial visit helps students in reinforcing the theoretical knowledge with practical knowledge. • Industrial visit helps students in recognizing different process units such as Boiler, Crusher, Steam turbine, Distillery plant, Power generator etc. • Industrial visit helps students in identifying input and output for the process and experience the importance of working safety.

HOD
Head of the
Department of Chemistry
B. K. College, CHIKODI - 591 201

PRINCIPAL
PRINCIPAL
KLES'S Basavaprabhu Kore
Arts, Science and Commerce Coll
CHIKODI - 591 201

K.L.E. Society's
BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE, CHIKODI
(Accredited at 'A' Grade by NAAC with CGPA of 3.26 in 3rd Cycle)
College with Potential for Excellence (CPE)

DEPARTMENT OF CHEMISTRY

REPORT

ON

INDUSTRIAL VISIT

TO

VISHWARAJ SUGAR INDUSTRY

GHATAPRABHA ROAD, BELLAD BAGEWADI,
HUKKERI, BELAGAVI-591305, KARNATAKA STATE, INDIA

ON

7th MARCH 2020

Arranged For
B.Sc. Final Year Students

INDUSTRIAL VISIT REPORT

One Day Educational Industrial Visit To Vishwaraj Sugar Industries, Ghataprabha Road, Bellad Bagewadi, Hukkeri, Belagavi-591305, Karnataka State, India.

Our college arranged one day Educational visit to **Vishwaraj Sugar Industries, Ghataprabha Road, Bellad Bagewadi, Hukkeri, Belagavi** on **7th March, 2020** for B.Sc. final year students of Chemistry Department. This Industrial visit was helpful to develop and enhance the practical knowledge of students as well as our faculty members and they get to know about sugar production and Maintenance work.

NAME OF COMPANY	VISHWARAJ SUGAR INDUSTRIES LTD.
ADDRESS OF COMPANY	POST- BELLAD BAGEWADI, GHATAPRABHA ROAD, HUKKERI, BELAGAVI-591305, KARNATAKA STATE, INDIA.
CHAIRMEN OF COMPANY	SHRI. UMESH V. KATTI
ESTABLISHED YEAR	1995
NATURE OF BUSINESS	PRODUCING SUGAR, POWER, SPIRITS (INCLUDING IML, INDUSTRIAL SPIRITS & ETHANOL) & COMPOST
CAPACITY	11000 TCD SUGAR CANE CRUSHING & CO-GENERATION UNIT OF 14 MW
DATE OF VISIT	7th MARCH , 2020
BRANCH INVOLVED	DEPARTMENT OF CHEMISTRY (B.Sc. PCM & CBZ)
SEMESTER	B.Sc. VI SEM.
CONCERNED SUBJECT	B.Sc. VI SEM. CHEMISTRY PAPER – I PRACTICAL CURRICULUM
TOTAL STUDENTS	124
TRANSPORT FACILITY	COLLEGE BUS
FACULTY COORDINATERS	1. Shri. RAJU 2. Dr. S. M. PATIL 3. P M .PALANKAR 4. S. S. LATTHE 5. G B. JAMBAGI 6. S D. KOTABAGI 7. P B. DUBALE

BRIEF ABOUT PLANT:

Vishwaraj Sugar Industries Limited was incorporated in the year 1995. It has an integrated sugar based unit producing Sugar, Power, Spirits (including IML, Industrial Spirits and Ethanol) and Compost. The production facility is located at Bellad Bagewadi, Belgaum District in North West Karnataka, which is classified as a High Recovery Zone for sugar by the Government of India.

Vishwaraj Sugar Industries an integrated sugar and other allied products manufacturing company operating from Belgaum District in the State of Karnataka which is designated as one of the "High Recovery zones" for sugar production by Government of India. It operates a single location sugar unit having licensed crushing capacity of 11,000 TCD. In addition to sugar it also manufacture other allied products like Rectified Spirits, Extra-Neutral Spirits, Indian Made Liquor, Vinegar, Compost, Carbon dioxide (CO2), etc. and are further engaged in the generation of Power for captive consumption as well as external sale.

In the year 2001, It commenced operations of manufacture of Distillery products such as Ethanol, Rectified Spirit and Extra Neutral Spirit. In the year 2006, Company implemented backward integration and began commercial operations for Sugar manufacture from sugarcane, along with Co-Generation capabilities. During the year 2008, It began bottling of Indian Made Liquor. Currently integrated unit processes sugarcanes to produce sugar and the by-products are used to generate electricity for captive use and commercial sale, manufacture rectified spirit, ENA, IML, Vinegar, Press-mud and Compost. Present licensed manufacturing capacity for our various products is given below:

SL. No.	Product	Current Approved Capacity
1	Sugar	2,42,000 Tons / Year(1)
2	Bagasse	6,60,000 Tons / Year(1)
3	Molasses	88,000 Tons / Year(1)
4	Rectified Spirit	30,000 KL / Year
5	Extra Neutral Alcohol (ENA)	21,000 KL / Year
6	Industrial Ethanol	90,000 KL / Year
7	Electricity / Power	4,96,800 MW / Hr
8	Brewed Vinegar	34,500 Ltrs. / Day

(1) The above licensed capacities are equivalent to a total Sugarcane crushing capacity of 11,000 TCD working for approximately 200 days per year (Crushing Season) at an average 11% recovery rate for sugar, 30% for Bagasse and 4% for Molasses.

PROCESS OBSERVED BY STUDENTS:

By visiting this plant students observed the process of producing sugar and also a working of steam power plant furnishes, boiler, water treatment plant, cooling plant. We also showed the workshop of the plant.

Vishwaraj Sugar Industries Major products are as follows:

SUGAR :

The sugar which is a Carbo-hydrate is obtained from sugar cane and is known as Cane Sugar. It contains 99.50% sucrose.Actually cane sugar is chemically known as Sucrose which is disaccharide. It is soluble in water. Sucrose is dextrorotatory on hydrolysis.

BAGASSE :

Bagasse is the residue obtained from crushing cane in the mills. It contains about 50% moisture and 2% sugar and the balance is fiber. It is also very commonly used as fuel in boilers in the Sugar Factory. Bagasse is used as a row material for the production of Cellulose, Furfural, Paper, Particle board, Cattle feed etc.

MOLASSES :

Molasses which is also known as black strap molasses or treacle is a dark brown viscous liquid obtained as a by-product in processing Cane Sugar. It contains nearly 45% uncrystallized, fermentable Sugar & some Sucrose.

RECTIFIED SPIRIT (RS) :

It is manufactured by Formation & Distillation of molasses.
It is used for manufacturing of Acetic Acid, Acetone, Oxalic Acid Absolute Alcohol & other various chemicals.

ABSOLUTE ALCOHOL (ETHANOL) :

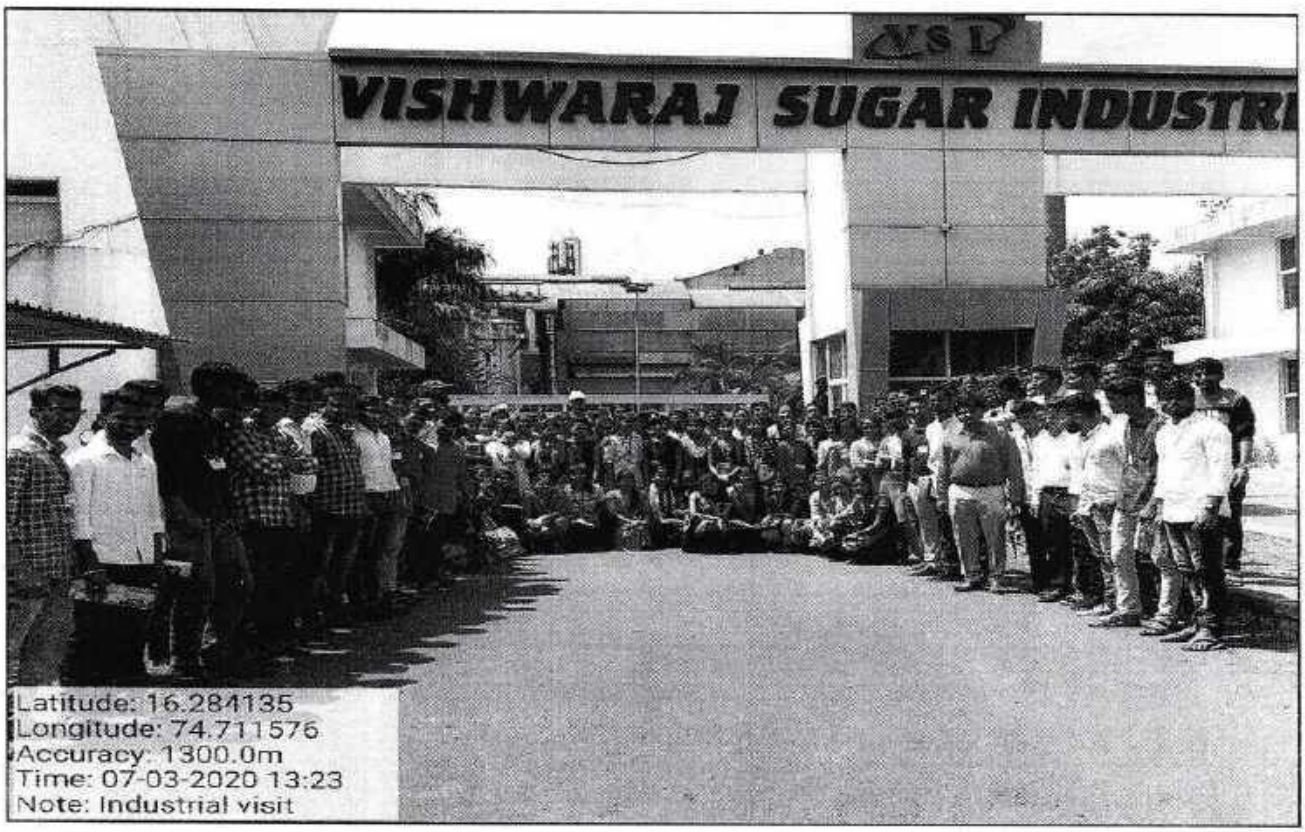
It is manufactured by Azeotropic Distillation .
It is used as Fuel in Automobile and also in Pharmaceutical Industries.

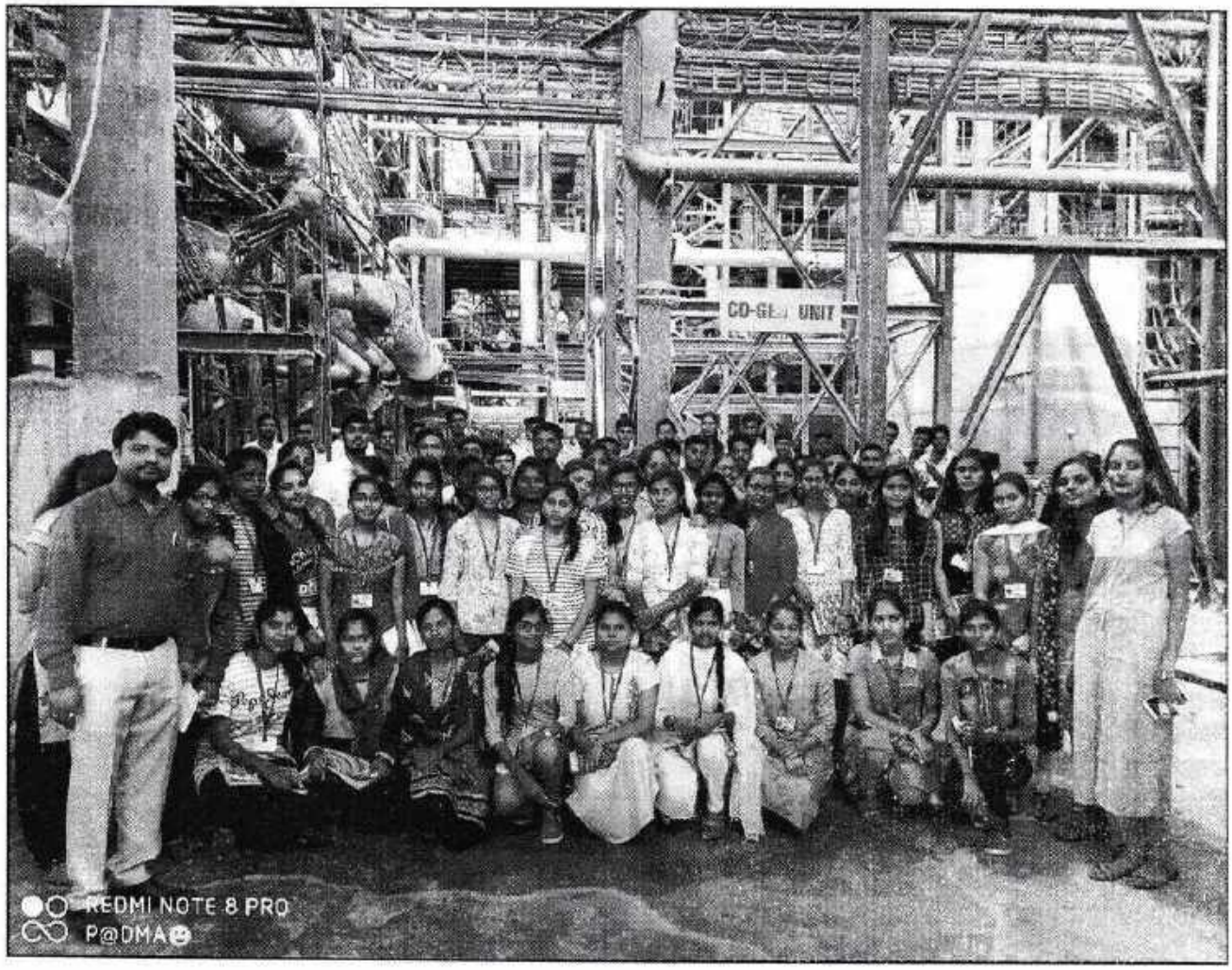
SUMMARY OF THE INDUSTRIAL VISIT:

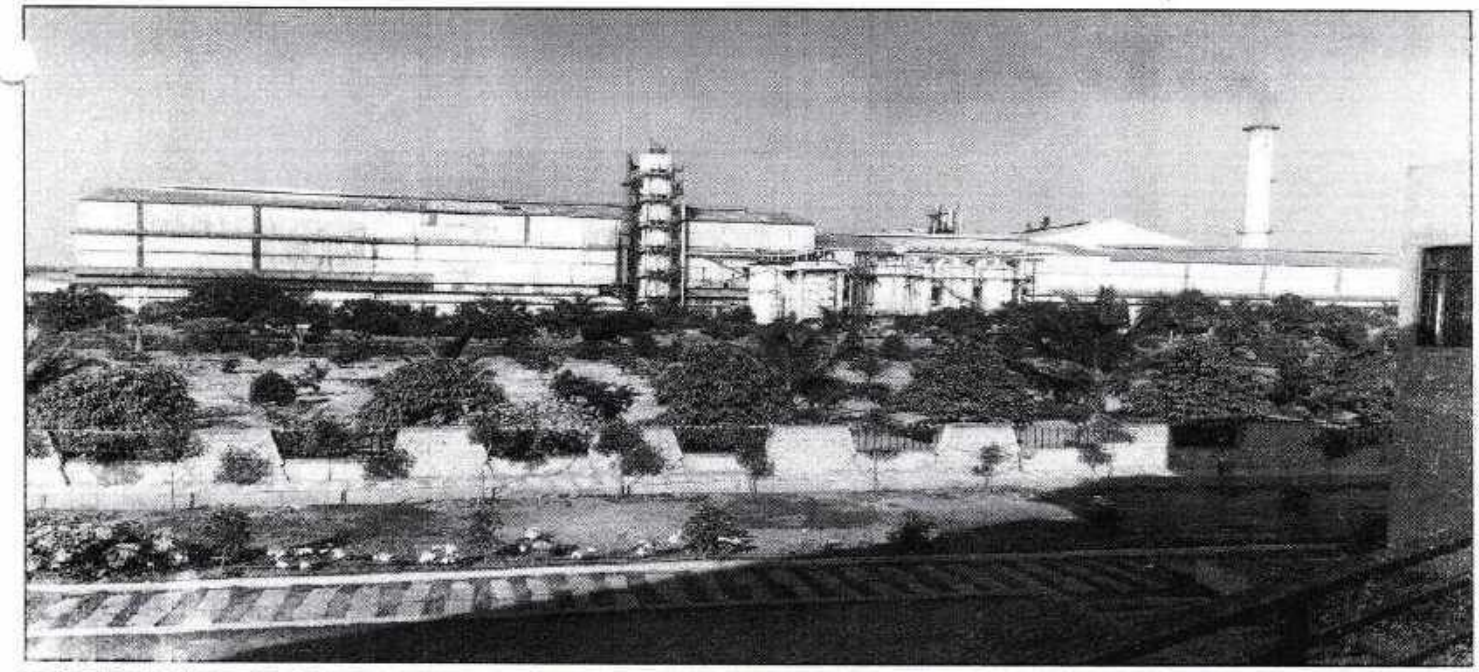
From this visit students and faculty members understands how electricity can be generated through steam power plant as well as working principles of furnish type boilers. Students and faculty members also observed cooling of processed water by cooling power, production process of sugar, Bagasse, Molasses, Rectified Spirit, Industrial Ethanol, Electricity / Power, Brewed Vinegar.

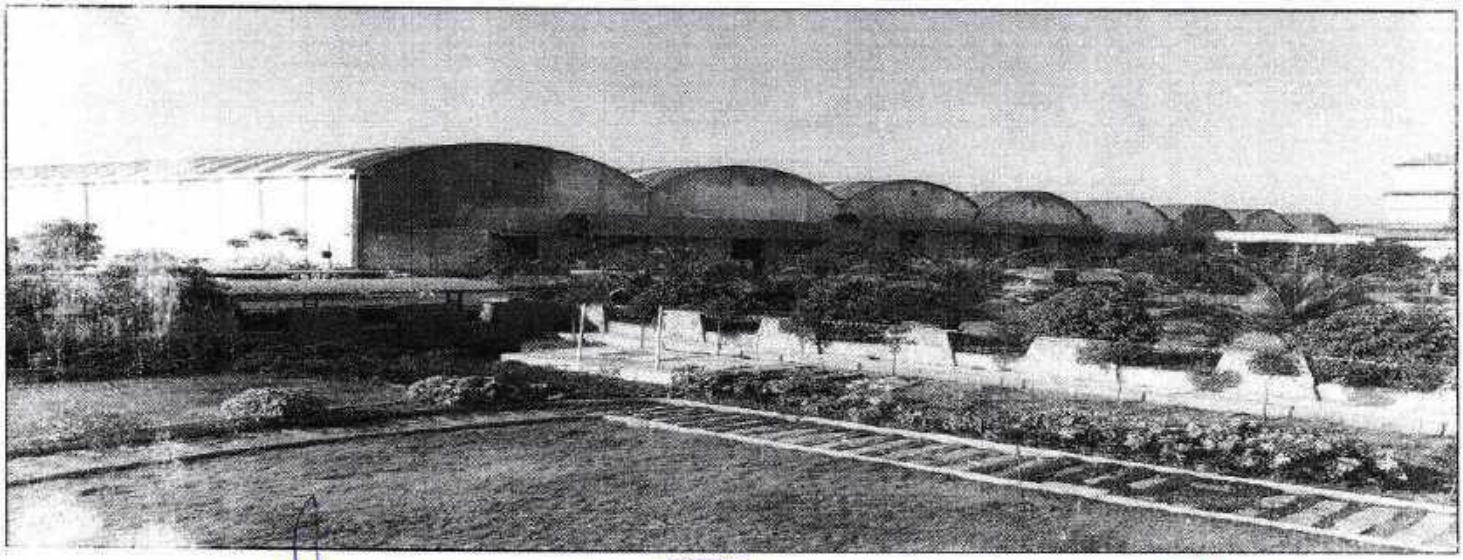
The visit was aimed to enhance the knowledge of the students, to understand the operations that are used in the SUGAR INDUSTRY and to understand the different process implemented to prepare sugar from sugarcane. At Industry students were able to see and understand different mechanical operation carried out in industry e.g. cutting, shredding, screening, centrifuging etc. Students have experienced the actual operations which are being taught in the classroom e.g. evaporation, crystallization etc. The aim of visit was fulfilled at the end of "SUGAR INDUSTRY" visit.

Photos taken during Industrial visit are attached below.









Head
Dept. of Chemistry
B. K. College, Chikodi.

HOD

B.L.E. S's BASAVAPRABHU KORE COLLEGE
NAAC-A

PRINCIPAL
B.K. Arts, Science & Commerce College
CHIKODI - 591 201.

PRINCIPAL

K.L.E. SOCIETY'S
BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE, CHIKODI
(Accredited at 'A' Grade by NAAC with CGPA of 3.26 in 3rd Cycle)
College with Potential for Excellence (CPE)

Date: 02/03/2020

DEPARTMENT OF CHEMISTRY

Notice

As every year department of chemistry is organizing an Industrial visit to **Millenium India Starch PVT Ltd, Athani**. on **7th March, 2020** for B.Sc. Final year Students.

Objectives of Industrial visit:

1. To create awareness about manufacturing process of industry.
2. To give industrial exposure.

Departure Time : 8:30 A.M. on 7th March, 2020

Arrival Time : 6:00 P.M. on 7th March, 2020

Name of Company : Millenium India Starch PVT Ltd, Athani. Dist: Belagavi

All B.Sc Final year students are requested to register their names along with **100/- Rs.** in department of chemistry on or before **4th March, 2020 without fail.**

Note: Industrial visit is compulsory for all B.Sc. final year students.

Head of the
Department of Chemistry
B. K. College, CHIKODI - 591 201

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College with Potential for Excellence (CPE)

Date: 03/03/2020

To,

The Managing Director,
VISHWARAJ SUGAR LIMITED,
GHATAPRABHA ROAD, BELLAD BAGEWADI,
HUKKERI, BELAGAVI-591305, KARNATAKA STATE, INDIA

Sir,

Sub: Seeking Permission for Industrial Visit to your esteemed organization.

As part of the Rani Channamma University Belagavi. curriculum of B.Sc. third year students have industrial visit. To facilitate the onsite working procedure of a esteemed organization such as yours and the curriculum demand, we request you for the industrial visit. Kindly permit us to visit your esteemed organization for a **team of 45 students 3 groups (Including Staff Members)** on **March 7th 2020.**

Kindly grant us permission for the industrial visit and make the necessary arrangements for the same. We look forward to a positive reply from your side.

Thanking You,

Yours Sincerely,

Prof. S. B. Vanjire,
Head of the Department of Chemistry,
KLE's B. K. College, Chikodi -591201, Dist: Belagavi
Contact: 7349747434, 7892201626

Website: www.klesbkcollegechikodi.edu.in

Received by
4/3/20

KLE Society's
BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE, CHIKODI
(Accredited at 'A' with 3.26 CGPA in 3rd Cycle of A & A)

2019-2020
CHEMISTRY DEPARTMENT

Following students of VI sem were permitted to participate in the tour organized by Chemistry Department

Sl. No	Name of the student
1	Abhishek Taradale
2	Aishwarya Parannavar
3	Akshata Bandagar
4	Akshata Karoshi
5	Akshata Mirje
6	Akshata Upadhye
7	Akshata Walake
8	Akshay Pujari
9	Amruta Gangale
10	Aniket Bekkeri
11	Apurva Patil
12	Arati Chougale
13	Aroodh Mallapure
14	Babita Naik
15	Basavaraj Bhoomar
16	Bavana Sarapure
17	Chaitra Chajagoud
18	Chaitra Mukkannavar
19	Chaitra Mathapati
20	Chetan Sadalage
21	Deepika Potadar
22	Ganesh Bastawade
23	Gangadhar Bakale
24	Jasmin Tamboli
25	Jayashree Mali
26	Kaveri Kulakarni
27	Kavyashree Kesti
28	Keerti Akkole

Continued to page 2

29	Keerti Maradi
30	Krishna Nandani
31	Krishna Pujeri
32	Laxmi Devangol
33	Laxmi Khot
34	Laxmi Metri
35	Mahesh Hegale
36	Manjunath Bhoje
37	Manjunath Nandagaon
38	Manoj Holevvagol
39	Meghashri Gajanan Gundakalle
40	Neha Pol
41	Nikhita Bamane
42	Nilesh Chougala
43	Nivedita Hanje
44	Pallavi Thorushe
45	Pooja Kasar
46	Pooja Khot
47	Pooja Pujari
48	Pooja Ravan
49	Poonam Magdum
50	Poornima Kumbar
51	Prachi Patil
52	Pradnya Jaganade
53	Prajakta Latawade
54	Preetam Hiremath
55	Preeti Wader
56	Preetam Magadum
57	Priyanka Chougala
58	Priyanka Halijol
59	Prijanka Vanjeri
60	Raghunath Pawar
61	Rahul Kulagude
62	Rahul Ugare
63	Rakshata Kamate
64	Rashmi Tamadaddi
65	Rashmi Vantamure
66	Revati Khot
67	Rohini Drakshe
68	Rohini Swami
69	Rohini Molake
70	Rutuja Halappanavar

Continued to Page 3

71	Sachin Hospeti
72	Sachin Kore
73	Sachin Shirahatti
74	Sagar Maishale
75	Sahana Salagare
76	Sakshi Mahishale
77	Samareen Jamadar
78	Sandya Kambar
79	Sapana Shiraguppe
80	Sapna Patil
81	Sarika Mali
82	Savita Halakarni
83	Savita Patil
84	Seema Heddure
85	Seema Rukade
86	Shankare Guggare
87	Shashikala Jadhav
88	Shashikumar Saptasagar
89	Shivanand Sangati
90	Shivanand Mudasi
91	Shivani Metri
92	Shivaraj Benurakar
93	Shobha Akkole
94	Shradha Pawar
95	Shreya Mugali
96	Shridevi Hunnarage
97	Shruti Gundappagol
98	Shruti Gurav
99	Shruti Mohite
100	Shruti Saptasagare
101	Shubham Jakate
102	Shweta Koli
103	Sneha Gavade
104	Snehal Ninganure
105	Sonali Bhandagar
106	Sonal Mirje
107	Soumya Shedabale
108	Sourabh Kokane
109	Sourabh Shedabale
110	Supriya Balikai
111	Sushila Hiremath

Continued to Page 4

112	Sushilavva Hullennavar
113	Tanuja Shinde
114	Tejashwini Sagare
115	Usha Devarushi
116	Vachana Kolakar
117	Vaibhav Halingali
118	Vani Chougule
119	Vanishree Muragoji
120	Varsha K Karagar
121	Varsha Patil
122	Vedashri Halyal
123	Vidya Bhagat
124	Vinay Gharabude

Prof U R Rajput
PRINCIPAL
KLES'S Basavaprabhu Kore
Arts, Science and Commerce College
CHIKODI - 591 201

K.L.E. SOCIETY'S

BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE,

CHIKODI-591201

PG DEPARTMENT OF COMMERCE AND MANAGEMENT

CERTIFICATE

This is to certify that **MISS. GOURI SHEDABALE** has satisfactorily completed the project report entitled **"A Study On buying behaviour of consumers towards Hero Motocorp "** At M/S Shree Renuka Hero Motors authorised hero motocorp dealer, Chikodi for the partial fulfillment of Degree in MASTER OF COMMERCE in **RANI CHANNAMMA UNIVERSITY, BELAGAVI** during the academic year **2019-2020**

SHRI. S. M. BHOSAGE
PROJECT GUIDE

SHRI. LAXMIKANTHA NAYAKA T O
CO-ORDINATOR
P.G. CO-ORDINATOR
Department of Commerce
B.K. College Chikodi

SHRI.UDAYSINGH RAJPUT
PRINCIPAL
PRINCIPAL
B.K.Arts, Science & Commerce College
CHIKODI - 591201.

K.L.E.S's BASAVAPRABHU KORE COLLEGE CHIKODI NAAC-A

M/s. SHREE RENUKA HERO

Hero

CERTIFICATE

This is to certify that **Miss. Gouri Kumar Shedabale** M.Com IVth semester student of KLE Society's B.K.College Chikodi has successfully completed project work, study titled **"buying behavior of consumers towards Hero Motocorp with special reference to M/s.Shree Renuka Motors Authorized Hero Motocorp Dealer Chikodi"** in our company from 01/05/2020 TO 30/06/2020. During the period she found sincere and hard working.

We wish her all the success for her bright future.

Managing Partner

For SHREE RENUKA MOTORS

PARTNER

M/s. Shree Renuka Motors - Authorised Dealer, Hero MotoCorp Ltd.,
Sangli Road, Chikodi - 591 201. Ph.: 08338 - 274400, 274499 M: 9513353812

CHAPTER 1

INTRODUCTION AND RESEARCH DESIGN

1.1 INTRODUCTION:

Throughout the centuries man has driven to expand the capabilities through the use of machine. His ever inventive mind has constantly devised ways to use tool to increase hi abilities to explore the world around him. To go Faster, Deeper, Higher and further than before. Coupled with his need to find new thrills, new adventures and new modes of transportation. The invention refinement of the motorcycle seems as investible outcome.

As a customer we are all unique and this uniqueness is reflected in the consumption pattern and the process of purchase. The study of consumer behavior provides us the reason why consumer differ from one another in buying, using products and services.

The study of consumer behavior is very important to the marketers because it enables them to understand and predict buying behavior of consumers in the market place. It is concerned not only with what customers buy but also with why they buy it, when and where and how they buy it, and also how they consume it and deposit it.

According to Professor Theodore Levitt of Harvard Business School, the study of consumers buying behavior is one of the most important in business education, because the purpose of a business is to create and keep customers.

1.2. REVIEW OF LITERATURE:

ACCORDING TO CEO AND MD OF HERO METOCORP LTD PAWAN MUNJAL (2012):

The company has tied up with Italian two wheeler design house Engines engineering to improve its in house technology and design capabilities. This tie up is done with keeping in mind the vision of having multiple centers of excellence located strategically across the globe.

JOSEPH GEORGE (2012):

Is the opinion about the Hero tie up with engines engineering to improve design that while hero needs good R&D support, it should ensure it finds right partners, unlike Bajaj and TVs. Who pursued in house research and development, hero seeking outside help is fraught with risks as it could be tough for hero to synergize diverse inputs from variety of partners.

AMRIT RAJ (2012):

Has reported that hero motocorp ltd a focusing on technology revamp by having tie ups with US brand EBR racing and aim to extend arm in R&D as the company has decided not to run the existing brands on Honda engines.

ABHIJEET SINGH AND BRIJESH TUMAR (2011):

Mentioned that hero Honda motors ltd is running a program called good life passport to relationship record with an objective to create an innovative environment for interaction between hero Honda and its customers. Members of this program are given a magnetic card in which all information is stored and this card is swiped when using any services at a showroom or workshop and it works like a loyalty benefit card.

BISWAJIT MAHANTY AND VIRUPAXI BAGOGI (2008)

Has mentioned that it is an area of customer delight for the two wheeler industry and the conventional measures implemented by the service organizations tend to be in adequate to attract customers' persistency

1.3. STATEMENT OF THE PROBLEM:

The study is about the activities of consumers with respect to their opinion about the best quality of two wheelers and their preferences towards the purchase of two wheelers. The research is also analyzing the consumer's income of vehicle, price of vehicle, quality. Because these factors also determine the purchase factor.

The study is based on the consumer preference towards the various types of two wheeler in rural chikodi only. The research is mainly concentrated the attitude of consumers. Here the sample size is limited. This study has relied upon oral facts given by the respondents. The attitude of the consumer may be changed. Due to time constraint, I have done this research work in particular area. And all the responses are not considered as true .

1.4. NEED FOR THE STUDY:

- To understand the buying behaviors of consumer during purchase of Hero bikes.
- To know about the satisfaction level of customers.

1.5. OBJECTIVES OF THE STUDY:

1. To know consumer behavior for the purchase of hero bikes.
2. To know the market position of Hero bikes in chikodi taluka.
3. To study the factors which affect consumer behavior for purchase of two wheeler bikes?
4. To study consumer satisfaction towards Hero bike in chikodi.
5. To study whether the consumer is interested to purchase bikes in Hero motocorp ltd. or not?

1.6. SCOPE OF THE STUDY:

1. The main scope of the study is limited to chikodi only.
2. The study has been made to find the level of satisfaction of the customer regarding the service provider by bike place.

1.7. RESEARCH METHODOLOGY:

(a) Introduction

Marketing research is the function which links the consumer, customer and public to the marketers through information used to identify and define marketing opportunities and problems, generates refine marketing action ; monitor marketing performance; and improve undertaking of marketing as a process

(b)Research definition:

"Research is careful inquiry or examination to discover new information and relationship and to expand and verify exiting knowledge."

Research always stats with questions or a problem. Its purpose is to find answer to questions through the application of the scientific method. It is a systematic and intensive study directed towards a more complete knowledge of the subject studies.

(c) Sources of data

The sources of data collection methods are as follows.

Primary data:-

As the name itself suggests, are first- hand information collected by the surveyor. The data so collected are pure and original and collected for specific purpose.

Methods of primary data:

Personal investigation: the surveyor collects the data himself/herself. The data so collected is reliable but is suited for small projects.

Collection via Investigators: Trained investigators are employed to contact the respondents to collect data.

Questionnaires: questionnaires may be used to ask specific questions that suit the study and get responses from respondents. These questionnaires may be mailed as well.

Telephonic Investigation: the collection of data is done through asking questions over the telephone. To give quick and accurate information.

(d) Sampling plan

Sampling is a process of obtaining. The information about the entire population by examining a part of it. The effectiveness of the research depends on the sample size selected for the survey purpose.

Sample Site:-

The survey was conducted in chikodi city.

Sampling unit:-

It means "Who is to be surveyed." Here target population is decided and it is who are interested to purchase "Bike" and sampling frame is developed so that everyone in the target population has known chance of being sampled. So the survey is conducted particularly in chikodi city.

Sample size:-

For the purpose of proper survey, there is need of perfect research instruments to find out sample size for more accurate result about behavior of bike. The sample size is 41 respondents.

Sampling method:-

A stratified random sample is one where the population is divided into mutually exhaustive strata or sub-group and then a simple random is selected within each of strata on age groups, occupation etc. it may be noted that stratification does not means absence of randomness. I used a random sampling method.

1.8LIMITATIONS OF THE STUDY:

1. When the buyers are busy we can't get accurate information from them.
2. During survey some respondents may not give answer in a proper manner.
3. This study is limited to M/S Shree Renuka Motors Authorized Hero Motocorp dealer Chikodi

1.9 CHAPTER SCHEME:

CHAPTER 1: INTRODUCTION AND RESEARCH DESIGN

This chapter deals with: Introductions, Review of literature, Statement of problem, Need for the study, Objectives of the study, Scope of the study, Research methodology, limitations of the study, chapter scheme.

CHAPTER 2: CONCEPTUAL FRAMEWORK

This chapter deals with: Introduction, Meaning of consumer buying behavior, Definition of consumer behavior, Characteristics of consumer buying behavior, Factors influencing consumers buying behavior, Stages of consumer buying process, Types of consumers buying behavior.

CHAPTER 3: COMPANY PROFILE

This chapter deals with: Industrial profile, Company profile, Organization chart of Renuka hero motors pvt. Ltd. Chikodi, Products of hero motocorp.

CHAPTER 4: DATA ANALYSES AND INTREPRETATION

This chapter deals with: Data analysis and interpretation

CHAPTER 5: FINDINGS, SUGGESTIONS AND CONCLUSION

This chapter deals with: Findings, Suggestions and Conclusion.

CHAPTER 2

CONCEPTUAL FRAMEWORK

2.1. INTRODUCTION:

Consumer behavior is the study of individuals, groups, or organizations and all the activities associated with the purchase, use and disposal of goods and services, including the consumer's emotional, mental and behavioral responses that precede or follow these activities. Consumer behavior emerged in the 1940s and 50s as a distinct sub-discipline in the marketing area.

2.2. Meaning of consumer buying behavior:

Consumer buying behavior is the sum total of a consumers attitudes, preferences, intentions, and decisions regarding the consumer behavior in the marketplace when purchasing a product or service. The study of consumer behavior draws upon social science disciplines of anthropology, psychology, sociology, and economics.

2.3Definition of consumer behavior:

The consumer behavior is the study of how an individual decides to purchase a particular product over the other and what the underlying factors that mold such behavior are.

2.4. Characteristics of consumer buying behavior:

1. Bargaining:

A trend of bargaining is often found in the behavior of buyers. They prefer buying goods by reducing the price as told by seller. Indian buyers too do not frame uniform price policy. The trend bargaining is still in vogue in the Indian markets.

2. Quality vs. price:-

Buyers focus on price instead of variety of goods. They therefore, prefer goods. A little bit change has come now because the consumers have now begun purchase of quality goods on higher price.

3. Brand or trademark consciousness:-

It is the characteristic of the behavior of buyer that he appears now aware of brand of items and considers these goods authentic and of higher quality.

4. Changing consumption pattern:-

Owing to widespread education, increase in income and standard of living as also desire of more comforts, the pattern of consumption is now being changed. The low income groups are increasingly buying fried, tape recorder, cooler, sewing machines, etc.

5. Role of women:-

The role of women is increasing day to day in the manner of decisions for purchase. The women do purchase of all kinds particularly in families where the husbands earn the bread.

6. Credit and guarantee:-

New motives for purchase are getting their way rapidly because of having credit and guarantee facility available in the market. Such facilities are developing the trade and commerce.

7. Complaining:-

Buyers are gradually being aware of their rights. They have started exhibiting their complaints through media and representations before consumer forum and thus, can receive the compensation against the damage/loss so sustained.

2.5. FACTORS INFLUENCING CONSUMERS BUYING BEHAVIOR:

The marketers try to understand the actions of the consumers in the marketplace and the underlying motives for such actions. These motives are the factors the influence the consumer behavior.

These are the factors influencing behavior:

***Psychological factors*:** The human psychology plays a crucial role in designing the consumer's preferences and like or dislikes for a particular product and services. Some of the important psychological factors are:

Motivation

Perception

Learning

Attitudes and beliefs

***Social factors*:** the human beings live in a complex social environment wherein they are surrounded by several people who have different buying behaviors. Since the man is a social animal who likes to be acceptable by all tries to imitate the behaviors that are socially acceptable. Hence, the social factors influence the behavior of an individual to a great extent. Some of the social factors are:

Family

Reference groups

Roles and status

***Cultural factors*:** it is believed thnet5 an individual learns the set of values, perceptions, behaviors, and preferences at a very early stage of his childhood from the people especially, the family and the other key institutions which were around during his developmental stage. Thus, the behavioral patterns are developed from the culture where he or she is brought up. Several cultural factors are:

Culture

Subculture

Social class

***Personal factors*:** There are several factors personal to individuals that influence their buying decisions. Some of them are:

Age

Income

Occupation

Lifestyle

Economic factors: the last but not the least is the economic factors which have a significant influence on the buying decision of an individual. These are:

Personal income

Family income

Income expectations

Consumer credit

Liquid assets of the consumer

Savings

These are some of the underlying factors that influence the consumer behavior, and the marketer must keep in mind, so that appropriate strategic marketing decision is made.

2.6. Stages of consumer buying process:

Buying behavior involves a mental process as well as physical activity. The buying behavior and purchase decisions need to be studied thoroughly to understand, predict and analyze critical market variations. Buyer is a riddle, highly complex entity want to satisfy his innumerable needs and desires.

The five steps involved in consumer buying behavior process are described briefly:

Step # 1. Problem recognition:

Problem recognition (awareness of need) difference between the desired state and actual condition. Deficit in assortment of products. Huger- food. Hunger stimulates your need to eat.

Step # 2. Information search:

Information is to know about a service, attributes, prices, and stores and so on. Search may be categorized in four categories- pre-purchase, ongoing, internal and external. An aroused buyer may or may not search more information. If the buyers derive is strong and the desired service to satisfy the need is easily available then he or she may not search for more information.

Step#3. Evaluation of alternatives:

Evaluation involves those activities undertaken by the buyer to compare alternatives carefully on the basis of certain criteria, alternative solutions to market related problems etc. the marketers are interested in knowing how the buyer processes information to arrive at brand choice. There is no single evaluation process used by the buyers or even one consumer on all purchase decisions.

Step # 4. Purchase decisions:

Purchase decision is a consumer commitment for a product. It is the terminal stage in buying decision process that completes a transaction. In case a consumer is buying a product for the first time, then from the behavioral point of view it may be repeat the purchase only where he is satisfied with its performance.

Actual purchasing process of buyer seeking to build a better understanding of how buyers make their purchases. In the decision evaluation stage , the consumer forms preferences among the brands in the choice set. The consumer may also form a purchase intention and lean towards buying the most preferred brand. However factors can intervene between the purchase intention and the purchase decision.

Step#5. Post purchase behavior:

It refers to the behavior of a consumer after the purchase and use of products; it originates out of consumer experience regarding the use of the product and is indicated in terms of satisfaction. This behavior is reflected in repeat purchases or discontinuation from further purchase. If product use experience indicates satisfaction, they repeat purchases will occur, otherwise not.

Once the buyer makes the decision to purchase a product or service there can be several types of additional behavior associated with that decision such as decisions on service uses and decision on service related to the item purchased. The marketer's job continues even after the service is bought especially since he has to learn a lot from the post purchase behavior undertaken by the buyer. This will be indicative of whether the buyer is experiencing post purchase satisfaction or not.

(Post purchase satisfaction)- the level of satisfaction experienced by the buyer after his purchase will depend on the relationship between his expectations about the service and performance of the service.

A satisfied buyer an informal word of mouth for the firm whereas a dissatisfied buyer will react in an entirely different manner.

(Post purchase action) – The satisfaction or dissatisfaction with the service will determine subsequent performance of the service In the market. If the buyer is satisfied then he will exhibit a higher probability of repeat purchase of the service. The satisfied buyer will also tend to say good words about. Whereas a highly dissatisfied buyer will not buy the service again and spread negative words about service and company.

2.7. Types of consumers buying behavior:

The four types of consumer buying behavior are:-

1. **Routine response/ programmed behavior:**

a. Buying low involvement frequently purchased low cost items; need very little search and decision effort; purchased almost automatically. Examples include soft drinks, snack foods, milk.

b. **Limited decision making :**

c. Buying product occasionally. When you need to obtain information unfamiliar brand in a familiar product category, perhaps. Requires a moderate amount of time for information gathering. Examples include clothes- know product class but not the brand.

2. **Extensive decision making / complex high involvement:**

a. Examples include cars, homes, computers, education. Spent a lot of time seeking information and deciding. Information from the retailers catalogs; friends and relatives, store personnel, etc. go through all six stages of the buying process.

3. **Impulse buying, no conscious planning:**

a. The purchase of the same product does not always elicit the same buying behavior. Product can shift from one category to the next.

b. For example: Going out for dinner. For one person it may be extensive decision making (for someone that does not go out often at all), but limited decision making for someone else.

CHAPTER 3

COMPANY PROFILE

3.1 INDUSTRIAL PROFILE:

Hero Motocorp Ltd. (Formerly Hero Honda Motors Ltd.) is the world's largest manufacturer of two – wheelers, based in India. In 2001, the Company achieved the coveted position of being the largest two-wheeler manufacturing Company in India and also, the 'World No.1' two-wheeler Company in terms of unit volume sales in a calendar year. Hero Motocorp Ltd. continues to maintain this position till date.

VISION:-

The story began with a simple vision – the vision of a mobile and an empowered India, powered by its bikes. Hero Motocorp Ltd., company's new identity, reflects its commitment towards providing world class mobility solutions with renewed focus on expanding company's footprint in the global arena.

MISSION:-

Hero MotoCorp's mission is to become a global enterprise fulfilling its customers' needs and aspirations for mobility, setting benchmarks in technology, styling and quality so that it converts its customers into its brand advocates. The Company will provide an engaging environment for its people to perform to their true potential. It will continue its focus on value creation and enduring relationships with its partners.

STRATEGY:-

Hero MotoCorp's key strategies are to build a robust product portfolio across categories, explore growth opportunities globally, continuously improve its operational efficiency, aggressively expand its reach to customers, continue to invest in brand building activities and ensure customer and shareholder delight.

Manufacturing:-

Hero Honda bikes are manufactured across three globally benchmarked manufacturing facilities. Two of these are based at Gurgaon and Dharuhera which are located in the state of Haryana in northern India. The third and the latest manufacturing plant is based at Haridwar, in the hill state of Uttarakhand.

TECHNOLOGY:-

In the 1980's the Company pioneered the introduction of fuel-efficient, environment friendly four-stroke motorcycles in the country. It became the first Company to launch the Fuel Injection (FI) technology in Indian motorcycles, with the launch of the Glamour FI in June 2006.

Its plants use world class equipment and processes and have become a benchmark in leanness and productivity.

Hero Motocorp, in its endeavor to remain technology pioneer, will continue to innovate and develop cutting edge products and processes.

PRODUCTS:-

Hero Honda's product range includes variety of motorcycles that have set the industry standards across all the market segments. The Company also started manufacturing scooter in 2005. Hero Honda offers large no. of products and caters to wide variety of requirements across all the segments.

DISTRIBUTION:-

The Company's growth in the two wheeler market in India is the result of an intrinsic ability to increase reach in new geographies and growth markets. Hero Motocorp's extensive sales and service network now spans over to 5000 customer touch points. These comprise a mix of authorized dealerships, Service & Spare Parts outlets, and dealer-appointed outlets across the country.

BRAND:-

The new Hero is rising and is poised to shine on the global arena. Company's new identity "Hero Motocorp Ltd." is truly reflective of its vision to strengthen focus on mobility and technology and creating global footprint. Building and promoting new brand identity will be central to all its initiatives, utilizing every opportunity and leveraging its strong presence across sports, entertainment and ground- level activation.

Hero Motocorp Limited

Type	Public
Traded as SENSEX Constituent	BSE: 500182 NSE: HEROMOTOCO BSE
ISIN	INE158A01026
Industry	Automotive
Founded	19 January 1984
Founder	Dr. Brijmohan Lall Munjal Ji
Headquarters	New Delhi, India
Key people	Dr. Brij Mohan Lall Munjal (ChairmanEmeritus) Pawan munjal (chairman, MD &CEO)
Products	Motorcycles, Scooters
Production output	7,587,130 units (2018)
Revenue	₹34,658 crore (US$4.9 billion) (2019)
Operating income	₹5,043 crore (US$710 million) (2019)
Net income	₹3,466 crore (US$490 million) (2019)
Total assets	₹17,641 crore (US$2.5 billion) (2019)

HISTORY

Hero Honda started its operations in 1984 as a joint venture between Hero Cycles (sometimes called Hero Group, not to be confused with the Hero Group food company of Switzerland) of India and Honda of Japan. In 2010, when Honda decided to move out of the joint venture, Hero Group bought the shares held by Honda, and focused on its entirely owned subsidiary, Honda Motorcycle and Scooter

Total equity ₹12,857 crore (US$1.8 billion) (2019) Number of employees 8,551 (2019) Website Hero Motocorp

India (HMSI). In June 2012, Hero Motocorp approved a proposal to merge the investment arm of its parent Hero Investment Pvt. Ltd. with the automaker. This decision came 18 months after its split from Hero Honda.

"Hero" is the brand name used by the Munjal brothers for their flagship company, Hero Cycles Ltd. A joint venture between the Hero Group and Honda Motor Company was established in 1984 as the Hero Honda Motors Limited at Dharuhera, India. Munjal family and Honda group both owned 26% stake in the Company.

During the 1980s, the company introduced motorcycles that were popular in India for their fuel economy and low cost. A popular advertising campaign based on the slogan 'Fill it – Shut it – Forget it' that emphasized the motorcycle's fuel efficiency helped the company grow at a double-digit pace since inception. In 2001, the company became the second largest two-wheeler manufacturing company in India and globally. It maintains global industry leadership to date. The technology in the bikes of Hero Motocorp (earlier Hero Honda) for almost 26 years (1984–2010) has come from the Japanese counterpart Honda.

The Termination of Honda joint venture and the renaming

By December 2010, the board of directors of the Hero Honda Group had decided to terminate the joint venture between Hero Group of India and Honda of Japan in a phased manner. The Hero Group would buy out the 26% stake of the Honda in JV

Hero Honda. Under the joint venture Hero Group could not export to international markets (except Nepal, Bangladesh and Sri Lanka) and the

The Termination of Honda joint venture and the renaming

Termination would mean that Hero Group could now export. From the beginning, the Hero Group relied on their Japanese partner Honda for the technology in their bikes.

The Japanese auto maker exited the joint venture through a series of off market transactions by giving the Munjal family— which held a 26% stake in the company— an additional 26%. Honda, wanting to focus only on its independent fully owned two-wheeler subsidiary—Honda Motorcycle and Scooter India (HMSI)—, exited Hero Honda at a discount and get over ₹64 billion (US$900 million) for its stake. The discount was between 30% and 50% to the current value of Honda's stake as per the price of the stock after the market closed on 16 December 2010.

The rising differences between the two partners gradually emerged as an irritant. Differences had been brewing for a few years before the split over a variety of issues, ranging from Honda's reluctance to fully and freely share technology with Hero (despite a 10-year technology tie-up that expired in 2014) as well as Indian partner's uneasiness over high royalty payouts to the Japanese company. Another major irritant for Honda was the refusal of Hero

Honda (mainly managed by the Munjal family) to merge the company's spare parts business with Honda's new fully owned subsidiary, HMSI.

As per the arrangement, it was a two-leg deal. In the first part, the Munjal family, led by Brijmohan Lal Munjal group, formed an overseas-incorporated special purpose vehicle (SPV) to buy out Honda's entire stake, which was backed by bridge loans. This SPV was eventually thrown open for private equity participation, and those in the fray included Warburg Pincus, Kohlberg Kravis Roberts (KKR), TPG, Bain Capital, and Carlyle Group.

Formation of the new company

The name of the company was changed from Hero Honda Motors Limited to Hero Motocorp Limited on 29 July 2011. The new brand identity and logo of Hero Motocorp were developed by the British firm Wolff Olins. The logo was revealed on 9 August 2011 in London, to coincide with the third test match between England and India.

Hero Motocorp can now export to Latin America, Africa and West Asia. Hero is free to use any vendor for its components instead of just Honda-approved vendors.

On 21 April 2014, Hero Motocorp announced their plan on a ₹2.540 billion (US$36 million) joint venture with Bangladesh's Nitol-Niloy Group in the next five years to set up manufacturing plant in Bangladesh. The plant started production in 2017. Hero Motocorp owns the 55% of the manufacturing plant and rest 45% is owned by Niloy Motors (A subsidiary of Nitol-Niloy Group). Hero also updated its 100cc engine range in 2014 for 110cc Bike expect hero dawn

3.2 COMPANY PROFILE

Name: M/S SHREE RENUKA MOTORS AUTHORIZED HERO MOTOCORP DEALER CHIKODI.

Address: RENUKA MOTORS,

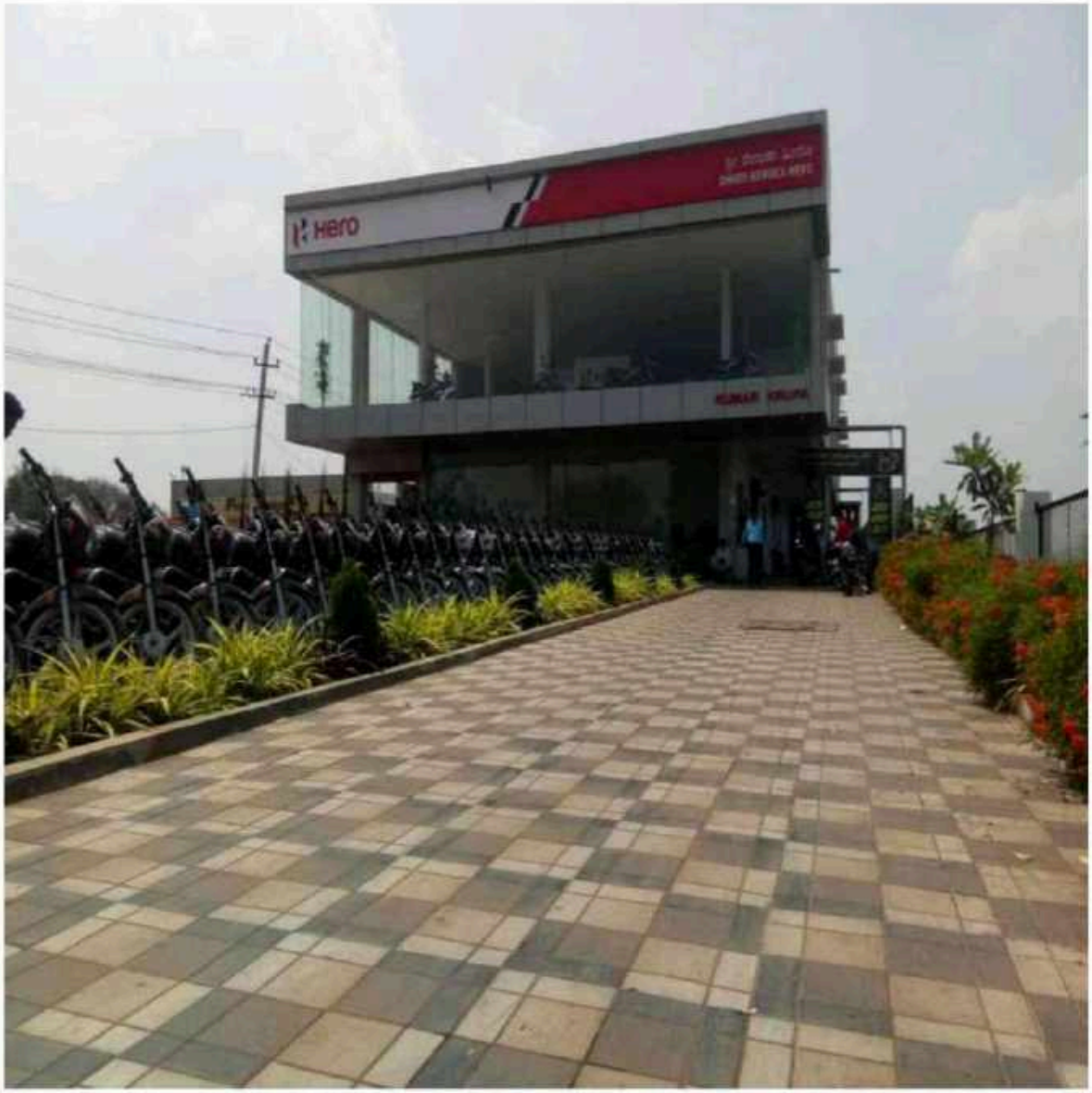
SANGALI ROAD,

CHIKODI – 591201

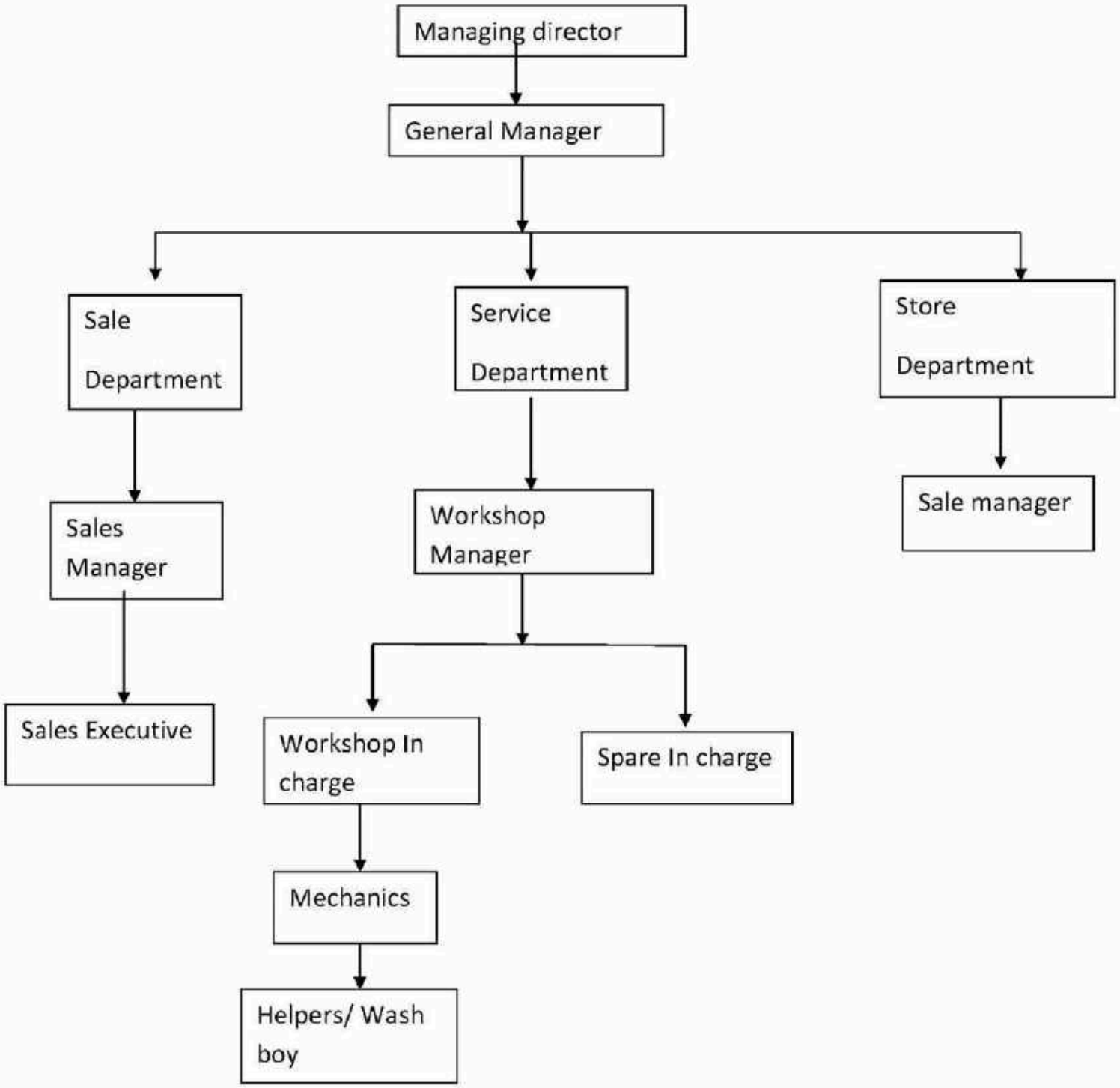
E-MAIL:- srmgerockd@gmail.com

DATE OF ESTABLISHMENT: - 24/02/2014

DEALER CODE: - 11625


Hero

3.3 ORGANIZATION CHART OF RENUKA HERO MOTORS PVT. LTD. CHIKODI.



3.4 PRODUCTS OF HERO MOTCORP:

NAME	Ismart
PRICE	51,030
ON ROAD PRICE	59,329

NAME	SPLENDOR PLUS
PRICE	49,210
ON ROAD PRICE	59,367

NAME	Xpulse
PRICE	94,000
ON ROAD PRICE	1,10,376

NAME	Xtreme 200S
PRICE	98,400
ON ROAD PRICE	1,14,978

NAME	Maestro
PRICE	58,500
ON ROAD PRICE	67,472

NAME	Ignitor
PRICE	63,599
ON ROAD PRICE	67,722

NAME	Glamour
PRICE	61,200
ON ROAD PRICE	71,599

NAME	Karizma ZMR
PRICE	1,08,000
ON RROAD PRICE	1,15,000

NAME	Passion pro
PRICE	53,425
ON ROAD PRICE	58,200

NAME	HF Deluxe
PRICE	49,900
ON ROAD PRICE	60,111

NAME	Passion Xpro
PRICE	56,550
ON ROAD PRICE	65,374

NAME	Destini
PRICE	54,650
ON ROAD PRICE	61,056

NAME	Pleasure
PRICE	47,300
ON ROAD PRICE	57,300

NAME	Duet
PRICE	47,680
ON ROAD PRICE	57,887

CHAPTER 4

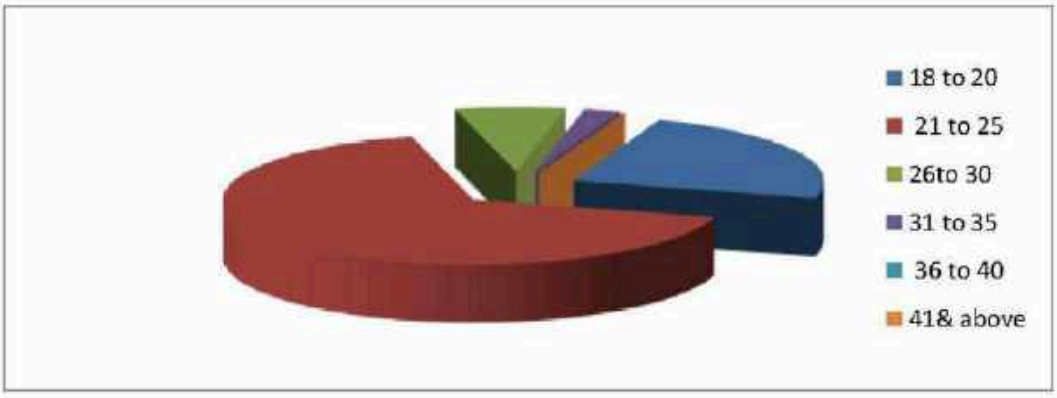
DATA ANALYSES AND INTREPRETATION

Table 4.1 Shows Age of Respondents

Age	No. of respondents	Percentage (%)
18 to 20	10	24
21 to 25	28	67
26 to 30	3	7
31 to 35	1	2
36 to 40	0	0
41 & above	0	0
Total	41	100%

Source: Survey

Graph 4.1 Shows Age of Respondents

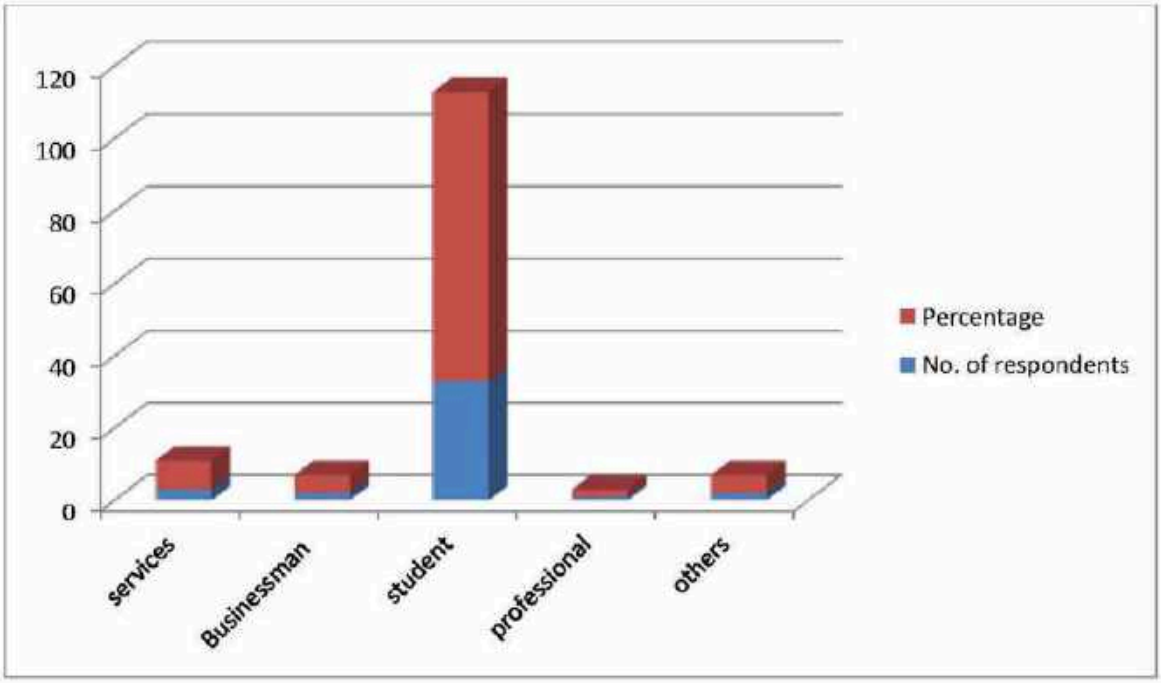


Above Table shows that 24% of respondents are in the age group of 18-20, 67% of respondents are in the age group of 21-25, 7 % and 2% of respondents are in age group of 26-30 and 31 -35 respectively, and no respondents in the age group of 36-40 and 41 above .

Table 4.2. Shows occupation of the respondents

Occupation	No. of respondents	Percentage (%)
Services	3	8
Businessmen	2	5
Student	33	80
Professional	1	2
Others	1	5
Total	40	100

Graph 4.2 shows percentage of occupation of respondents



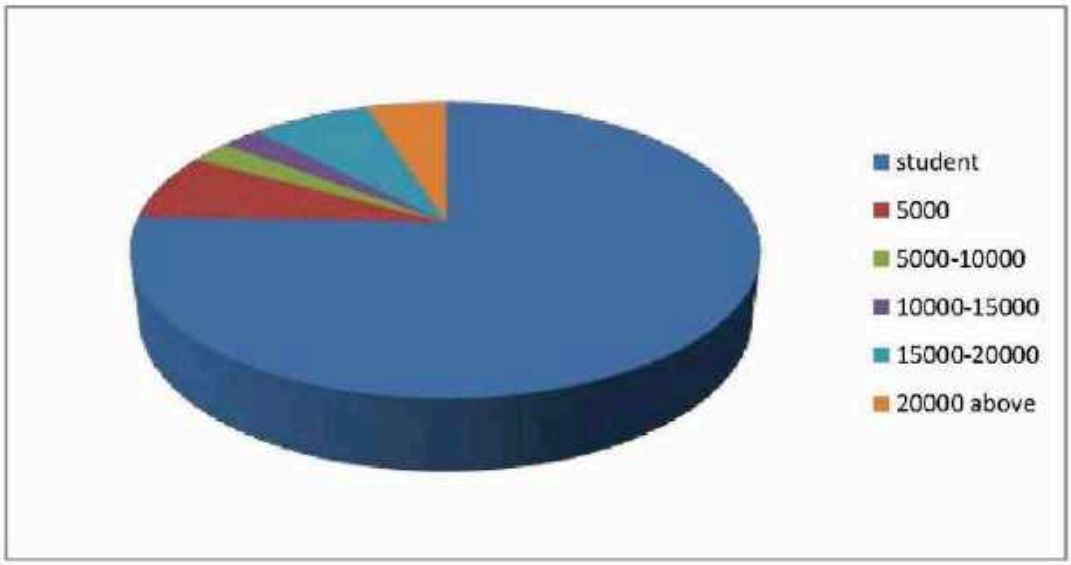
Source: survey

Above table shows that out of 41 respondents 3 respondents are servicemen, 2 are businessmen, 33 are students, and 1&1 are professionals and others respectively.

Table 4.3 Shows income of the respondents.

Income level	No. of respondents	Percentages (%)
Students (< 5000)	31	78
5000	3	8
5000-10000	1	2
10000-15000	1	2
15000-20000	3	7
20000 above	2	5
Total	41	100

Graph 4.3. shows the percentage of income of the respondents.



Source: survey

Above table shows that 78% of respondents income are students ,8% of respondents are of 5000 income level,2% of respondents are of 5000-10000 and 10000-15000 income level each, 7 % and 5% respondents are of 15000-20000 and 20000 above respectively.

Table 4.4 Shows Respondents opinion on Purchase of Hero Bike in future

Details	No. of respondents	Percentage (%)
Yes	30	71
No	12	29
Total	41	

Graph 4.4 shows percentage of respondents opinion on purchase of Hero Bike in future

Source: survey

From the above table it can be studied that 71% of respondents want to purchase Hero bikes in future. It means Hero has good future aspects and can sell more bikes than competitors. 29% of respondents don't want to purchase Hero bikes, and they prefer other company bikes. Hero can attract those customers by providing them other benefits.

Table 4.5 shows the media by which consumers (respondents) come to know about bikes.

Media	No. of respondents	%
Newspaper	0	0
Magazines	0	0
Advertising	11	26
Television	6	15
Showroom	8	20
Banners on road	1	2
Friends and Relatives	15	37
Total	41	100

Graph 4.5 shows the percentage of media by which consumers (respondents) come to know about bikes.

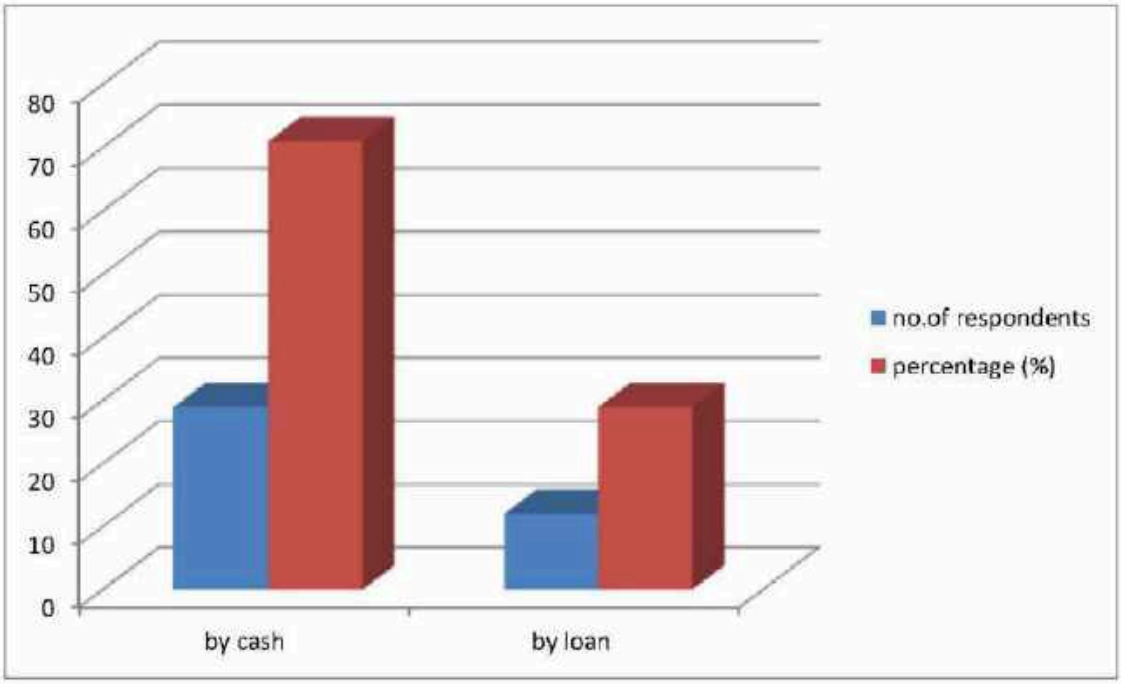
Source: survey

Above table shows that most important media by which consumers come to about bikes are advertising, friends and relatives , showroom 26%, 37% and 20% respectively. They are most affective source to advertise and promote new and existing models of bikes for hero manufacturer

Table 4.6 shows the sources of finance for purchase of Hero Bike.

Source of finance	No. of respondents	%
By cash	29	71
By loan	12	29
Total	41	100

Graph 4.6 shows the sources of finance for purchase of Hero Bike.



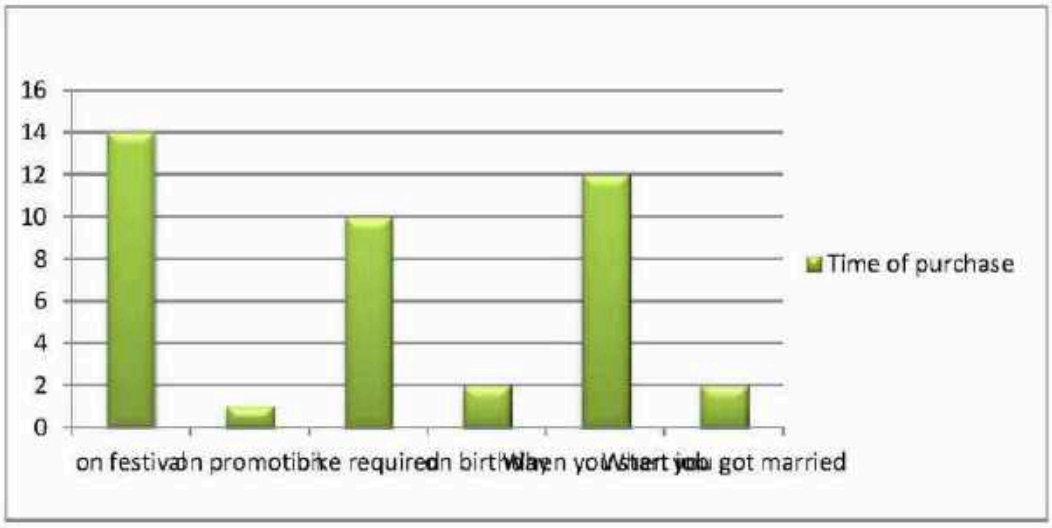
Source: survey

Above table shows that 71% i.e. 29 respondents purchase Hero Bikes by loan and 29% i.e. 12 respondents purchase Hero bikes through cash.

Table 4.7 shows on specific occasion Consumers purchased Hero bike

Time	No. of respondents
On festival	14
On promotion	1
Bike required	10
On birthday	2
When you start job	12
When you got married	2
Total	41

Graph 4.7 shows the time which customer uses to purchase bike.



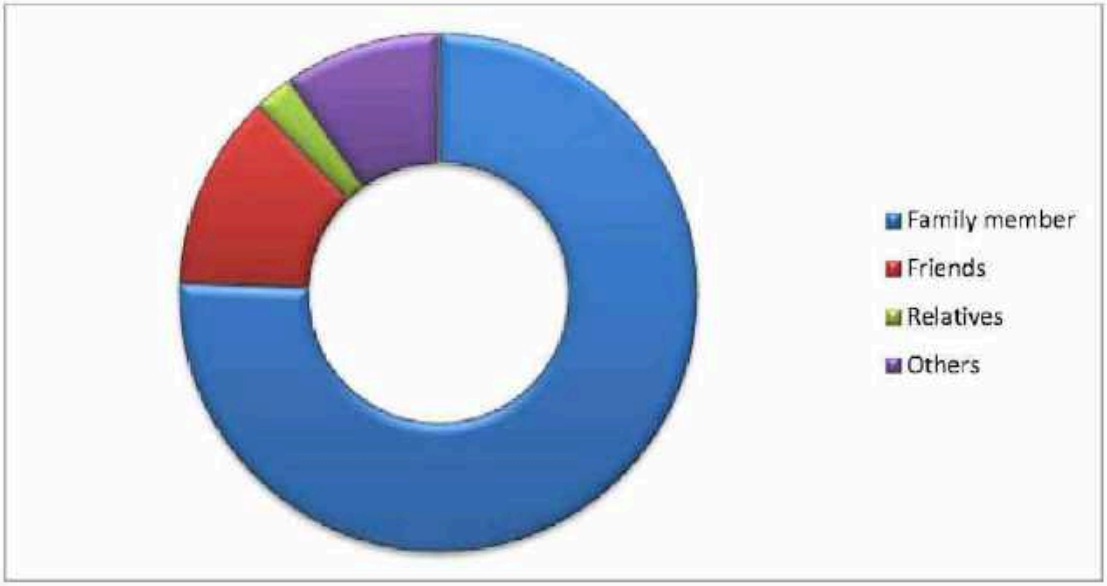
Source: survey

From the above table it can be seen that most of the people purchase bikes during festivals and also if bike required and 12 respondents purchase bike when they start job.

Table 4.8 shows the people who affect the consumer most while making the purchase decision.

Detail	No. of respondents	Percentages (%)
Family member	31	76
Friends	5	12
Relatives	1	2
Others	4	10
Total	41	100

Graph 4.8 shows the percentage people who affect the consumer most while making the purchase decision.



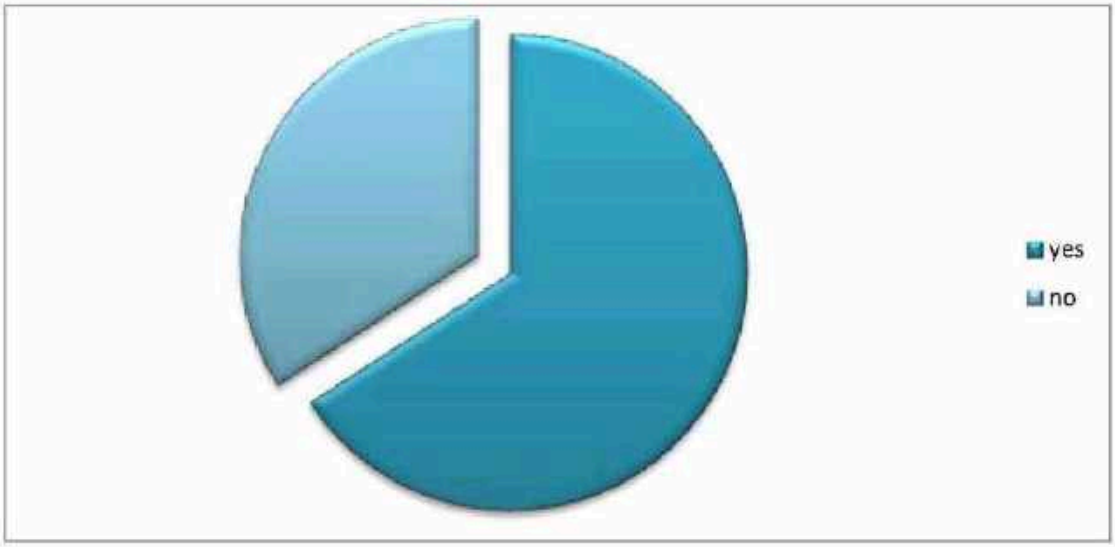
Source: survey

Above table shows that 76% respondents take decision by their family members for purchasing bike, 12%, 2%, and 10% respondents take decision by friends, relatives and others respectively for purchasing bike .

Table 4.9 shows the affect of promotional schemes on consumer.

Affect by Incentives	No. of respondents	Percentage
Yes	27	66
No	14	34
Total	41	100

Graph 4.9 shows the affect of promotional schemes on consumer.



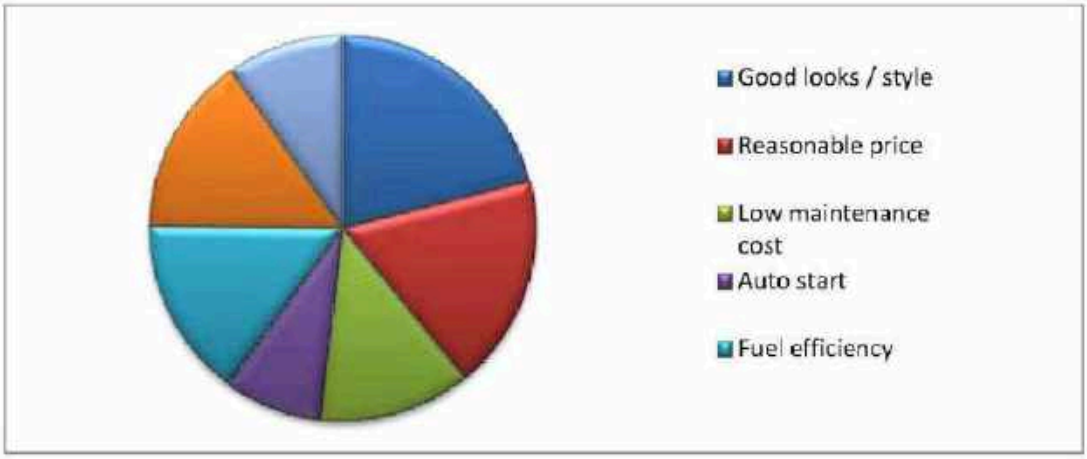
Source: survey

As per the above table, consumers purchases bikes when they get promotion incentives for purchasing bikes. 66% of consumers affect by promotional schemes and incentives and purchase bike when they get more incentives. 34% of consumers are not waiting for any incentive schemes and purchase the bike without any incentive expectation.

Table 4.10 shows the reason to consumers for selecting particular Hero bike.

Reasons	No. of responses	Percentage (%)
Good looks / style	28	21
Reasonable price	24	18
Low maintenance cost	17	13
Auto start	11	8
Fuel efficiency	20	15
Engine capacity	20	15
Pick up	13	10
Total	133	100

Graph 4.10 shows the consumers reason for selecting particular Hero bike.



Source: survey

As above mentioned consumer looks for many things before purchasing bike 21% of consumer looks for good looks/styles, while 18% of consumers look for reasonable price. 15% of consumers look fuel efficiency and engine capacity each, and 13% consumers want bikes of low maintenance cost is important, where as 8% shows auto start bikes and 10% shows pick up of bike.

Table 4.11 shows the criteria which are considered by consumers while purchasing Hero Bikes.

Criteria	Count	Percentage
Price	25	18
Average	29	21
Pickup	13	9
Design	19	14
Company image	12	9
Maintenance	22	16
CC of Engine	18	13
Total	138	100

Graph 4.11 shows the criteria which are considered by consumers while purchasing Hero Bikes.

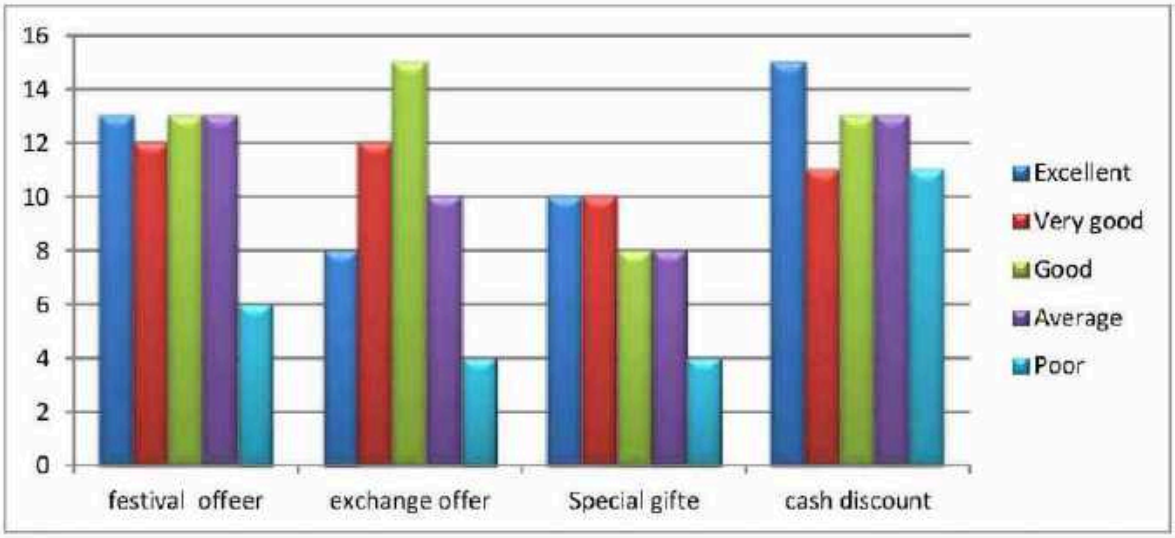
Source: survey

While purchasing bike, consumers considers a number of criteria such as price , average, company image, maintenance cost, etc. average is most important criteria for purchase bike with 29%, after that comes price (25%),maintenance (22%), design (19%),CC of engine (18%), pick up (13%), company image (12%).

Table 4.12 shows the scheme that attracts the Consumers most.

Attributes	Excellent	Very good	Good	Average	Poor
Festival offer	13	12	13	13	6
Exchange offer	8	12	15	10	4
Special gift	10	10	8	14	4
Cash discount	15	11	13	19	11

Graph 4.12 shows the scheme that attracts the consumers most



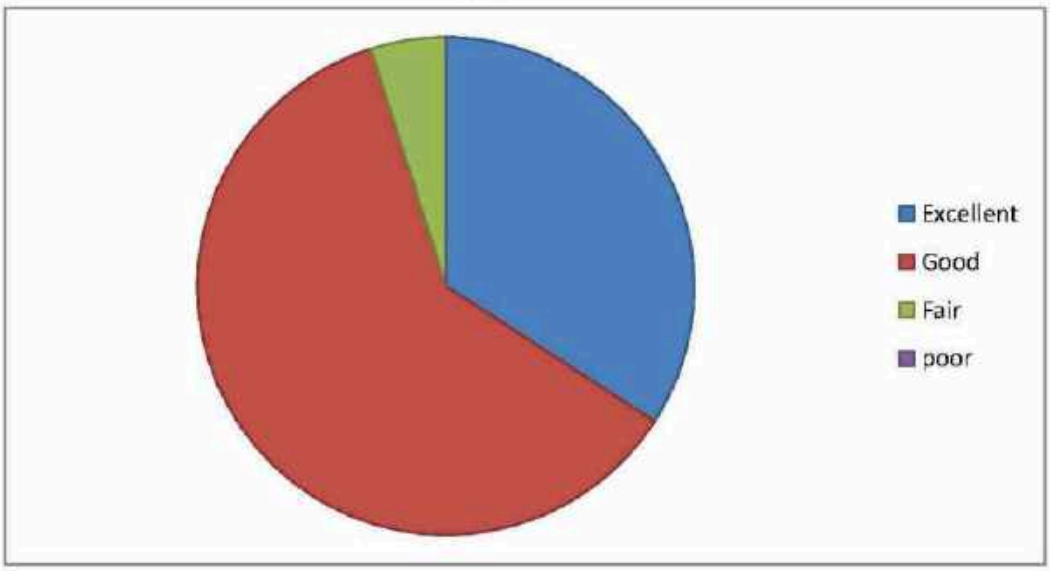
Source: survey

Above table shows that in festival offer 13 respondents out of 41 give a excellent, good and average rank ,then in exchange offer 15 respondents out of 14 gives good rank, in special offer 14 respondents give an average rank , in cash discount 19 respondents give average rank.

Table 4.13 shows the consumers opinion about service provided by dealers.

Opinion	No. of respondents	Percentage (%)
Excellent	14	34
Good	25	61
Fair	2	5
Poor	0	0
Total	41	100

Graph 4.13 shows the percentage of consumer's opinion about service provided by dealers.



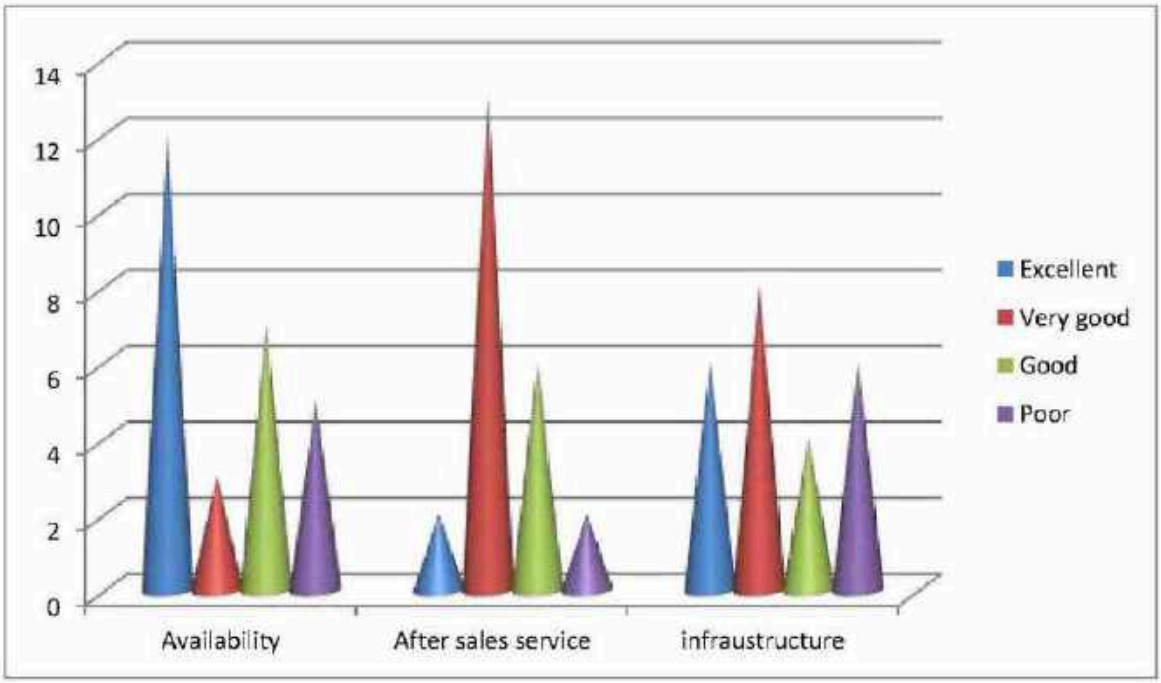
Source: survey

Above table shows that 61% of respondents opinion about service provided by dealers is good rank , while 34% respondents rank excellent , and 5% and 0% respondents rank fair and poor respectively.

Table 4.14 shows consumer's opinion about the attributes of the show room.

Attributes	Excellent	Very good	Good	Poor
Availability	12	3	7	5
After sales service	2	13	6	2
Infrastructure	6	8	4	6

Graph 4.14 shows the attributes of the show room



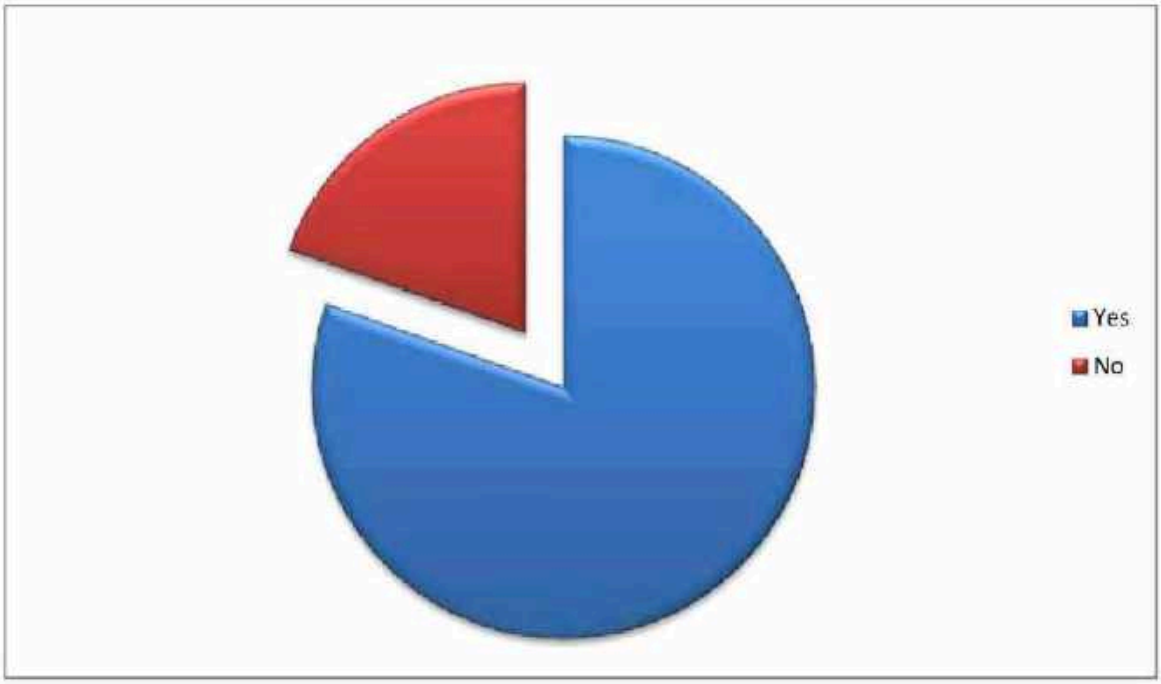
Source: survey

Above table shows that out of 41 respondents 12 respondents give excellent rank , while 13 respondents give very good for after sales service and 4 respondents rank good for infrastructure of the show room.

Table 4.15 shows the satisfaction level of the consumers about Hero Bikes.

Details	No. of respondents	Percentage
Yes	39	80
No	2	20
Total	41	100

Graph 4.15 shows the satisfaction level of the consumers about Hero Bikes.



Source: survey

From the above table it can known that out of 41 respondents 39 respondents are satisfied with their bike and the remaining respondents i.e. 2 are not satisfied with Hero bike.

CHAPTER 5

FINDINGS, SUGGESTIONS AND CONCLUSION

5.1 FINDINGS:

- The study shows that all the 41 respondents are using Hero Bikes.
- The current trend is that the respondents give maximum number of points to price and mileage.
- The study shows that out of 41 respondents 4 respondents are come to know from "others" and 37 respondents came to know from "family, friends and relatives" about Hero bike.
- The study shows that 12 respondents purchase Hero Bike through loan and 29 respondents purchase Hero bike by cash.
- The study shows that the maximum respondents gives "excellent" rank to festival offer and cash discount and minimum "poor" rank to exchange offer and special gifts.
- From this study it can be seen that maximum number of respondents are students who prefer to purchase hero bikes.
- The study shows that maximum number of respondents uses the Hero bike for the purpose of going with family and for office work. Usually students prefer les number of Hero Bikes
- The study says that hero motocorp is a most trusted and valuable brand.
- There are only a few women customers who own hero bikes.
- Now a days the main Hero customers are students between 18-25 years of age and they like the bike because of its mileage.

5.2 SUGGESTIONS:

- Hero Company should introduce low price moped bikes.
- As the maximum customer prefer maximum number of points towards price of the Bike, so reduce the price of the Bike so that poor families, farmers can purchase Hero Bikes. This may lead to increase your sales.
- Hero Company should design the bike for college students so that he can feel proud as he is taking other company bikes such as Yamaha, Royal Enfield, KTM, etc

5.3 CONCLUSION:

Hero is one of the leading two wheeler producer in the world and a major player in Indian market. They are the producer of largest selling motor cycle of India that to Hero splendor it has its own importance still in the market. It holds an important place in the minds of customer by providing efficient service and better products. Product efficiency and innovations are the method they live up today. Their engineering is comprehensive.

The new Hero is rising and is poised to shine on the global arena. Company's new identity "Hero Motocorp Ltd." is truly reflective of its vision to strengthen focus on mobility and technology and creating global footprint. Building and promoting new brand identity will be central to all its initiatives, utilizing every opportunity and leveraging its strong presence across sports, entertainment and ground- level activation.

Consumer perception towards hero motorcycles is very good. It has created very good brand image for itself by providing low maintenance, fuel efficient, sleek looking models along with efficient after sales services. It is only due to the positive perception of the consumer that the company is being able to complete in the market its other competitors.

To,

The Principal
Basavaprabhu Kore College,
Chikodi.

Sub: Permission to go for Botanical study tour regd.....

Respected Sir,

With respect to the above cited subject M.Sc. 1st semester students and faculty members of P.G. Department of Botany have planned to go to Siddapur and Yana place of Uttar Kannada district for study tour as it is mandatory as per syllabus prescribed by Rani Channamma University for M.Sc. (Botany) 1st semester. We planned our visit to the above said location on 4th & 5th October 2019. In this regard I request you to kindly permit us for the same and do the needful.

Thanking You,

The Co-ordinator
P.G. Department of Botany

THE CO-ORDINATOR
P. G. Department of Botany
B. K. College, Chikodi.

Place: Chikodi
Date: 24 /09/2019

Enclosure: List of Students and faculty members

PRINCIPAL
B.K. Arts, Science & Commerce College
CHIKODI - 591 201.

P.G. DEPARTMENT OF BOTANY
Basavaprabhu Kore Art's, Science and Commerce College, Chikodi

M.Sc. I Semester

List of Students and Staff attending the study tour

Sl. No.	Name of the student	Contact number	Signature
01	Ms. Asha Bagawale	9482629747	
02	Ms. A. Priyanka	9591536236	
03	Ms. Aishwarya Patil	8431547015	
04	Ms. Arpita Jugal	9880489953	
05	Mr. Dnyandev Huddar	9742166301	
06	Ms. Gayatri Avvanni	7026148472	
07	Ms. Jyoti Neli	9980485879	
08	Ms. Kamala Shegunashi		
09	Ms. Kaveri Halli	9686173796	
10	Ms. Monika Khot	8296962075	
11	Ms. Prema Patil	7349405370	
12	Ms. Reetu Jangalagi	9148768719	
13	Mr. Sachin Pattar	9886559407	
14	Ms. Shambhavi Salimath	9538799305	
15	Ms. Shakuntala Kankanwadi	7349090044	
16	Ms. Shreya Gaikwad	9164323345	
17	Ms. Shruti Naik	7033820908 9	
18	Ms. Sneha Kamble		
19	Ms. Vidyashree Ugrani	9148294536	V.B. Ugrani

List of the staff members

Sl. No.	Name	Designation
1	Dr. Kambhar S. V.	Lecturer
2	Dr. R.R. Patil	Lecturer
3	Ms. Anjali Hajeri	Lecturer
4	Mr. Shivanand Patil	Non-teaching staff

THE CO-ORDINATOR
P. G. Department of Botany
B. K. College, Chikodi.

TWO DAYS BOTANICAL FIELD TRIP

A STUDY TOUR REPORT SUBMITTED TO RANI CHANNAMMA UNIVERSITY, BELAGAVI, FOR PARTIAL FULFILLMENT OF PRACTICAL II

M.Sc. I SEMESTER

SUPERVISED

BY

DR. SIDANAND V. KAMBHAR M.Sc., Ph.D., K-SET

DR. RAHUL R. PATIL M.Sc., Ph.D., K-SET

Ms. Anjali Hajeri M.Sc., K-SET

P.G. DEPARTMENT OF BOTANY

BASAVAPRABHU KORE ART'S, SCIENCE AND COMMERCE COLLEGE, CHIKODI- 591 201

BELAGAVI, KARNATAKA

OCTOBER 2019

CERTIFICATE

Date: Examination Seat No._____

This is to certify that Kum./ Shri_____ is the student of M.Sc. _____ Semester has satisfactorily completed the Two Days Botanical field trip for partial fulfillment of Practical II (1.3: Systematic Botany of Angiosperms) prescribed by the Rani Channamma University, Belagavi for the year 20__-20__.

Signature of the Course In-charge

The Co-ordinator
P.G. Dept. of Botany

ACKNOWLEDGEMENT

I would like to thanks our beloved Principal Shri. U.R. Rajput who permitted us to visit study area and also for providing all the facilities and support during our study tour.

I would also like to express my sincere thanks to our respected Co-ordinator Shri. R.R. Naik for providing me an opportunity to undergo such wonderful tour, which helps us in getting practical knowledge about our field work.

I wish to pay high regards to my loving parents and grandparents for their sincere encouragement and motivation throughout my career.

I acknowledge special thanks to our teaching faculty Dr. Sidanand V. Kambhar, Dr. Rahul R. Patil and Ms. Anjali Hajeri and also non-teaching faculty Shri. Shivanand Patil for providing the detailed information about the various aspects with respect to plant collection methods in field, identification tricks and precautions during plant collection during the entire tour.

I would like to give my special thanks to Shri. Mahesh Naik, Shri. Shridhar Hegde and Shri. Arvindgouda Patil for their kind cooperation during our visit at Yellapur forest area. And also we are grateful to Bhuvneshwari temple authority for their hospitality at yatri nivas and foodstuff.

I would like to mention sincere thanks to my class friends for their constant help and encouragement throughout the tour programme.

TABLE OF CONTENTS

Introduction

The study of plants from specific region not only is of a didactic value, but they are also the source of information for students on diversity of nature and a necessity for protection of the region they live in. Going for exploration, by visiting near and farther surroundings, together with students and teachers, can observe the principle properties, record and collect plants or analyze and describe plant communities with different types of vegetation of the given region. As a part of M.Sc. curriculum, two days field trip was organized on 4th and 5th October 2019 by Post Graduate Department of Botany, KLE Society's Basavaprabhu Kore Art's, Science and Commerce College, Chikodi under Rani Channamma University, Belagavi, Karnataka.

On 3rd October, we gathered in our college campus at around 8:30 pm and started journey from the college at 10:00 pm with the guidance and company of our lecturers and class friends. On 4th October, We reached our first destination around 6.00 am at Bhuvaneshwari temple, near Bedakani Village in Siddapur Taluka in Uttar Kannada District of Karnataka State. The Goddess Bhuvaneshwari is located at Bhuvanagiri in Siddapur taluk of Uttara Kannada district. The centuries-old temple sits atop a hill and is surrounded by evergreen trees of Western Ghats, so is naturally beautiful. What it lacks is recognition by the state government. Goddess Bhuvaneshwari, known as Kannadamate (mother of Kannada), was conceived by the first Kannada kingdom Kadambas in the fourth century.

Then, all got fresh up at Bhuvaneshwari temple yatri nivas and started trekking from Bilagi to Hukli forest area, at the same time, we had started to collected plants information in field notebook. The plant collection was stopped at around 4.00 pm, we all returned back to camping site. Next day morning on 5th October we started our journey towards Jog falls. og Falls located near Jog Village. Falling point of water is located in Siddapura, Uttara Kannada and the view point in Sagara Karnataka. Jog Falls is also known as Gerusoppe falls, Joga jalapatha and Jogada gundi in the regional Kannada language. It is the second highest plunge waterfalls in India. It is a segmented waterfall which depends on rain and season becomes a plunge waterfall. The falls are major attractions for tourists and is ranked 13th in the world by the waterfall database. We had collected some plants from the jog falls regions. Afterwards, we moved towards to Apsarkonda beach Honnavar to observe some

mangrove as well as sea grasses species and further reached to Gokharna at 2.00 pm, enjoyed a lot at om beach and collected some of the mangrove species at that place. Soon after, we all visited the divine place i.e. the main temple and deity is Lord Shiva, who is also known as Mahabaleshwara. This temple houses what is believed to be original image of Lord Shiva's linga (Atmalinga). Return journey started at 10.00 pm and reached our college campus successfully at 6.00 am.

List of Students and Staff attending the study tour

Sl. No.	Name of the student
01	Ms. Asha Bagawale
02	Ms. A. Priyanka
03	Ms. Aishwarya Patil
04	Ms. Arpita Jugal
05	Mr. Dnyandev Huddar
06	Ms. Gayatri Avvanni
07	Ms. Jyoti Neli
08	Ms. Kaveri Halli
09	Ms. Monika Khot
10	Ms. Prema Patil
11	Ms. Reetu Jangalagi
12	Mr. Sachin Pattar
13	Ms. Shambhavi Salimath
14	Ms. Shakuntala Kankanwadi
15	Ms. Shreya Gaikwad
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17	Ms. Vidyashree Ugrani

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2	Dr. R.R. Patil	Lecturer
3	Ms. Anjali Hajeri	Lecturer
4	Mr. Shivanand Patil	Non-teaching staff

Observations

A total 69 species belonging to 44 families have been collected and identified with aid of flora (see, Table). Among 69 species, some of the notable species are The species of *Nothapodytes nimmoniana* is highly medicinal plant containing anticancer property. The member of *Melastoma malabathricum* is dominated in study area and identified easily based on three subparallel prominent nerves on leaf and dimorphic stamens. A member of Urticaceae *Boehmeria macrophylla*, a small perennial herbs, the fibre of the stem is of excellent quality. *Burmannia coelestis* is a species of plant in the genus Burmannia, which has usually found in wet places. The species *Drosera indica* is an insectivorous plant, a sundew native to tropical countries throughout the world, from Asia to Africa. The species *Habenaria longicorniculata* has one of the longest spurs in the plants seen in Western Ghats. It is usually 12-15cm long. *Hydrophylax maritima* and *Spinifex littoreus* mainly occurring the coastal area (See Photoplate I).

Sl.no.	Botanical Name	Family
1	*Angelonia angustifolia* Benth.	Planaginaceae
2	*Blumea* sp.	Asteraceae
3	*Boehmeria macrophylla* Hornem.	Utricaceae
4	*Borreria spinosa* (L.) Cham. & Schltdl.	Rubiaceae
5	*Burmannia coelestis* D.Don	Burmanniaceae
6	*Canthium parviflorum* Lamk.	Rubiaceae
7	*Caryota urens* L.	Arecaceae
8	*Cassia absus* L.	Caesalpiniaceae
9	*Catunaregam spinosa* (Thunb.) Tirveng.	Rubiaceae
10	*Cayratia tenuifolia* (Wight & Arn.) Gagnep.	Vitaceae
11	*Cissus javanica* DC.	Vitaceae
12	*Clerodendrum paniculatum* L.	Verbenaceae
13	*Clerodendrum trichotomum* Thunb.	Verbenaceae
14	*Crotalaria filipes* Benth.	Fabaceae
15	*Desmodium triflorum* (L.)DC.	Fabaceae
16	*Desmodium triquetrum* (L.) DC.	Fabaceae
17	*Dillenia indica* L.	Dilleniaceae
18	*Dioscorea oppositifolia* L.	Dioscoreaceae
19	*Diploclisia glaucescens* (BI.) Diels	Menispermaceae
20	*Drosera indica* L.	Droseraceae
21	*Elephantopus scaber* L.	Asteraceae
22	*Emilia sonchifolia* (L.) DC. ex Wight	Asteraceae
23	*Eriocaulon* sp.	Eriocaulaceae

Sl.no.	Botanical Name	Family
24	*Ficus arnottiana* (Miq.) Miq.	Moraceae
25	*Garcinia indica* (Thou.) Chois	Clusiaceae
26	*Gmelina arborea* Roxb. ex Sm.	Lamiaceae
27	*Gnidia glauca* (Fres.) Gilg	Thymelaeaceae
28	*Habenaria longicorniculata* J.Graham	Orchidaceae
29	*Hydrophylax maritima* L.f.	Rubiaceae
30	*Hymenodictyon obovatum* Wall.	Rubiaceae
31	*Impatiens minor* (DC.) Bennet	Balsaminaceae
32	*Impatiens* sp.	Balsaminaceae
33	*Ipomoea* sp.	Convolvulaceae
34	*Ixora coccinea* L.	Rubiaceae
35	*Jansenella griffithiana* (Mill. Hal.) Bor	Poaceae
36	*Jatropha gossypiifolia* L.	Euphorbiaceae
37	*Leea indica* (Burm. f.) Merr.	Vitaceae
38	*Melastoma malabathricum* L.	Melastomaceae
39	*Memecylon umbellatum* Burm. f.	Melastomaceae
40	*Mimosa pudica* L.	Mimosaceae
41	*Murdannia simplex* (Vahl) Brenan	Commelinaceae
42	*Mussaenda glabrata* (Hook.f.) Hutch ex Gamble	Rubiaceae
43	*Nothapodytes nimmoniana* (J. Grah.) D.J. Mabberley	Icacinaceae
44	*Peperomia pellucida* (L.) Kunth	Apiaceae
45	*Pandanus tectorius* Parkinson ex Du Roi	Pandanaceae
46	*Phoenix* sp.	Arecaceae
47	*Pothos scandens* L.	Areaceae
48	*Premna integrifolia* L.	Verbenaceae
49	*Rhamphicarpa longiflora* Benth.	Scrophulariaceae
50	*Rhynchoglossum obliquum* Blume	Gesneriaceae
51	*Salvia* sp.	Lamiaceae
52	*Selaginella* sp.	Selaginellaceae
53	*Sesamum mulayanum* Nair	Pedaliaceae
54	*Sida spinosa* L.	Malvaceae
55	*Smilax zeylanica* L.	Smilacaceae
56	*Smithia salsuginea* Hance	Fabaceae
57	*Solanum* sp.	Solanaceae
58	*Spermacoce articularis* L.f.	Rubiaceae
59	*Sphenoclea zeylanica* Gaertn.	Hydroleaceae
60	*Spinifex littoreus* (Burm.f.) Merr.	Poaceae
61	*Striga lutea* Lour.	Scrophulariaceae
62	*Tabernaemontana heyneana* Wall.	Apocynaceae
63	*Thespesia lampas* (Cav.) Dalzell & A. Gibson	Malvaceae
64	*Trema orientalis* (L.) Blume	Cannabaceae
65	*Tylophora fasciculata* Thwaites	Asclepidiaceae
66	*Urena sinuata* L.	Malvaceae
67	*Vigna vexillata* (L.) A. Rich.	Fabaceae
68	*Waltheria indica* L.	Tiliaceae
69	*Ziziphus rugosa* Lam.	Rhamnaceae

Objectives of Study Tour

- To familiarize the students with the flora and ecology of the region.
- Identification of different trees/shrubs/climbers and herb species in the wild with identification tricks.
- To observe introduced, alien and exotics plant species, which are responsible for various threats to the regional biodiversity.
- To understand the different wildlife species, their habitats and niche, their interaction with ecosystems and what are the important protection measures carried out by dwellers or regional communities.
- It would also help us to know about how taxonomy and phytosociological research work will be carried out.

Learning from the Study Tour

- After attending this tour, I have acquainted myself with the objective of Biodiversity conservation and management of Forests and Ecosystems.
- I have familiarized myself with the different tree, shrubs and herbs flora in the forest area.
- I have also edified myself with the knowledge regarding changing in floral composition with respect to different abiotic factors such as rainfall, altitude, latitude and soil composition.

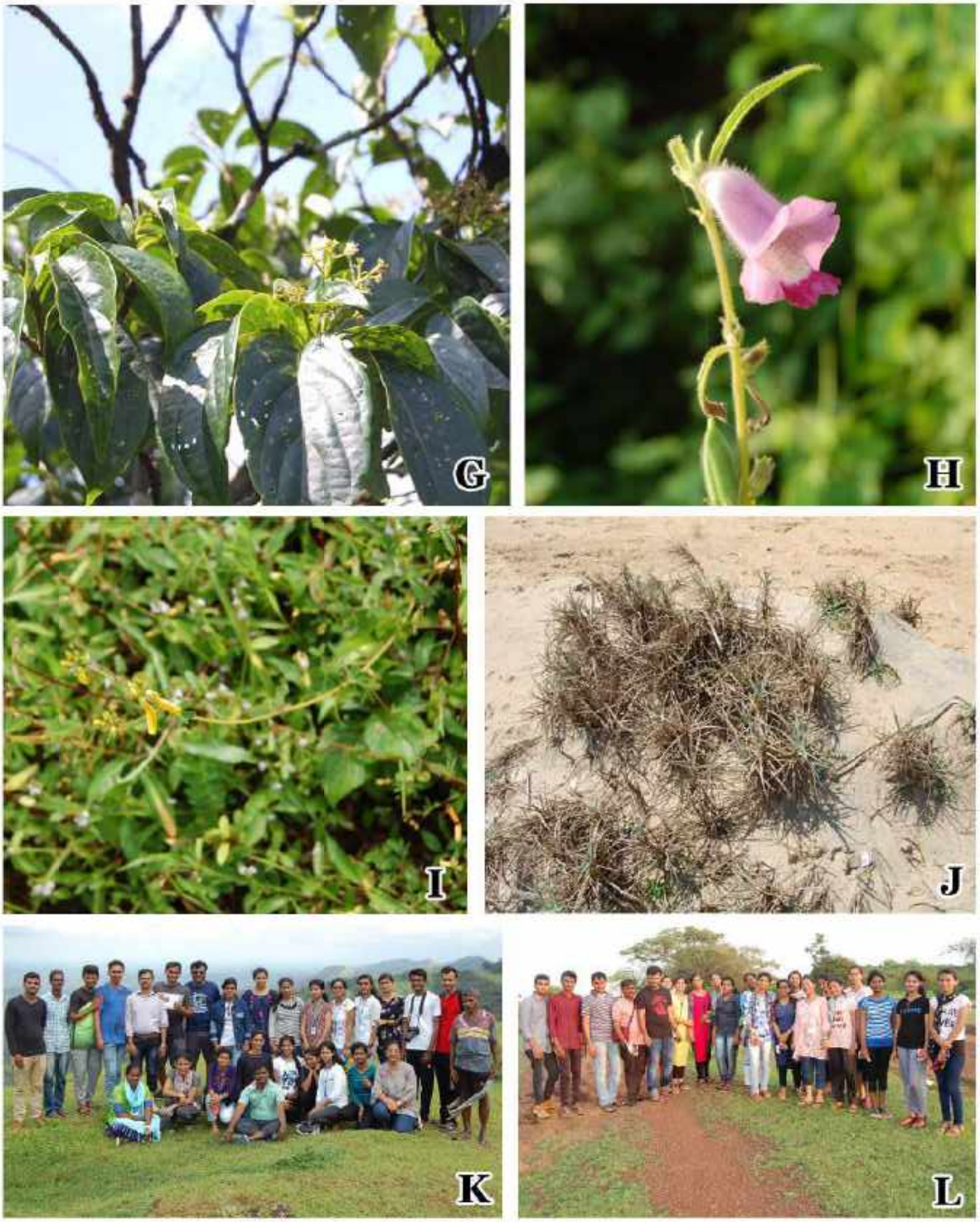
Conclusion

- Forests and its resources are universally required for the perpetuation of human society.
- It is very essential to create awareness among peoples to use minimum resources from the forest in turns they should involve in forest management in a sustainable manner.
- It is utmost important to document the plants which around us before they vanished.

PHOTOPLATE

Figure; **A**. *Angelonia angustifolia* Benth. (Planaginaceae); **B.** *Boehmeria macrophylla* Hornem. (Utricaceae); **C.** *Burmannia coelestis* D.Don (Burmanniaceae); **D.** *Cayratia tenuifolia* (Wight & Arn.) Gagnep (Vitaceae); **E.** *Clerodendrum trichotomum* Thunb (Verbenaceae); **F.** *Leea indica* (Burm. f.) Merr. (Vitaceae).

PHOTOPLATE



Figure; G. *Nothapodytes nimmoniana* (J. Grah.) D.J. Mabberley (Icacinaceae); **H.** *Sesamum mulayanum* Nair (Pedaliaceae); **I.** *Smithia salsuginea* Hance (Fabaceae); **J.** *Spinifex littoreus* (Burm.f.) Merr. (Poaceae); **K.** Group photo on the hill top near Badakani forest area; **L.** Group photo in Gokarna forest area.

ASSESSMENT OF PROXIMATE COMPOSITION OF NEWLY DISTRIBUTED WILD VIGNA INDICA

A PROJECT REPORT SUBMITTED TO

RANI CHANNAMMA UNIVERSITY BELAGAVI

FOR PARTIAL FULFILLMENT OF THE AWARD OF THE DEGREE OF

MASTER OF SCIENCE

IN

BOTANY

SUBMITTED BY

MISS. ANKITA AJIT MAGADUM Reg. No: BT181401

MISS. LAXMI HALINGALI Reg. No: BT181404

MISS. PRIYANKA SALUNKHE Reg. No: BT181408

UNDER THE GUIDANCE OF

DR. KAMBHAR SIDANAND VITTHAL M.Sc., Ph.D.
DR. RAHUL R. PATIL M.Sc., Ph.D.

DEPARTMENT OF POST GRADUATE STUDIES IN BOTANY,
KLE SOCIETY'S, BASAVAPRABHU KORE ART'S, SCIENCE AND COMMERCE COLLEGE, CHIKODI, BELAGAVI- 591 201

2020

RANI CHANNAMMA UNIVERSITY BELAGAVI

CERTIFICATE

This is to certify that; this project entitled **"Assessment of Proximate Composition of Newly Distributed Wild *Vigna indica*"** is being submitted here with for the partial fulfillment of award of the Degree of Master of Science in Botany, Rani Channamma University, Belagavi. The work reported in this report is based upon the results of the original work carried out by **Miss. Ankita Ajit Magadum, Miss. Laxmi Halingali** and **Miss. Priyanka Salunkhe** under my supervision and guidance.

Place: Chikodi

Date: 18/09/2020

Dr. Kambhar S.V.

Dr. Rahul R. Patil

Research Supervisor

Co-ordinator

Post Graduate of Department Botany

THE CO-ORDINATOR
P. G. Department of Botany
R. K. College, Chikodi.

1. Sukanthu 24.09.20

2. Patil 24.09.20

DECLARATION

We hereby declare that this project work entitled **"Assessment of Proximate Composition of Newly Distributed Wild *Vigna indica*"** completed and written by us has not previously formed. This report is based on the results carried out by us.

Place: Chikodi

Date: 18/9/2020

Miss. Ankita Ajit Magadum
Reg. No: BT181401

L. V. Halingali
Miss. Laxmi Halingali
Reg. No: BT181404

Salunkhe
Miss. Priyanka Salunkhe
Reg. No: BT181408

ACKNOWLEGMENTS

We express our deep sense of indebtedness to our Research Supervisors Dr. Kambhar Sidanand Vitthal and Dr. Rahul R. Patil for suggesting this topic, their continued guidance and suggestions.

We are grateful to Principal Shri. U. R. Rajput, Co-ordinator Shri. R.R. Naik who has been continuous source of inspiration.

At the outset, we would like to thank teaching faculty of this Department: Mr. Manjunath L. Hanji, Miss. Anjali Hajeri and Miss. Gayatri Joshi for their valuable suggestion during our research project.

We would like to mention sincere thanks to my friends Miss. Sujata Bandagar, Miss. Vidya Sattigoudar and Miss. Vijaylaxmi Danannavar for their constant help.

We extend our thanks to all our family members for providing support and putting up with us for all this time. We owe our special thanks to non-teaching staff Mr. V. Devrushi, Mr. Shivanand Patil, Mr. Venkatesh Kamble and Mr. Anand Chougala from the Department of Botany whose direct or indirect co-operation during the entire course was valuable.

Last but not least we are thankful to all our well-wishers.

Miss. Ankita Ajit Magadum
Miss. Laxmi Halingali
Miss. Priyanka Salunkhe

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CHAPTER 1

INTRODUCTION

1.1 Family Fabaceae- *sensu lato*

The Leguminosae, commonly called the bean or pea family, is currently divided in to three subfamilies (Caesalpinioideae, Mimosoideae and Papilionoideae), further subdivided into 35 tribes which together comprise 751 genera containing a total of ca. 19,500 species (LPWG, 2013a). The Leguminosae is second only to the grass family in economic value, but has significantly greater habit, flower and fruit diversity. Legumes are ubiquitous throughout the main biomes and occur in nearly all vegetation types globally. Published phylogenies of legumes at the supra-generic level have been accumulating at an ever increasing rate since the beginning of the century. An international legume systematics community is now working towards producing a comprehensive phylogenetic estimate and revised classification for all Leguminosae (LPWG, 2013b; Wojciechowski, 2013).

The legume family being so important ecologically and economically, it should be no surprise that it has been a special focus of taxonomists since the time of De Candolle, (1825) and Bentham, (1865). In a landmark effort to compile the voluminous quantity of legume taxonomic work from Bentham's time onward to the early 1980s, Roger Polhill (Kew), Peter Raven (Missouri) and collaborators organized the first International Legume Conference at the Royal Botanic Gardens, Kew in 1978, and subsequently published the conference proceedings as Advances in Legume Systematics (Polhill and Raven, 1981). The original two volumes of Advances in Legume Systematics set in motion a seemingly exponential increase in interest in legume systematics that has reached to numerous publications, many of which are in the Advances in Legume Systematics series (eleven volumes published since 1981 to 2003). Recently, Legumes of the World is being developed as an online web resource

for information about legume genera that can complement link to the success of the online International Legume Database and Information Service (Bisby, 1993). This has led to the formation of the Legume Phylogeny Working Group (LPWG), which aims to develop collaborative research towards a comprehensive phylogeny and classification for Leguminosae.

1.2 Genus *Vigna*

Vigna, originally published by Savi in 1824 was named after Dominaco *Vigna*, Professor of Botany at Pisa (Baudoin and Marechal, 1988). The genus *Vigna* consists of approximately 104 species which are distributed throughout the world. (Lewis *et al.*, 2005). Initially the genus *Vigna* was divided into seven subgenera, *Ceratotropis* (Piper) Verdc., *Haydonia* (Wilczek) Verdc., *Lasiosporon* (Benth.) Verdc., *Macrorhyncha* Verdc., *Plectotropis* (Schum.) Baker, *Sigmoidotropis* (Piper) Verdc. and *Vigna* Savi (Verdcourt, 1970; Marechal *et al.*, 1978). Now the genus comprises five subgenera as subgenus *Macrorhyncha* Verdc. has been transferred to genus *Wajira* (Thulin *et al.*, 2004) and subgenus *Sigmoidotropis* (Piper) Verdc. is considered as genus *Sigmoidotropis* (Piper) A. Delgado (Delgado-Salinas *et al.*, 2011). The subgenus *Ceratotropis* has centre of species diversity in Asia. India, with 24 species of genus *Vigna* (Sanjappa, 1992), represents centre of diversity for the subgenus *Ceratotropis* (Arora, 1985; Babu *et al.*, 1985; Bisht *et al.*, 2005). Recently, *V. trilobata* (L.) Verdc. var. *pusilla* Naik and Pokle has been raised to the rank of species *V. indica* by Dixit *et al.*, (2011). One new species, *V. sahyadriana* and one new combination, *V. silvestris* from varietal status *V. mungo* var. *silvestris* were recognized by Aitawade *et al.*, (2012) and in another report, Latha *et al.*,(2014) has described a new species *V. konkanensis* from west coast of India.

1.3 Taxonomy of Asiatic *Vigna*

Twining or erect herbs, rarely subshrubs. Leaves pinnately 3-foliolate; stipules peltate or basally spurred, 2-3 lobed, cordate, or truncate. Racemes axillary or terminal, nodes of rachis often thickened and glandular. Bracts and bracteoles deciduous. Calyx 5-toothed, 2-lipped. Corolla yellow or purple; standard suborbicular, base appendaged; wings shorter than standard; keel subequal to wings, incurved, not beaked or produced into an incurved. Stamens diadelphous; anthers uniform. Ovary sessile; style filiform, upper part thickened, bearded or hirsute lengthwise inside; stigma oblique. Legumes linear or linear-oblong, terete or flat. Seeds reniform or subquadrate; hilum short or elongate, with or without aril.

1.4 Morphology of *Vigna indica* Dixit et.al.

Herbs, trailing or twining, 15–100 cm. high. Leaves pinnately 3–foliolate or deeply 3–lobed, lobes 1.5–3.0 x 1.2– 2.5 cm, ovate, subacute or retuse at apex. Flowers yellow, 5–10 in dense, terminal clusters. Pods 1.5–2.0 cm long, hairy. Seeds 5–10, brown, granulate, truncate at both ends.

CHAPTER 2

REVIEW OF LITERATURE

2.1 Family Fabaceae- *sensu lato*

Family Leguminosae, the second-largest angiosperm family with ca. 751 genera and ca. 19,500 species (Lewis *et al.*, 2005; LPWG, 2013a) has a global distribution and high ecological and economic importance. The family represents spectacular morphological and life history diversity, from giant rain forest trees and woody lianas, to desert shrubs, ephemeral herbs, herbaceous twining climbers and aquatic species (Lewis *et al.*, 2005). The Leguminosae is usually divided into three subfamilies, but there are those who continue to recognize three separate families (Steyermark *et al.*, 2001; Cullen *et al.*, 2011) despite this view being widely regarded as untenable (Lewis and Schrire, 2003; Lewis *et al.*, 2005). The subfamily Caesalpinioideae includes approximately 2250 species under 171 genera (Lewis *et al.*, 2005). Mimosoideae is the second-largest legume subfamily with ca. 3271 species (Lewis *et al.*, 2005) and reflects high species-richness in several of its 83 genera. Papilionoideae is the largest legume subfamily with 13,800 species across 28 tribes within 478 genera (Lewis *et al.*, 2005). The subfamily Papilionoideae includes tribe Phaseoleae with 1500 species across 84 genera.

2.2 Genus *Vigna*

The pantropical genus *Vigna* Savi consists of approximately 104 species which are distributed throughout the world (Lewis *et al.*, 2005). *Vigna* potentially comprises disparate New and Old World groups (Marechal *et al.*, 1978; Lackey, 1981, 1983). New World *Vigna* were more closely related to other New World genera of Phaseolinae (*Phaseolus*) than to the Old World *Vigna*. Regardless, Maréchal, (1978) comprehensive circumscription of *Vigna*, which was derived from a morphometric

analysis of the *Phaseolus-Vigna* complex (Mréchal *et al.*, 1978) and a seminal taxonomic study of *Vigna* (Verdcourt, 1970) has remained intact. Initially the genus *Vigna* was divided into seven subgenera, viz. *Ceratotropis* (Piper) Verdc., *Haydonia* (Wilczek) Verdc., *Lasiosporon* (Benth.) Verdc., *Macrorhyncha* Verdc., *Plectotropis* (Schum.) Baker, *Sigmoidotropis* (Piper) Verdc. and *Vigna* Savi (Verdcourt, 1970; Marechal *et al.*, 1978). Now the genus comprises five subgenera as subgenus *Macrorhyncha* Verdc. is transferred to genus *Wajira* (Thulin *et al.*, 2004) and subgenus *Sigmoidotropis* (Piper) Verdc. is considered as genus *Sigmoidotropis* (Piper) A. Delgado (Delgado-Salinas *et al.*, 2011).

2.3 Subgenus *Ceratotropis* (Asiatic *Vigna*)

The section *Aconitifoliae* has small flowered species and distributed in tropical areas, while section *Angulare* has large flowered species of high altitude and high rainfall locations, and section *Ceratotropis* have intermediate floral morphology and ecological adaptation (Tomooka *et al.*, 2002a). The sectional classification of subgenus *Ceratotropis* has been confirmed by several workers (Jaaska and Jaaska, 1990; Kaga *et al.*, 1996; Tomooka *et al.*, 2002a and 2002b; Konarev *et al.*, 2002 and Doi *et al.*, 2002 and Saini *et al.*, 2008).

India, with 24 species of *Vigna*, represents centre of species diversity for all the three sections of subgenus *Ceratotropis* (Sanjappa, 1992; Bisht *et al.*, 2005). More recently, *V. trilobata* (L.) Verdc. var. *pusilla* Naik and Pokle is raised to the rank of species as *V. indica* T. M. Dixit, K. V. Bhat and S. R. Yadav by Dixit *et al.*, (2011). *Vigna indica* can easily be distinguished from all other species of section *Aconitifoliae* by its cylindrical to sub-tetragonous seeds with truncate ends. Among the species of section *Aconitifoliae* reported from India, *V. indica* is more closely related to *V.*

aconitifolia from which it differs in having narrowly to broadly spathulate lobes of leaflets and ovate hilum. It is also similar to *V. trilobata* and *V. stipulacea* from which it differs in having smaller, pale yellow flowers with flattened, deltoid keel pocket; obscure style beak; non-protruding hilum and aril lacking a rim.

2.4 Crossability studies and species Hybridization

Interspecific hybridization plays an important role for transferring the desirable traits from one species to another, increasing genetic variation clarifying the taxonomic relationship by testing several interspecific combinations investigating natural selection and speciation process, being a prominent tool for theoretical and empirical studies in evolutionary biology and recently being used to construct genetic linkage map (Kaga *et al.*, 2000).

However, crossing barriers occurred which were the result of incongruity. Sexual barriers preventing interspecific hybridization have been distinguished into pre- and post- fertilization barriers (Van Tuyl and De Jeu, 1997). Pre-fertilization barrier on the stigma surface which arrests pollen germination or pollen tube entry into the stigma is one of the frequent barriers particularly in pollination with distantly related species (Barone *et al.*, 1992). To overcome pre-fertilization barriers, a range of techniques such as bud pollination, stump pollination, use of mentor pollen and grafting of the style have been applied successfully (Van Tuyl and De Jeu, 1997). The Interspecific hybridization among several cultivated species of *Vigna* has been attempted earlier by several workers in the past two decades.

A comprehensive crossing programme involving 250 crosses was attempted between different species of wild and cultivated *Vigna* species by Audi Laxmi and Chandel, (1990). In this study, the cross between *V. radiata* × *V. sublobata* was

successful while reciprocal cross did not succeed. The cross between *V. radiata* × *V. silvestris* did not produce seeds while the cross between *V. sublobata* × *V. silvestris.* produced sterile hybrids. The interspecific crosses between *V. sublobata* and *V. trilobata* which suggest that gene exchange can occur between these two wild species in the nature and *V. trilobata* together with *V. sublobata* and *V. radiate* constitute the secondary gene pool.

Therefore, in the present study the species of *Vigna indica* Dixit *et al.*, belonging subgenus Ceratotropis comes under section Aconitifoliae was recorded from Chikodi, Belagavi District, Karnataka. Previously, This Vigna species was placed under *V. trilobata* (L.) Verdc., as it variety (var. *pusilla*) by Naik and Pokle reported from Marathawada, Maharashtra. The same taxon has been raised to the rank of species by Dixit *et al.* This species is widely distributed in semiarid zone of Rajasthan, Gujarat, Madhya Pradesh and Maharashtra only. The present collection of this species found new distribution record for Karnataka state (Kambhar *et al.*, 2020). Therefore, the present wild collection of this species may helpful to understand the issue of parental identification of cultivated *Vigna* species and which may be helpful to establish a new cultivated variety of *Vigna* through breeding programmes. Hence, the present work is undertaken for the following objectives.

1. To analyse the proximate composition of *Vigna indica*
2. Karyotype analyse of *V. indica*

CHAPTER 3

METHODOLOGY

3.1. Species identification

During regular floristic exploration surveys in the campus and its surroundings, a species of *Vigna* Savi was observed with good population in the B.K. College Campus as well as at foothills of Chikodi. After critical examination and reference to relevant taxonomic literature, it was identified as *Vigna indica* Dixit el al., (Dixit *et al.*, 2011) see Figure 1. The collected specimens were processed and deposited in the Herbarium, Post Graduate Department of Botany, KLE Society's, Basavaprabhu Kore Art's, Science and Commerce College, Chikodi, Belagavi, Karnataka.

3.2 Seed Sample Preparation

Seed samples were collected in one kilogram plastic bags. Similarly all the seeds were shifted from dirt and malformed kernels and stored at room temperature. One-third of the seeds were ground in the grinder and then further ground to fine particles by chopper in the laboratory for chemical analysis. Some of the seeds were kept for germination process.

3.3 Proximate Composition

Seeds of *Vigna* were analyzed for crude fat, ash and moisture by standard methods of AOAC.

Moisture Contents.

Moisture was determined by oven drying method. 1 g of each sample was accurately weighed in a Petri dish. The partially covered Petri dish was placed in an

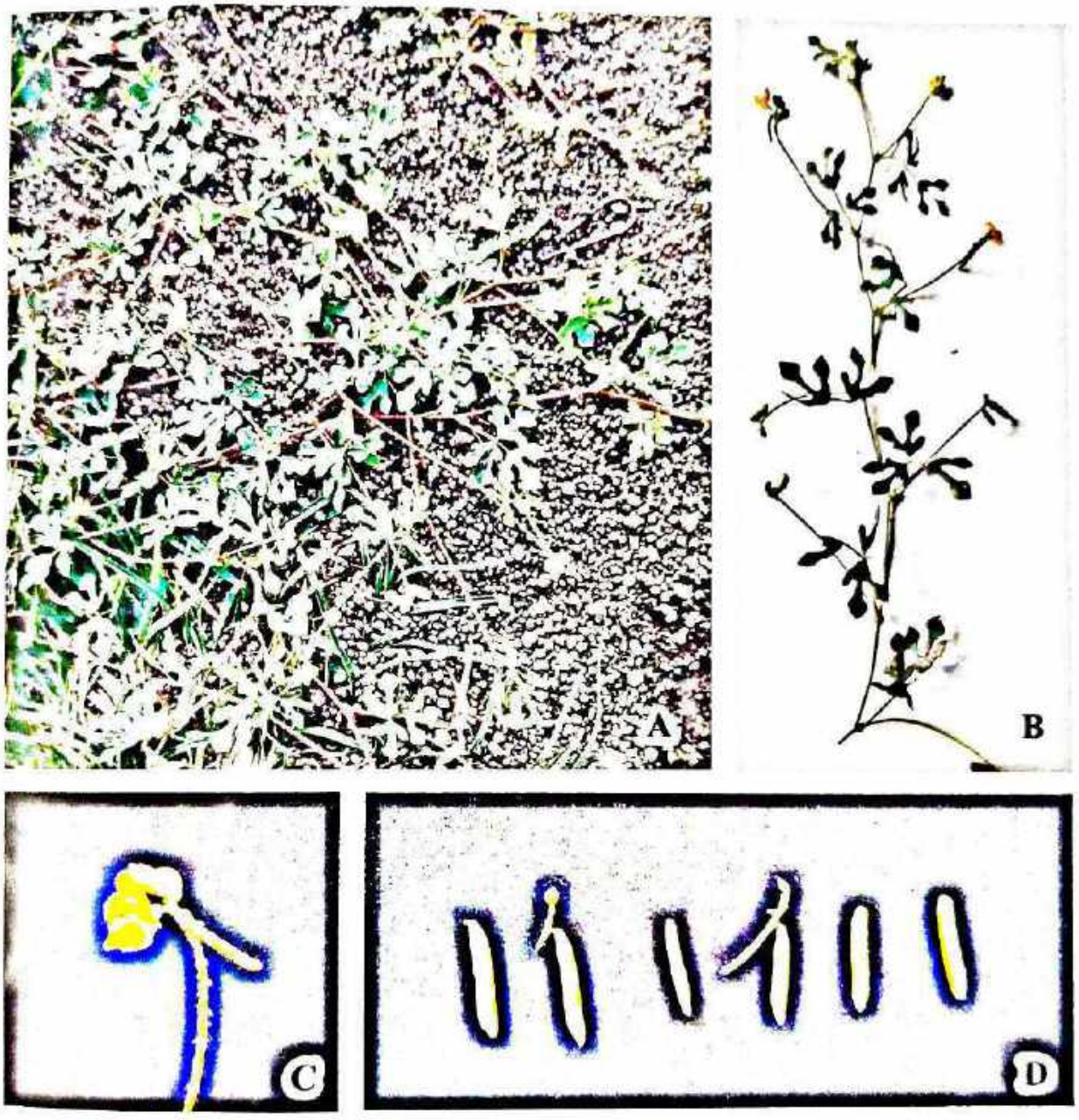

Figure 1. A. Habit of *Vigna indica*; B. Close up view of *V. indica*; C. Close up view of single flower; D. Pods of *V. indica*.

oven at 105°C for 6 hours. After cooling the Petri dish in the desiccators for 30minutes, it was reweighed. The percent moisture was calculated as

Moisture content (%) = Weight loss on drying x 100/ weight of sample

Crude Fats

Crude fat was determined by ether extract method using Soxhlet apparatus. 1 g of each moisture sample was wrapped in filter paper, placed in thimble, and then introduced into extraction tube. Receiving flasks were filled up to 1/3 with hexane and fitted into apparatus. After complete extraction, the hexane from the receiving flasks was evaporated on water bath, the ether extract was dried in an electric oven, and the flasks were reweighted. The percent crude fat was determined by using the following formula:

%Crude Fat = Weight of ether extract x 100/weight of sample

Ash content

The ash content was determined by heating 2g of the dried sample in a silica dish at 600°C for 6hr (AOAC, 2005). The ash content was determined by using formula:

%of ash = Weight of ash/Initial weight of sample x 100

Crude fibre

Extract 4gm of ground material with ether to remove fat (initial boiling temperature 35-38°C & Final temperature 52°C). Boil 2gm of dried material with 200ml of Sulphuric acid for 30 minutes with bumping chips. Filter through muslin & wash with boiling water until washings are no longer acidic. Boil with 200ml of sodium hydroxide solution for 30min. Filter through muslin cloth again & wash with 25ml of boiling 1.25% Sulphuric acid, three 50ml portions of water & 25ml alcohol. Remove the residue and transfer to ashing dish (pre-weighted dish W_1). Dry the residue for 2 h at 130 ± 2°C. Cool the dish in a desiccator & weigh (W_2). Ignite for 30min at 600 ± 15°C. Cool in a desiccator & reweigh (W_3). The crude fibre was determined by using formula:

$$\% \text{ Crude fibre} = (w2 - W1) - (W3 - W1) / 4 \times 100$$

Lipid content

Homogenize the sample 20g with 60ml of distilled water, 40 ml of chloroform and 80 ml of ethanol at the speed of 9500 rpm for 1 minute at 4°C. Add 40 ml of chloroform and homogenize for 30 seconds, add 40 ml of distilled water and homogenize for 30 seconds. After centrifugation of the homogenate at 2000 rpm at 4°C for 20 minutes. Transfers the supernatant into a reparatory funnel and allow to separate determine lipid content gravimetrically by measuring triplicate quotes of the chloroform layer into tared containers, evaporate the solvent and weight. Calculate the lipid content. The lipid content was determined by using formula;

% Lipid content= weight of the empty crucible – weight of the sample after drying/ weight of the sample

3.4 Karyotype Analysis

Mitosis was studied from root tips of germinated seeds. Root tips of 6–10 mm length were pretreated with saturated solution of para-dichlorobenzene for 3–4 h at 9 ± 3°C and then squashed in 2% propionic orcein. For meiotic studies, smears of developing anthers from appropriately sized flower buds were made after fixing in Carnoy's fluid (3:1ethanol and acetic acid) for 3 h using propionic orcein. Suitable mitotic and meiotic plates from freshly prepared slides were photographed with a Binocular Olympus microscope with attached camera at 1000 × magnification.

Ten well-separated somatic chromosome plates were selected for karyotype analysis for each species. Chromosomes were classified according to Levan et al. (1964). Ideograms were constructed using the software Ideokar 1.2 (Mirzaghaderia and Marzangib 2015). The degree of karyotype asymmetry has been determined using intrachromosomal (A1) and interchromosomal (A2) indices (Romero Zarco 1986) and the categories of Stebbins (1971).

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Proximate Composition

Moisture Contents

Observation:

Weight of the empty crucible =20.82

Weight of the sample =1gm

Weight of the crucible + Weight of the sample = 21.82gm

Weight of the empty crucible + Weight of the sample after drying =21.73

Calculation:

Moisture content =21.82-21.73 =0.09

1gm of sample content= 0.09gm

100gm of sample content =0.09/1*100

Percentage of moisture content = 9%

Crude Fats

Observation:

Weight of the empty crucible = 74.35

Weight of the extract = 100ml

Calculation;

Weight of the crucible with extract = 74.76-74.35

= 0.41%

% of crude fat = Weight of crucible with extract x 100/Weight of the extract

= 0.41 x 100/100

= 0.41%

Ash content

The ash content was determined by heating 2g of the dried sample in a silica dish at 600°C for 6hr (AOAC, 2005). The ash content was determined by using formula

Observation:

Weight of empty crucible = 30.35gm

Weight of sample = 1gm

Weight of crucible with sample =31.35gm

Weight of crucible with ash =30.38gm

Calculation:

Weight of ash = Weight of crucible with ash – Weight of empty crucible

= 30.38-30.35

= 0.03gm

Percentage of ash = Weight of ash/Initial weight of sample *100

= 0.03/1 x 100

= 3%

Crude fibre

Observation:

Weight of the sample: 4g

Weight of the empty crucible: 69.19

Weight of the empty crucible + weight of the sample after drying = 69.19+1.86=71.05

Weight of the empty crucible + reweight of sample =70.79

Calculation:

% of crude fibre = (w2 –W1) – (W3 –W1) /4 x100

= (71.05 -69.19) – (70.79- 69.19) /4 x100

= (1.8 - 1.6) /4 x100

= 0.26 /4 x100

=6.5 %

Lipid content

Observation:

Weight of the empty crucible: 74.54

Weight of the empty crucible + weight of the sample after drying= 74.4

Calculation:

% Lipid content= weight of the empty crucible – weight of the sample after drying/ weight of the sample

= 74.54-74.4/ 10

= 1.4%

4.2 Discussions

Vigna indica can easily be distinguished from all other species of section Aconitifoliae by its cylindrical to subtetragonous seeds with truncate ends. It is allied to *V. aridicola* from which it differs in having smaller flowers; buff to light brown pods; ovate, non-protruding hilum and petiolate seedling leaves. *Vigna aridicola* is endemic to Sri Lanka.

Among the species of section Aconitifoliae reported from India, *V. indica* is more closely related to *V. aconitifolia* from which it differs in having narrowly to broadly spathulate lobes of leaflets and ovate hilum. *Vigna indica* is also similar to *V. trilobata* and *V. stipulacea* from which it differs in having smaller, pale yellow flowers with flattened, deltoid keel pocket; obscure style beak; non-protruding hilum and obscure aril lacking a rim. *Vigna khandalensis,* a robust species of higher altitudes with an erect habit and large foliaceous stipules is very distinct from all other species of the section Aconitifoliae mentioned above. Hence, a comparison of selected characters is made to distinguish closely related species of section Aconitifoliae excluding *V. khandalensis.*

Proximate analysis of food is of great importance in that it accounts for the food quality and it is usually the basis for the establishment of nutritional quality of food and its acceptability by consumers (Shaheen *et al.*, 2012). The species of *V. aconitifolia* is more closely related to *Vigna indica.* The proximate composition has been compared with earlier results published by Soris and Mohan (2011). It is indicated that, *V. indica* has greater moisture content (9%) than *V. aconitifolia* which is nearly 4.8%. Similarly, the percentage of ash content has 3% in *V. indica* and 4.34% in *V. aconitifolia* from Tamil Nadu. Likewise, Opara *et al.* (2017) investigated the proximate analysis vitamins, minerals and anti-nutrients compositions of

unprocessed of *V. aconitifolia* from Nigeria and they were reported the Moisture content (12.87±0.03), Crude protein (14.06±0.01), Crude fibre (0.33±0.01), Crude fat (3.52±0.00) and ash (2.81±0.00). The moisture content of the investigated *Vigna aconitifolia* compares with the value (11.25±0.11) reported by Kala and Mohan (2010).

Very recently in 2019, eleven *V. aconitifolia* varieties including both pre-released and released varieties were analyzed for proximate composition and antioxidant activity from Regional Agricultural Research Station, Vijayapur (Badami *et al.*, 2019). Further, it was concluded that, among the studied eleven varieties, RMB-141 was having highest protein content (26.08 g/100 g) and KBMB-1 was having highest crude fiber content (5.16 g/100 g). In the antioxidant and polyphenol content, RMB-408 was found to be highest (13.44 percent and 2.79 mgGAE /g respectively). Therefore, the variation in the proximate composition between the varieties could be from location, varietal differences, soil and agroclimatic condition. Hence the present work was an attempt to develop the data apart from the proximate composition, such as vitamin analysis, mineral analysis, antinutrient analysis and antioxidant activity.

CHAPTER 5

CONCLUSION

The India is one of the major country who domesticated several pulses. Legumes which are mainly the edible dry seeds are one of the major classes of seeds that play an important role in human nutrition. They contain 25% protein thereby serving as substitute for meat. Information on the chemical composition of these potential protein sources and their possible utilization as human food is inadequate. However, some of these species are actually consumed by several human groups.

Evaluation of nutritional and anti-nutritional compositions of the seed of *Vigna aconitifolia* has been done enormously, which is very close associate with *V. indica*. Hence the current investigation is initiated with their proximate analysis with few parameters such as moisture content shows 9%, ash content with 3%, crude fat with 0.4%, lipid content with 1.4% and Crude fibre 6.5 %. There are several other parameters which have not been completed (including karyotype analysis) due to COVID-19 situation in the State.

Therefore, it is recommended that to investigate the relationships between regional cultivated *Vigna* species and wild species of *V. indica* with respect their nutritional value and anti-nutritional value from the raw/unprocessed seeds. So that, such kind of assessment which may helpful in raising a new drought resistant variety to fulfill the needs of the farmers as well as society through the suitable breeding program, in particularly interspecific hybridization.

CHAPTER 6

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K.L.E. Society's
Basavaprabhu Kore Arts, Science and Commerce
College, CHIKODI -591 201

DEPARTMENT OF ZOOLOGY

B.Sc Second Semester

CERTIFICATE

This is to certify that Mr / Miss ...Keerti Gadwaddar.....**of second semester has satisfactorily completed the study tour as prescribed in the practical syllabus by the Rani Chennamma University Belagavi, during the academic year 2019-2020.**

Staff-member in-charge

Head of the Department

HEAD
DEPARTMENT OF ZOOLOGY

List of the students who have participated in study tour

R. No	Sl. No	NAME OF THE STUDENTS
150	1	KAVITA ANIL SHIPURAKAR
151	2	MANALI MANIK PATIL
153	3	ROHINI RAJU BADIGER
154	4	SAGAR BAPU HERWADE
155	5	SUCHITA SUNIL HAVALE
157	6	VASUNDHARA KRISHNA GHATAGE
159	7	VINAYAK PRAKASH BENADE
160	8	VINUTA UTTAM KAMBLE
161	9	AISHWARYA DAYANAND SANE
162	10	AKANKASHA BABAGOUDA PATIL
163	11	BASAVARAJ ANNASAB CHOUGALE
164	12	KAVERI SUBHAS KHOT
165	13	KEERTI MALLESHI GADIWADDAR
166	14	LAXMI PUNDALIK NAIK
167	15	MADHU RAVIKUMAR RAMALAD
168	16	NANDINI MAHANTESH MAGADUM
169	17	NAVEEN RAVASAB SADALAGI
170	18	NIKHIL VIJAY NAIK
171	19	POOJA ANNASAB KUMBAR
172	20	POOJA RAJAGOUDA PATIL

173	21	PRAMOD BHARAMAPPA JAGANURE
174	22	REKAH RAMESH HUDED
175	23	SANDESH ASHOK ZALAKE
176	24	SHREESH PRASAD KULKARNI
177	25	SNEHA JITTENDRA MADYAPPAGOL
178	26	SOUMYA SHRISHAIL PATTANSHETTI
179	27	SUHASINI SIDRAM KABADAGI
180	28	TEJESWINI SANJEEV KILLEDAR
190	29	SUHAS R
191	30	SAHANA BASAVARAJ HANJI
197	31	KRUTIKA BASAVARAJ KALLATTI
198	32	RAKSHITA RAJU BINDAGE
200	33	ISHA PRAVEEN JAIN
201	34	JEEVAN RAMESH KAGALE
209	35	SAMIKSHA MILIND PATIL
210	36	VIKAS MARUTI KAMBLE
213	37	D DASARI VINAY RAMAKRISHNA
214	38	AKKINI VINOD SRIINIVAS
216	39	SUPRIYA MAHADEVAPPA CHALAWADI

As per the Rani Chennamma University Belgavi, B. Sc II semester Zoology curriculum (both theory and practical) is based on "Biodiversity of Animals". Making a trip to any habitat having diverse fauna and writing a report about what is observed is the partial fulfillment of the course.

We have decided to study the animal biodiversity at "Chitri-ecotourism" at Awandi, Ajara on Friday, 13th March 2020. The distance of Chitri forest from Chikodi is around 75 Km. We have accompanied a total of 38 students, 4 staff members and 1 peon. We left the Chikodi by 8:00 A.M. and reached Chitri by 10:00 A.M in a government bus.

There we met Prof. Anil Magar, Head, Department of Zoology, Dr Ghali College Gadhinglaj. After breakfast at 11:00 A.M we have started the "Blind Trek" with the help of rope under the guidance of Prof. P. P. Shete. Blind treking was very nice experience.

After completion of blind trek at 1:00P.M, we went for jungle trail towards Chitri Dam Backwaters, about 4 Km from the entry point. During jungle trail, we have observed different types of plants, mosses, epiphytes, birds, butterflies and insects. The entire visit was finished by 3:00 P.M. After finishing the jungle trail at 3:30P.M, we had delicious lunch together. After lunch we enjoyed various activities like tyre passing, spider net climbing etc.

At 4.30 P.M, a lecture was organized. Prof. Anil Magar, Head of the Department Zoology, Dr Ghali College Gadhinglaj explained about poisonous and non-poisonous snakes. He also explained how to handle snakes with live limbless reptile. Like this we studied and enjoyed whole day with lots of knowledge. We left the Chitri at 6.30 P.M. and returned to the Chikodi by 8.30 P.M. The entire study excursion was found to be very successfully completed and academically satisfied and beneficiary.

INTRODUCTION

As per the Rani Chennamma University Belagavi, B. Sc second semester Zoology syllabus, Project is based on "Biodiversity of Animals". In theory we study only one animal as representative of the respective phylum. To know and understand the habitat where these animals live, study excursion is useful. As it is one day field visit, we restricted our visit to Chitri-Ecotourism centre, Awandi – Ajara. It is situated in the chitri forest of Maharashtra state and this provided us to study the animal diversity of a forest (terrestrial) habitat. The tour was conducted on 13th March 2020.

K.L.E Society's

BASAVAPRABHU KORE COLLEGE, ARTS, SCIENCE AND COMMERECE COLLEGE, CHIKODI – 591 201 (District Belagavi)

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DEPARTMENT OF ZOOLOGY

B. Sc Second Semester [2019-2020]

A PROJECT REPORT ON

"BIODERVISISTY OF ANIMALS AT AWANDI – AJARA"

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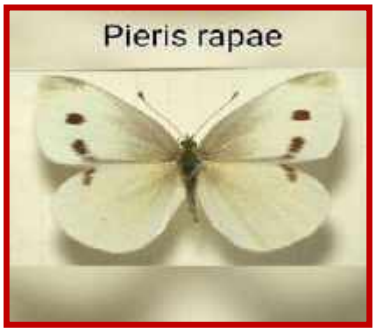
BIODIVERSITY AT CHITRI-ECOTOURISM AWANDI – AJARA

In Chitri forest we have observed a few animals in their natural habitat. We have observed different types of butterflies, insects, frogs, snakes and birds. This area is known for hundreds of different species of butterflies. Along with the animals we also observed different types of plants which provide shelter to the specific animals and medicinal plants also. Biodiversity is the variety and variability of life on earth. Following are the details for the species which we have seen in Chitri forest.

BUTTERFLIES

Cabbage White Butterfly: It is commonly called as "Cabbage White Butterfly". It is wide spread and populations are found across Europe, North Africa, Asia, South America and Grate Britain. The caterpillar of this species, often referred to as the "imported cabbageworm", is a pest to crucifer crops such as cabbage and broccoli. The butterfly can be distinguished by the white colour with small black dots on its wings. Under wings are yellowish with black spots.

Classification:



Phylum: Arthropoda
Class: Insecta
Order: Lepidoptera
Family: Pieridae
Genus: *Pieris*
Species: *rapae*

Grassy Yellow Butterfly: It is commonly called as "Grassy Yellow Butterfly" found in Asia and Africa. They are found flying close to the ground and are found in open grass habitat. Male upper side has yellow variable to rich lemon yellow according to locality with light or heavy rain fall. Female are very similar to males but without sex mark. Fertilization is internal and shows indirect development.

Classification:

Phylum: Arthropoda
Class: Insecta
Order: Lepidoptera
Family: Pieridae
Genus: *Eurema*
Species: *hecabe*

Common Crow Butterfly: It is commonly called as "Common crow butterfly" found in South Asia and Australia. In India it is referred as "Common Indian Crow". The common crow is glossy black butterfly has brown undersides with white markings along the outer margins of both the wings. It has velvety black brand located near the rear edge on upper side of forewings. On underside, there is white streak in the same location both in male as well as female. Fertilization is internal and shows indirect development.

Classification:

Phylum: Arthropoda
Class: Insecta
Order: Lepidoptera
Family: Nymphalidae
Genus: *Euploea*
Species: *core*

Tiger Butterfly: It is also known as "Tiger butterfly" and is one of the common butterflies of India. It mainly occurs in scrub jungles, dry and moist deciduous forest. It prefers the area of moderate to heavy rain fall. It closely resembles the Monarch butterfly (Danaus plexippus) of America. Male has prominent black and white spots on the underside if hind wings. Female has pouch on the hind wings. It visits to the flowers of Cosmos, Celosia, Lantana for nectar. Fertilization is internal and shows indirect development.

Classification:

Phylum: Arthropoda
Class: Insecta
Order: Lepidoptera
Family: Nymphalidae
Genus: *Danaus*
Species: *genutia*

INDIAN POISONOUS SNAKES

The Dense and dark forest of India is best habitat for the reptiles. The jungle offers a wide range of area for snakes. There are around 270 species of snakes in India, out of which about 60 are highly venomous (poisonous). We saw a few snakes in the forest area. Their description with pictures is mentioned in the next few pages:

Indian Cobra [Spectacled Cobra] (Naja naja), commonly known as 'Holy Snake': The Indian cobra, is one of the species of highly venomous snake found throughout India. Cobra prefer open forest edges, fields, and the areas around villages. It feeds on rodents, lizards, and frogs. The indian cobra usually hides in holes in embankments, termite mounds, tree hollows, rock. It exhibit the hood mark, located at the hood. These markings are formed by two circular ocelli connected by a curved line, resembling spectacles. Hence the common name spectacled cobra.

Classification:

Phylum:	Chordata
Subphylum:	Vertebrata
Division:	Gnathostomata
Superclass:	Tetrapoda
Class:	Reptilia
Order:	Ophidia
Genus:	*Naja*
Species:	*naja*

Indian Krait [Common Krait] – (Bungarus caeruleus): Krait venom is extremely neurotoxic. It induces paralysis. Its bite is lethal to man. There are 12 Species; some of them are the common krait, banded krait and Indian Krait. The body is cylindrical, tapering towards the tail. The tail is short and rounded. The eyes are small with rounded pupils. The head shields are normal, without loreals. The scales are highly polished and hexagonal.

Malabar Pit Viper – (Trimeresurus malabaricus): The Indian Green Pit Viper is also known as bamboo snake or tree viper. These are arboreal, living in bushes and amidst bamboo vegetation. It feed on frogs, lizards and insects. It grows to a length of 2.5 feet. Tail is prehensile. The species inhabits moist forests, both evergreen and deciduous, where it may be found on low vegetation, or in shrubs. The Malabar pit viper is nocturnal and usually inactive in the day, sometimes seen basking on rocks or trees near streams. The species preys upon tree frogs, geckos, musk shrews, and other small animals

Russell's viper: The species is found in Asia throughout the Indian subcontinent, much of Southeast Asia, Southern China and Taiwan. It is a common highly poisonous snake. Head is flattened tringular,and distinct from the neck. Snout is blunt, rounded and raised. Nostrils are large, single nasal scale. It posses paired erectile fangs in front of upper jaw. Its body rhythmically swells and hissing sound is produced. Its bite is fatal to man.

Classification:

Phylum:	Chordata
Subphylum:	Vertebrata
Division:	Gnathostomata
Superclass:	Tetrapoda
Class:	Reptilia
Order:	Ophidia
Genus:	*Dobia*
Species:	*russelii*

BIRDS

Cotton Teal (Nettapus coromandelianus): It belong to Anatidae family. Appears from a distance like a miniature comb duck. This is our wide spread resident small duck and gregarious in havit. The male has a white head and neck with a black cap and breast band. The female is dull in color. It is said to be the

smallest duck in the world. It is wide spread in better watered areas of India, but nowhere it is really abundant. Usually found in pairs or small flocks on weedy tanks where it feeds on aquatic plants. Though not good adapted for either diving or walking, but it flies fast and very well.

Large Egret (Casmerodius albus): The egrets belong to family Aredidae. It is solitary bird having black legs and toes. There is a dark line from yellow (black

when non-breeding) beak extending behind the eyes. Feathers are highly ornamental on the back.

Lesser Whistling duck (Dendrocygna javanica) : It belongs to the family Anatidae. Both male and female look alike. These are widely found in water bodies in the low lying areas of Kokan, Malabar and foothills of the Western Ghats and Deccan Plateau. It is commonly encountered on water bodies amidst human habitation, even if the water is partially polluted. Being a good diver and grazer, it is seen on water bodies. Nesting coincides with south west monsoon. Generally it makes nests in tree holes or in reed beds. It is still hunted for flesh.

Pheasant Tailed Jacana (Hydrophasianus chirugus): It belongs to the family Jacanidae. The Pheasant-tailed Jacana is a large (39-58 cm, including a 25-35 cm tail), distinctive bird with a long tail and very long toes. In breeding plumage the body is blackish below, browner with a greenish tinge above, the wings are white and the long tail is black. The head, face and front half of the neck are white, and the hind-neck is a shiny yellow-buff.

A black patch on the rear of the crown continues as a line down the neck, separating the yellow hind neck from the white fore-neck. The bill and legs are bluish gray and the iris is brown. In non-breeding plumage the under-parts are white, with a

brownish bar across the breast, the upperparts are paler greenish brown and the tail is much shorter. Sexes are alike, but the female is significantly larger. The Pheasant-tailed Jacana frequents freshwater wetlands with extensive aquatic vegetation such as lakes, ponds and swampy ground. It walks on floating water plants to feed on insects and other invertebrates. The nest is a pad of stems and pieces of aquatic vegetation, constructed chiefly by the male. The sex roles are reversed, with the female defending three or more males, and laying successive clutches of four eggs, up to about 10 per year. The eggs are left with the males for incubation and all parental care. The female, however, defends the nesting territory.

Purple Moor Hen (Porphyrio porphyrio): It belongs to the family Rallidae. It is a beautfuly shy rail. Flocks graze on the edges of lakes and soon enter into aquatic plants when sense the presence of human beings. They playfully chase each other. White rump flashes as the tail is flicked now and again. The low flight is clumsy with much effort and wings will be fluttering. They generally walk on floating vegetation, eating tubers and insects.

Bronze Winged Jacana (Metopidius indicus) : It belongs to the family Jacanidae (Charadriidae). It is the only member of the genus Metopidius. The jacanas are a group of waders in the family Charadriidae, which are identifiable by their huge feet and claws which enable them to walk on floating vegetation in the shallow lakes that are their preferred habitat. They are found worldwide within the tropical zone. The Bronze-winged Jacana breeds in India and southeast Asia. It is sedentary apart from seasonal dispersion.

It lays four black-marked brown eggs in a floating nest. The males, as in some other wader families like the phalaropes, take responsibility for incubation. These are conspicuous and unmistakable birds. They are 29 cm (11 in) long, but the females are larger than the males. They are mainly black, although the inner wings are very

dark brown and the tail is red. There is a striking white eye stripe (white eye brow is conspicuous). It is mostly seen in the lake having Hydrilla, Water Lily. Trapa, Water Hyacinth. These are excellent swimmers and divers. The yellow bill extends up as a red coot-like head shield, and the legs and very long toes are grey. Young birds have brown upperparts. Their under-parts are white, with a buff fore-neck. The Bronze-winged Jacana's feeds on insects and other invertebrates picked from the floating vegetation or the water's surface. When forced they sometimes choose to hide by submerging themselves. The male may carry chicks between the wings and body. Metallic bronze coloured under wings surrounding the tail are conspicuous.

Common Coot (Fulica atra): Coots are medium-sized water birds that are members of the rail family Rallidae. They constitute the genus Fulica. Coots have

predominantly black plumage, and unlike many rails they are usually easy to see, often swimming in open water. They are close relatives of the moorhen. They have prominent frontal shields (decoration on the forehead) and bill.

Like other rails, they have lobed toes. The featherless shield gave rise to the expression "as bald as a coot," which the Oxford English Dictionary cites in use as early as 1430. They tend to have short, rounded wings and are weak fliers and nevertheless can cover long distances on rare occasions. Coots can walk and run vigorously on strong legs, and have long toes that are well adapted to soft, uneven surfaces. These birds are omnivorous, eating mainly plant material, but also small animals and eggs. They are aggressively territorial during the breeding season, but are otherwise often found in sizeable flocks on the shallow vegetated lakes they prefer.

Red Wattled Lapwing (Vanellus indicus): This Lapwing is a large plover, a wader in the family Charadriidae. It has characteristic loud alarm calls which are variously rendered as did he do it or pity to do it leading to colloquial names like the did-he-do-it bird. Usually these are seen in pairs or small groups not far from water. These are large waders, about 35cm long. The wings and back are light brown with a purple sheen, but head and chest and front part of neck are black. Prominently white

patch runs between these two colours, from belly and tail, flanking the neck to the sides of crown. Short tail is tipped black. A red fleshy wattle in front of each eye, black-tipped red bill, and the long legs are yellow. In flight, prominent white wing bars formed by the white on the secondary coverts. Males and females are similar in plumage but males have a 5% longer wing. It is also seen in ploughed fields, grazing land, and margins and dry beds of tanks and puddles. It is also found in forest clearings around rain-filled depressions.

It runs about in short spurts and dips forward obliquely (with unflexed legs) to pick up food in a typical plover manner. This species is declining in its western range, but is abundant in much of South Asia, being seen at almost any wetland habitat in its range. In flight diagnostic features are white wing bar, and broad black band on tail. The diet of the lapwing includes a range of insects, snails and other invertebrates, mostly picked from the ground. They may also feed on some grains.

White breasted water hen (Amaurornis phoenicurus): It is a water bird of the rail and crake family Rallidae that is widely distributed across Southeast Asia and the Indian Subcontinent. They are dark slaty birds with a clean white face, breast and belly. They are somewhat bolder than most other rails and are often seen stepping slowly with their tail cocked upright in open marshes or even drains near busy roads. Adult White-breasted Water hens have mainly dark grey upperparts and

flanks, and a white face, neck and breast. The lower belly and under tail are cinnamon coloured. The body is flattened laterally to allow easier passage through the undergrowth. They have long toes, a short tail and a yellow bill and legs. Sexes are similar but females measure slightly smaller. They make short distance movements and are known to colonize new areas. Most often they are found near freshwater bodies. These birds are usually seen singly or in pairs as they forage slowly along the edge of a water body mainly on the ground but sometimes clambering up low vegetation. The tail is held up and jerked as they walk. They probe with their bill in mud or shallow water. They mainly eat insects, small fish, aquatic invertebrates and seeds. Both sexes incubate the eggs and take care of the chicks.

Scarlet minivet (Pericrocotus flammeus): It is a small passerine bird belonging to the family Canpephagidae. This minivet is found in tropical southern Asia from the Indian subcontinent east to southern China, Indonesia, and the Philippines. They are common resident breeding birds in forests and other well-wooded habitats including gardens, especially in hilly country. While the male of most subspecies are scarlet to orange with black upper parts, the females are usually yellow with greyish olive upper parts. The Scarlet Minivet is 20–22 cm long with a strong dark beak and long wings. The male has black upperparts and head, and scarlet under-parts, tail edges, rump and wing patches. The female is grey above, with yellow under-parts (including the face), tail edges, rump and wing patches.

Peacock: We were also lucky to witness the free movement of our National bird in the Londa forest area. Indian Peafowl (Pavo cristatus) : Peafowl are two Asiatic species of flying bird in the genus Pavo of the pheasant family, Phasianidae, best

known for the male's extravagant eye-spotted tail, which it displays as part of courtship. The male is called a peacock, the female a peahen, and the offspring peachicks. The adult female peafowl is grey or brown. Peachicks can be yellow colour with darker brown patches. The male has iridescent blue-green or green colored plumage. The peacock tail ("train") is not the tail quill feathers but the highly elongated upper tail covert feathers. The "eyes" are best seen when the peacock fans its tail. Both species have a crest atop the head. The female (peahen) Indian Peafowl has a mixture of dull green, brown, and grey in her plumage. She lacks the long upper tail coverts of the male but has a crest. Peafowl are forest birds that nest on the ground but roost in trees. They are terrestrial feeders. Peafowl are omnivorous and eat most plant parts, flower petals, seed heads, insects and other arthropods, reptiles, and amphibians.

Jungle Babbler: They are found in group containing seven members so also called as “Saath bhai”(seven brothers). It is common resident breeding bird in most parts of Indian subcontinent. The jungle babblers habitat is forest and cultivation. This species is non-migratory and has short rounded wings and weak flight. The upper part of the body is usually slightly darker in shade and there is some mottling on the throat and breast. They breed throughout the year. Sexes are identical.

Kingfisher: All kingfishers are highly territorial; since it must eat around 60% of its body weight each day, it is essential to have control of a suitable stretch of river or water body. Kingfisher is solitary for most of the year, roosting alone in heavy cover. Common Kingfisher, also known as Eurasian Kingfisher, or River Kingfisher, is a small Kingfisher resident to the Indian Subcontinent and widespread.

Yellow-footed green pigeon (Treron phoenicoptera): It is known as yellow-legged green pigeon. It is a common species of green pigeon found in the Indian subcontinent. It is the state bird of Maharashtra. In marathi it is called Hola or Hariyal. The species feeds on fruit, including many species of Ficus. They forage in flocks. In the early morning they are often seen sunning on the tops of emergent trees in dense forest areas. They especially are found sitting in couples on tree branches.

CONCLUSION: Biodiversity boosts ecosystem productivity where each species, no matter how small, all have an important role to play. The number of species of plants, animals, and microorganisms, the enormous diversity of genes in these species, the different ecosystems is all part of a biologically diverse Earth. Owing to habitat destruction for developmental activities in urban environment and unscientific management of natural resource, much for our some animals are disappearing and at present, their survival is under threat. Chitri reserve forest is situated northeast Chitri in Kolhapur district. This area provides polluted free and suitable habitat to different types of animals.

ACKNOWLEDGEMENT: We would like to express my gratitude to our beloved Principal of our college Prof. Udaysing R Rajput for permitting us to conduct this programme and providing the support.

We thank Dr. N. R. Birasal, Head, Department of Zoology for organizing study excursion to “Chitri Eco- Tourism centre” Maharashtra state to study the Biodiversity of animals. We thank Smt. Sridevi I Puranik, Miss. Megha P Kapurkar and Miss. Trupti P Khidrapure for their continuous support to undertake this visit and guiding us.

We would like to thank Prof. Anil Magar, Head of the Department of Zoology, Dr. Ghali College, Gadhinglaj for his Guidance and special lecture regarding identification of poisonous and non- poisonous snakes along with the necessary information regarding fauna of that place.

We also would like to thanks to Prof. P.P. Shete, Devchand College, Arjun-nagar for study tour management and their guidance.

A FEW SNAPS OF THE STUDY TOUR WHILE PERFORMING DIFEERENT ACTIVITIES

Team members getting ready for trekking event (collecting sticks)

Students entering into the forest

Students entering into the forest for trekking with the help of sticks

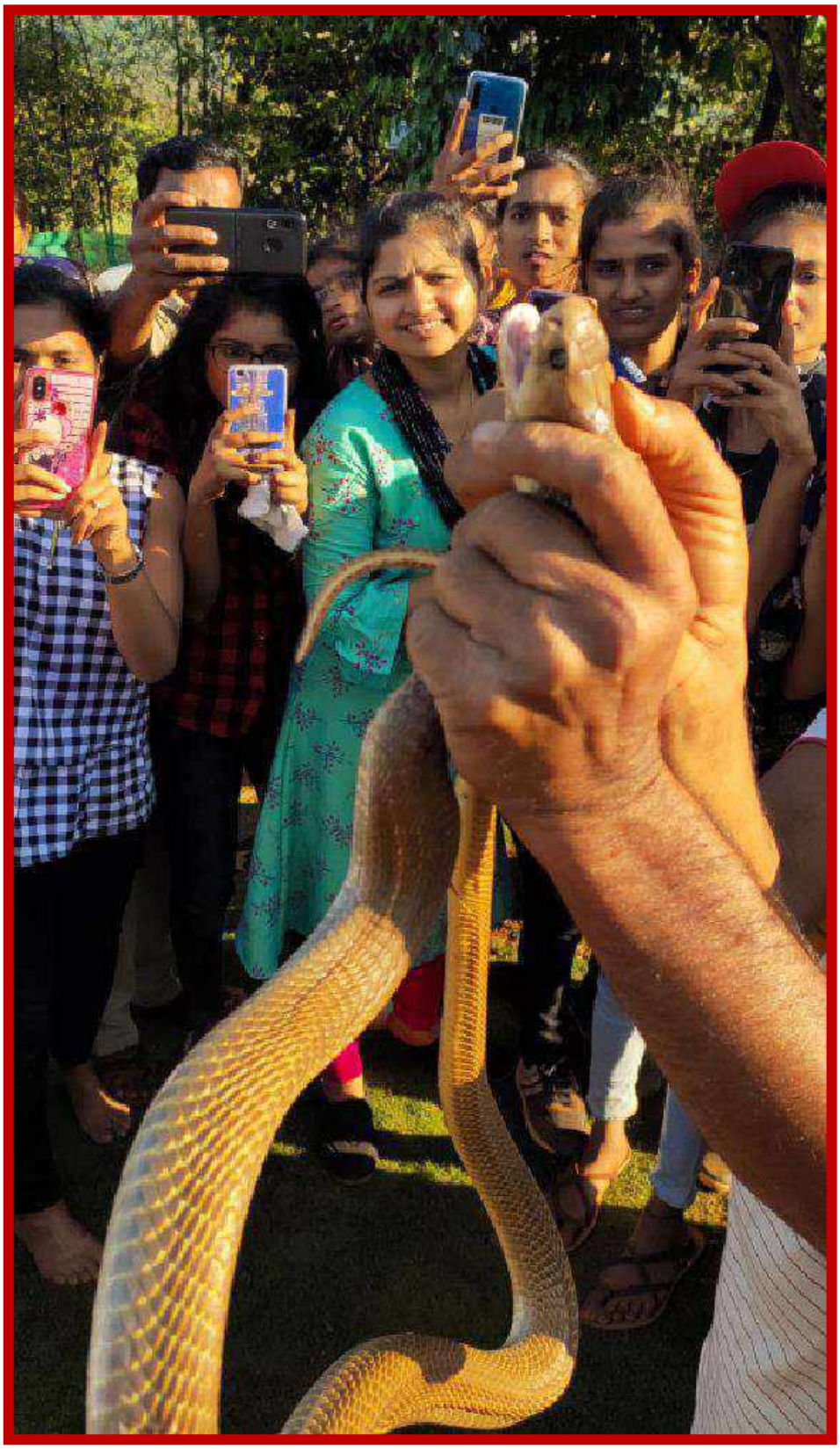
Students along with faculty take rest after reaching trekking point

Students visualizing scenic beauty of Chitri forest area

Students and staff near Chitri river

Students knowing about snakes through the lecture of Prof. Anil Magar

Students observe an old well found amidst Chitri forest



Snake handling by Prof. Anil Magar (showing fangs of snake)

K.L.E. Society's

BASAVAPRABHU KORE COLLEGE, CHIKODI

(Accredited at 'A' grade by NAAC with CGPA of 3.26 in the third cycle)

Website: www.klesbkcollegechikodi.edu.in **e-mail**: kles_bkcc@rediffmail.com **Phone**: 08338 – 272176

DEPARTMENT OF ZOOLOGY

B.Sc Fifth Semester

2019 – 2020

REG NO: S1715612 ROLL NO: 145

CERTIFICATE

Date: 15th October 2019

This is to certify that Mr / Miss Akshata A. Upadhye **of BSc Fifth semester has satisfactorily completed the field visit as prescribed in the practical syllabus of Rani Chennamma University Belagavi, during the academic year 2019 -2020.**

Staff-member-in-charge

Head of the Department

HEAD
DEPARTMENT OF ZOOLOGY

Examiners

(1) Valued 31/10/19

(2) 31/10/19

K.L.E.SOCIETY'S

BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE, CHIKODI

List of the students of 2019 - 20 who have participated in the tour

Sl. No	Roll No	Gender	Name of the student	Sex	Category
1	145	MISS	AKSHATA AJIT UPADHYE	F	III-B
2	146	MISS	AKSHATA ANIL MIRJE	F	III-B
3	147	SRI	ANIKET KALLAPPA BEKKERI	M	II-A
4	148	MISS	APURVA PRAKASH PATIL	F	III-B
5	149	MISS	JASMIN RASHID TAMBOLI	F	II-B
6	150	MISS	JAYASHREE APPASAHEB MALI	F	II-A
7	151	MISS	LAXMI MALLAPPA METRI	F	III-B
8	152	MISS	PALLAVI ASHOK THORUSHE	F	III-B
9	153	MISS	POOJA RAJSHEKHAR PUJARI	F	II-A
10	154	MISS	PRACHI BASAVARAJ PATIL	F	GM
11	155	MISS	PRAJAKTA ARUN LATAWADE	F	III-B
12	156	SRI	SACHIN RAMU KORE	M	III-B
13	157	MISS	SAMAREEN JAHANGIR JAMADAR	F	II-B
14	158	MISS	SHIVANI MALLAPPA METRI	F	II-A
15	159	SRI	SHUBHAM RAMACHANDRA JAKATE	M	III-B
16	160	MISS	SOUMYA SAGAR SHEDBALE	F	III-B
17	161	MISS	TANUJA APPASAHEB SHINDHE	F	III-B
18	162	MISS	AKSHATA ANAND WALAKE	F	II-A
19	163	SRI	AROODH MALLIKARJUN MALLAPURE	M	III-B
20	164	MISS	BHAVANA CHANDRAKANT SARAPURE	F	III-B
21	165	MISS	CHAITRA APPAYYA MATHAPATI	F	III-B
22	166	MISS	CHAITRA GOPAL MUKKANNAVAR	F	CAT-I
23	168	MISS	LAXMI KUMAR KAMATE	F	II-A
24	169	MISS	LAXMI MALLAPPA DEVANGOL	F	II-A
25	170	SRI	MANJUNATH MAHADEV BHOJE	M	II-A
26	171	MISS	MEGHASHRI GAJANAN GUNDAKALLE	F	III-B

Sl. No	Roll No	Gender	Name of the student	Sex	Category
27	172	MISS	POOJA GOVIND RAVAN	F	III-B
28	173	SRI	PRATIK SHASHIDHAR KATTIMANI	M	III-B
29	174	SRI	PREETAM ASHOK PAWAR	M	III-B
30	176	MISS	PRIYANKA RAJU HALIJOL	F	II-A
31	177	MISS	RAKSHATA VILAS KAMATE	F	III-B
32	178	MISS	REVATI RAJU KHOT	F	III-B
33	179	MISS	ROHINI LAXMAN MOLAKE	F	III-B
34	180	MISS	SANDHYA SHIVANAND KAMBAR	F	II-A
35	181	MISS	SAPANA VIDYASAGAR SHIRAGUPPE	F	III-B
36	182	MISS	SAVITA RAVINDRA PATIL	F	III-B
37	183	MISS	SAVITA SIDDAPPA HALAKARNI	F	III-B
38	185	MISS	SHWETA ASHOK KOLI	F	CAT-I
39	186	SRI	SONAL GANAPATI MALI	M	III-B
40	187	MISS	SONALI SANJAY BANDAGAR	F	II-A
41	188	MISS	SUSHILA RAMAYYA HIREMATH	F	III-B
42	190	MISS	VACHANA RAMACHANDRA KOLKAR	F	SC
43	191	MISS	VARSHA KALLAPPA KARAGAR	F	II-A
44	192	MISS	VINAYA ANNASAHEB GHARABUDE	F	III-B
45	210	MISS	ARATI VISHWANATH CHOUGALE	F	III-B
46	211	MISS	RUTUJA SANJU PATIL	F	III-B
47	212	SRI	CHETAN SURESH SADALAGE	M	III-B
48	214	MISS	SAKSHI SANJEEV MAHISHALE	F	III-B
49	236	MISS	PREETI LAXMAN WADER	F	II-A
50	237	SRI	RAGHUNATH ANNASAB PAWAR	M	III-B
51	238	MISS	NIKHITA SAMBHAJI BAMANE	F	SC
52	239	MISS	RASHMI RAJENDRA TAMADADDI	F	III-B
53	240	MISS	JYOTI MARUTI BORAGANVE	F	III-B
54	241	MISS	POOJA SANJAY KHOT	F	III-B

INTRODUCTION

We planned a field visit which is compulsory according to our practical syllabus. Studying in class rooms is not enough, at least in some portion of the syllabus. Class room study may not expose us to a reality. During the class room teaching we will just imagine concepts, but study tours turn those imaginations into reality. Against this backdrop, observations in the field is necessary and helps us to understand the 'nature' in a better way and expand our thinking and understanding capacity. This study tour has helped us for real 'experiential learning'

TOUR PROGRAMME

As it is two day visit, we confined our visit to Ganapati pule and Mahabaleshwar. Both are situated amidst evergreen forest and hence we could get more exposure to study the forest ecosystem. The study tour was conducted on 1st and 2nd of October 2019. Mahabaleshwar is a small town located in Satara district of Maharashtra state. It is a hill station located in the Sahyadri mountain range with 'green umbrella' of evergreen forest. So we selected it to study the forest ecosystem. We left Chikodi on 1st of October 2019 (morning at 7 am). We stayed in Ganapati pule and continued our journey on the next day morning and reached Mahabaleshawar. We had an opportunity to witness the natural forest ecosystem. We returned back and reached Chikodi on 3rd October 2019 morning.

DESCRIPTION ABOUT THE ECOSYSTEM BY OUR TEACHER

Our teacher Miss Trupti P Khidrapure explained the concepts like (a) Forest as an ecosystem (b) Types of forests: depending on the prevailing climatic conditions forests, the most important type is *Broad leaved forest.* It is the type of forest which include further types like Evergreen forest and deciduous forest.

She also explained about the components of forest ecosystem: biotic and abiotic factors. With examples amidst the forest, she explained biotic factors like (1) Producers: these are mainly trees, including small herbs, shrubs and trees **(2) Consumers**: these are in turn divided into a. **Primary consumers**: which directly feed on plants. Ex grass hoppers, Deers etc. b. **Secondary consumers**: these are the animals which feed on primary consumers ex. Snakes, lizards etc. c. **Tertiary consumers**: they consume secondary consumers. Ex Lion, Tiger etc. **(3) Decomposers**: these are wide variety of micro-organisms including Fungi, bacteria etc. **Abiotic factors:** It include organic and inorganic substances present in the soil, some trace elements, rocks and mountains.

OBSERVATIONS

We visited evergreen forests i.e broadleaved forest. It had very high humidity, high temperature, maximum rainfall which favours the growth of trees and contributes for huge diversity of flora and fauna. Different forms of life's occupy special areas within different layers and spaces of ecosystem depending upon their food, sunlight, water, nutrients etc.

We observed vertical stratification (distribution) of animals in the forest community.

Vertical stratification (arrangement) in the forest of Mahabaleshwar mainly consist of five layers.

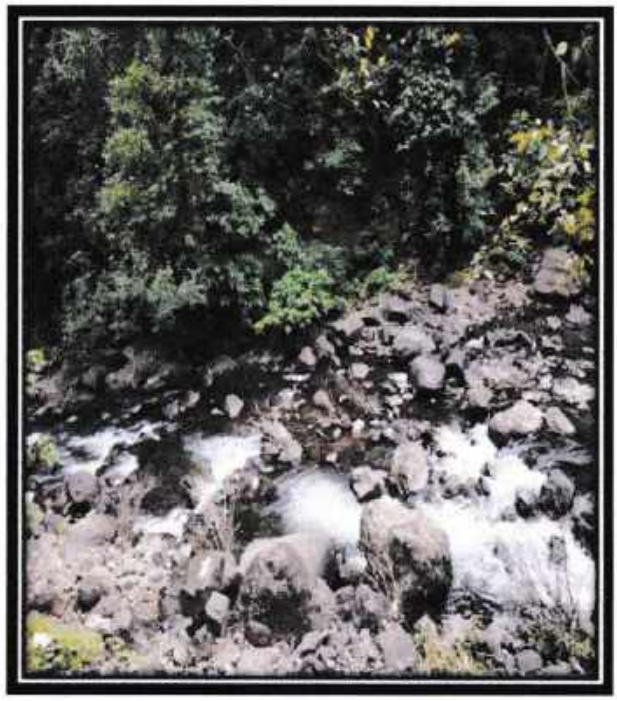
1. Upper most layer consisting of trees, which is occupied by animals like, monkeys and loris etc.
2. Second layer was of Shrubs, occupied by animals like squirrels, Deer, wild pigs etc.
3. Herbs: occupied by plant eating insects and spiders etc.
4. Forest floor: lowermost visible layer of forest including animals like fungi, bacteria, leech, earthworms etc.

Ecosystem operates in a well balanced way maintaining its food chain indicating the dependency of one animal with the other. If any of the components of a system is disturbed then the whole ecosystem will be disturbed. We witnessed how one plant is interdependent on each other and more so with one animal with the other in the natural forest ecosystem. This is the truth of interdependence of a plant and plant, animal and animal and plants and animals.

We could also see the disturbance and inconvenience caused by a few human beings. In some places in the forest, we could see plastics. Our teacher explained about the human beings is exploiting the nature for economic growth.

Since 5 decades such human activities have already harmed and damaged the forest ecosystem on a larger scale resulting in (a) reduction of many species (b) leading to extension of few species and (c) threatening a few other species. As a consequence, there will be imbalance in forest ecosystem, through food chain / food web. We have learnt that the food chain and food web are the inter-linked mechanisms which are really delicate in any ecosystem. Once this delicate balance is disturbed, it is very difficult to recover the same. Hence we are not supposed to disturb this balance. If undisturbed, the ecosystem continues to flourish.


Latitude: 17.146551
Longitude: 73.265117
Elevation: 4.67m
Accuracy: 3.2m
Time: 02-10-2019 07:15
Note: study trip ganapati pule



CONCLUSION

It was a wonderful experience to study "Forest ecosystem" in its own habitats, because in the class rooms, we can only imagine. By undertaking this study tour, we were able to observe and understand the system operating and mutualism and its food chain maintenance. It was the great combination of theoretical and practical knowledge with live examples inhabiting the natural forests. It is the classic example of *experiential learning* for us. Every time, our teachers were used to say in the classes that, natural science students will learn better in the forest. In nutshell, it helped us to understand and grasp the concepts clearly and extend our thinking capacity.

ACKNOWLEDGEMENTS

We the students of B.Sc fifth semester are indebted to our beloved Principal Sri U R Rajput for all his help and giving permission to undertake the study tour. With deep sense of gratitude, we express our sincere thanks to Dr N. R. Birasal, Head, Department of Zoology for his support to undertake this visit to study forest ecosystem

We sincerely thank our teachers Smt Sridevi I. Puranik, Smt Megha Kapurkar and Miss Trupti P Khidrapure for their continuous support to undertake this visit and guiding us.

We are also thankful to our department peon Sri Shivagouda patil and our friends who helped us in making this visit safe and interesting.

K.L.E.Society's
BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE,
CHIKKODI – 591201 District – Belagavi (Karnataka state, India)
(ACCREDITED AT 'A' GRADE BY NAAC WITH CGPA OF 3.26 IN THE THIRD CYCLE)

Department of Zoology (2019 – 20)

PROJECT WORK COMPLETION CERTIFICATE

This is to certify that following six B.Sc Final year students have undertaken the project entitled "***Analysis of antimicrobial activity of Curcumin***" in-partial fulfillment of the syllabus of Rani Channamma University, Belagavi during the year 2019-20. Following six students have successfully completed the said project under the guidance of Dr Sridevi I Puranik.

Sl. No	Gender	Name of the student	Fathers name	Roll Number	Exam Reg. Number
1	Miss.	Chaitra Mukkannavar	Gopal	166	S1715634
2	Miss.	Sandhya Kambar	Shivanand	180	S1715745
3	Miss.	Priyanka Halijol	Raju	176	S1715712
4	Miss.	Varsha Karagar	Kallappa	191	S1715832
5	Miss.	Vachana Kolkar	Ramachandra	190	S1715827
6	Miss.	Meghashree Gundaalle	Gajanan	171	S1715682

Dr Sridevi I Puranik
PROJECT GUIDE

Dr N R Birasal
HEAD
DEPARTMENT OF ZOOLOGY

Prof U R Rajput
PRINCIPAL
KLES'S Basavaprabhu Kore
Arts, Science and Commerce College
CHIKODI - 591 201

Project Team Members

Sl. No.	Gender	Name of the Student	Fathers Name	Roll Number	Exam Seat Number
1.	Miss.	Chaitra Mukannavar	Gopal	166	S1715634
2.	Miss.	Sndhya Kambar	Shivanand	180	S1715745
3.	Miss.	Priyanka Halijol	Raju	176	S1715712
4.	Miss.	Varsha Karagar	Kallappa	191	S1715832
5.	Miss.	Vachana Kolkar	Ramachandra	190	S1715827
6.	Miss.	Meghashree Gondakalle	Gajanan	171	S1715682

ACKNOWLEDGEMENT

In the present world of competition there is a race of existence in which those are having will to come forward succeed. Project is like a bridge between theoretical and practical working. With this willing, it is great pleasure for us to undertake this project. We feel highly doing the project entitled "**Analysis of antimicrobial activity of Curcumin"**.

We would like to express our special thanks of gratitude to our professor and even our project guide **Prof. Mrs. Sridevi I. Puranik**, Assistant Professor Department of Zoology. This project would not have completed without her enormous help and worthy experience. Whenever we were in need, she was there behind us.

We are very grateful to **Dr. N. R. Birasal,** Head of the Department of Zoology as well as our beloved Principal **Shri. U. R. Rajput** who gave us the golden opportunity to do this wonderful project.

We would also like to extend our thanks to the **Prof. Gayatri Joshi**, faculty member of Botany Department and to the technicians of the laboratory of the Botany and Zoology department for their help in offering us the resources in running the program.

Finally, we would also like to thank our friends who helped us in finishing this project within the limited time.

Although, this report has been prepared with utmost care and deep routed interest, even then we accept respondent and imperfection.

CONTENT

INTRODUCTION

Food borne diseases have always been a major concern in both developing and developed countries. *Campylobacter jejuni*, *Staphylococcus aureus*, *Salmonella*, *Escherichia coli*, *Streptococci*, etc are some of the major bacterial species that causes food borne diseases. *E. coli* are the most commonly found bacterium in the human intestinal tract. Under normal conditions, its presence is conducive to digestive processes (Abbas *et al.*, 2019). But when present in excess it causes diseases.

With increasing use of drugs, microorganisms are attaining resistance to commonly used antibiotics, which leads to downfall of effectiveness of conventional medicines and therefore, search for new antimicrobial agents has become necessary. Traditional medicines have been used for many centuries by a substantial proportion of the population of India. The interest in the study of medicinal plants as a source of pharmacologically active compounds has increased worldwide. It is recognized that in developing countries like India, plants are the main medicinal source to treat infectious diseases. Approximately 20% of the plants found in the world have been subjected to pharmacological or biological test, and a substantial number of new antibiotics introduced in the market are obtained from natural or semi-synthetic resources (Ahmadi, 2010)**.**

The active ingredients of plants against microorganisms are mostly some of the secondary metabolites (i.e. alkaloids, glycosides etc) that are present in abundance in herbs and spices commonly used in Indian food preparations. Herbs are small plants used by human being for various purposes like medicines, food supplements for imparting flavour or scant, and as a part of offerings to God since beginning of civilization.

Spices have been defined as plant substances from indigenous or exotic origin, aromatic or with strong taste, used to enhance the taste of foods. Spices include leaves (bay, mint, rosemary, coriander, laurel, oregano), flowers (clove), bulbs (garlic, onion), fruits (cumin, red chilli, black pepper), stems (coriander, cinnamon), rhizomes (ginger), root (turmeric), and other plant parts. The importance of spices can be found not only in the flavouring, but also in their medicinal, preservative and antioxidant properties. Being plants, the natural food stuffs, spices appeal to consumers who tend to question the safety of synthetic additives **(**Akram *et al.*, 2010)**.**

Antimicrobial properties of the spices have been documented in ancient literature and the interest continues to the present.

Antimicrobial activity refers to the process of killing or inhibiting the disease-causing microbes. Here, various antimicrobial agents are used. Antimicrobial may be anti-bacterial, anti-fungal or anti-viral. They all have different modes of action by which they act to suppress the infection.

An anti-microbial is an agent that kills micro-organisms or inhabits their growth. Antimicrobial medicines can be grouped according to the micro-organisms they act primarily against. Antimicrobial agents are of various classes. Some of the class includes; beta lactam, cephalosporins, quinolones, tetracyclines, macrolides, sulphonamides, aminoglycosides, etc. These different classes act in a different way and on different kind of bacteria.

In recent years, drug resistance to human pathogenic bacteria has been commonly and widely reported in literature **(**Kocaadam and Şanlier, 2017). Because of the side effects and the resistance that pathogenic micro-organisms build against antibiotics, many Scientist have recently paid attention to herbal extracts and biologically active compounds isolated from plant spices used in herbal medicines.

Figure 1: Spice samples - Curcumin roots and Curcumin powder

Turmeric is a spice that comes from the root Curcuma longa, a member of the ginger family, *Zingaberaceae*. It is brightly yellow and has been used as colouring agent in food (McLean, 2018). In India, it has been used for centuries as a spice and a food preservative, and also for its various medicinal properties. In Ayurveda, turmeric has been used for various

purposes and through different routes of administration. It has been used topically on the skin for wounds, blistering diseases such as pemphigus and herpes zoster, for parasitic skin infections, and for acne. It has been used via oral administration for the common cold, liver diseases, urinary tract diseases, and as a blood purifier **(**Rahmani *et al.*, 2018).

In the last few decades there has been considerable interest in the active compounds in turmeric called curcuminoids. The major curcuminoid is called curcumin (diferuloyl methane), which makes up approximately 90% of the curcuminoid content in turmeric, followed by demethoxy curcumin and bismethoxy curcumin. The curcuminoids give turmeric its bright yellow colour. The antibacterial activity of curcumin bioconjugates has been tested particularly for β-lactamase producing microorganisms.

Escherichia coli are the most commonly present bacteria in the human intestine, which helps in preventing the entry of pathogenic microorganisms. *E. coli* are non-pathogenic in normal conditions, but if present in excess, will become causative agent of various diseases like urinary tract infection, diarrhoea, vomiting etc. With increasing resistance of microorganisms to antibiotics, there is a shift of choice from allopathic to Ayurvedic and naturopathy, where herbs and spices are very common ingredients of medicines (Shahid *et al.*, 2020).

Herbs and spices are used in Indian recipes as they impart aroma and flavour to it. Most of the studies performed to check sensitivity of extraction of the active component(s) with some organic solvents. In the present study, turmeric spice is selected, its extract is made using distilled water and tested for its antimicrobial effect against *E. coli* the most common intestinal non-pathogenic organism. The turmeric tested was able to inhibit *E. coli* growth and it was found to be most effective against *E. coli.*

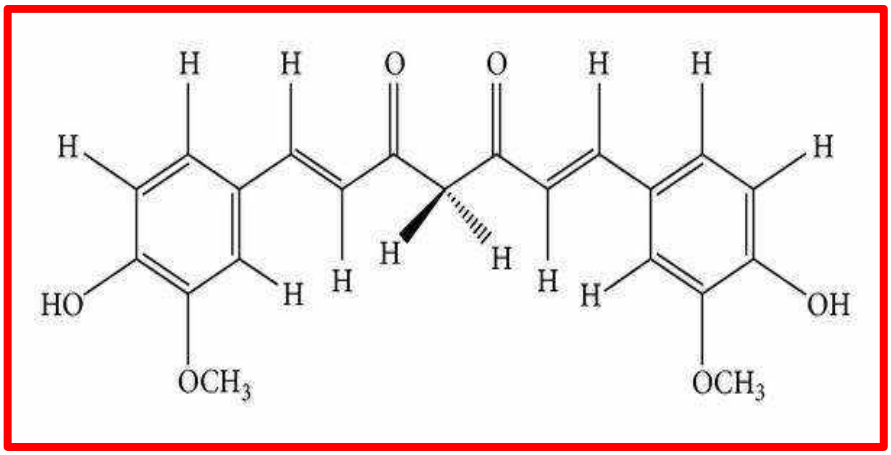


Figure 2: Chemical structure of Curcumin.

Curcumin, a yellow pigment present in the Indian spice turmeric, has been linked with suppression of inflammation; angiogenesis; tumorigenesis; diabetes; disease of the cardiovascular, pulmonary, and neurological systems, of skin, and of liver; loss of bone and muscle; depression; chronic fatigue; and neuropathic pain.

The utility of curcumin is limited by its colour, lack of water solubility, and relatively low *in vivo* bioavailability. Because of the multiple therapeutic activities attributed to curcumin, there is an intense search for 'super curcumin'. In present study, anti-microbial activity of turmeric natural dye against *E. coli* bacteria was measured by disk diffusion method. Turmeric natural dye showed good inhibitory activity against *E. coli* with a zone of inhibition 7 mm to 15mm. The incorporation of turmeric dye with natural fibre will help to produce value added handicrafts.

MATERIALS AND METHODS

Materials:

Nutrient Agar Medium, Curcumin powder mg/mL.

Methods

1. **Preparation of Nutrient agar medium**

   Composition of Nutrient Broth

Peptone	:	5 gm
NaCl	:	5 gm
Beef extract	:	3 gm
Distilled water	:	1000 mL
pH	:	7.0

Preparation of Media

- Accurately weigh the ingredients of nutrient broth and transfer them into a beaker containing 500 mL of distilled water
- Gently, heat the contents with continuous shaking to dissolve them.
- Add, more distilled water to make the volume 1 litre.
- Measure pH of broth, using pH meter and adjust pH to 7 by adding drops of either HCl or NaOH solution.
- Dispense 10 mL broth to each culture tube and put cotton plug to mouth of test tube.
- Tightly cover the mouth of cotton with aluminium foil or paper and tie with a rubber band.
- Transfer, all the broth into test tube and place them inside autoclave basket and sterilise at 121^0 C for 15 minutes.
- After sterilization, take out the broth tubes and store them in refrigerator for further use.

Figure 3: laminar air flow and nutrient media in Petri plates

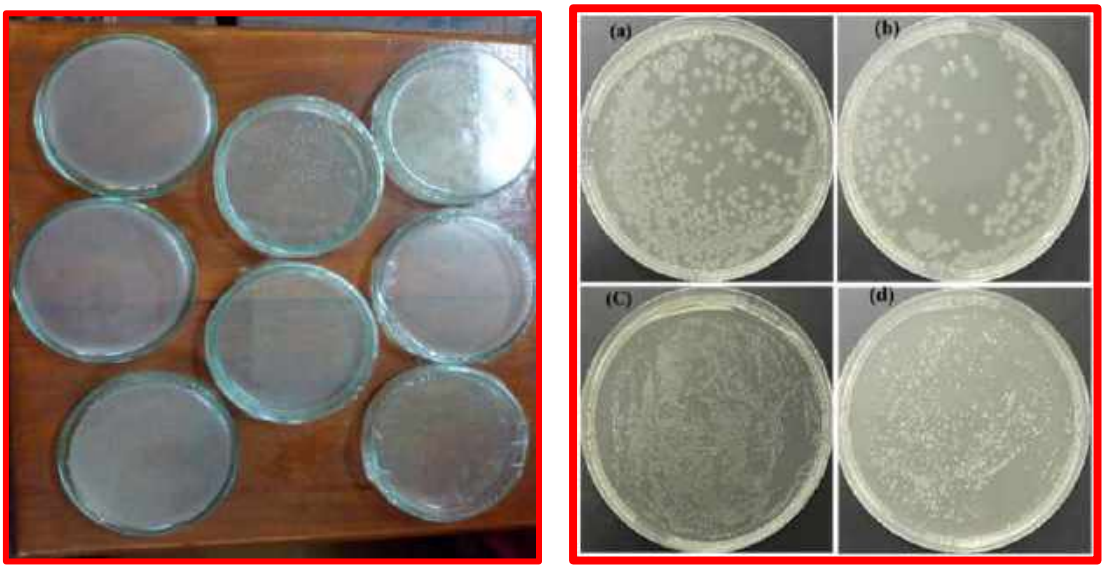
2. Extraction of turmeric sample

- The turmeric root was soaked in water and ground with mortar and pestle along with 5ml of distilled water. Then, the sample was centrifuged (3000 RPM, 10 min) and the supernatant obtained was used as an extract.
- The turmeric powder ground with 5mL of distilled water and centrifuged at 3000 RPM for 10 minutes and the supernatant was separated and used as extract and represented as µg/mL.

Figure 4: Curcumin extract

3. Preparation of *E. coli* inoculum

- Firstly, the nutrient medium was prepared using peptones, beef extract, distilled water. The pH is adjusted to 7.0.
- Then the bacterial strain was streaked over the nutrient medium and kept for incubation at 27^0 C for 24 hours the growth of the bacterial colony.



A **B**

Figure 05: A) Nutrient media in petri plates, streaked with bacterial strain.

B) Bacteria colony developed on nutrient media.

4. Paper disc method:

- The inoculums were spread uniformly in N-agar plates with the help of glass spreader or streaker and left for 5 minutes.
- Pre-sterilised paper discs were dipped into turmeric extract and placed in inoculated plates.
- The plates were incubated for 24 hours at 37^0 C and size of clear zone developed surrounding each disc.

Figure 6: Sterilised paper discs in beaker.

RESULTS AND DISCUSSION

Traditionally, herbs and spices are part of routine Indian food preparations as they make food appealing by providing better appearance, smell and taste. As mentioned in 'Atharva veda' these herbs and spices have healing, soothing and rejuvenating properties (Srinivasan, 2019).

(A) **(B)**

Figure 07: A) Student performing experiment under the supervision of guide.
B) Students performed experiment Infront of the laminar hood.

The turmeric possessed high activity against *E. coli* bacterial strain. This activity is due to the presence of curcuminoid, a phenolic compound. The antimicrobial property of turmeric has been attributed to the presence of the essential oil, an alkaloid, curcumin and other curcuminoids, turmeric oil, tumerol and veleric acid (Srinivasan *et al.*, 2004).

In the present study it was observed that the turmeric extract possessed significant antibacterial activity against *E. coli* bacteria. The turmeric extract was able to inhibit the growth

of the bacteria tested. It was indicated by an inhibition zone surrounding the paper disc containing the turmeric extract placed in the bacterial colony.

Figure 8: Petri plates showing inhibition zones surrounding the paper discs.

Considering the result, we got, it can be suggested that addition of herbs and spices to the food preparations helps to keep a check on the concentration of *E. coli* in the body. Turmeric used as most important food additive with antimicrobial activities in Indian recipes (Vinodhini *et al.*, 2019).

CONCLUSION

Turmeric is the golden spice and has been used for thousands of years as a medicinal herb to treat inflammation, bacterial infections and digestive issues. Curcumin is the main active ingredient in turmeric. It has powerful anti-inflammatory effects and is a very strong antioxidant. The present study states that the curcumin present in the turmeric, inhibits the growth of disease-causing bacteria. Bacteria is good for some processes, although it can result in ulcers, inflammation of the lining of the stomach, and an increased risk of stomach cancer.

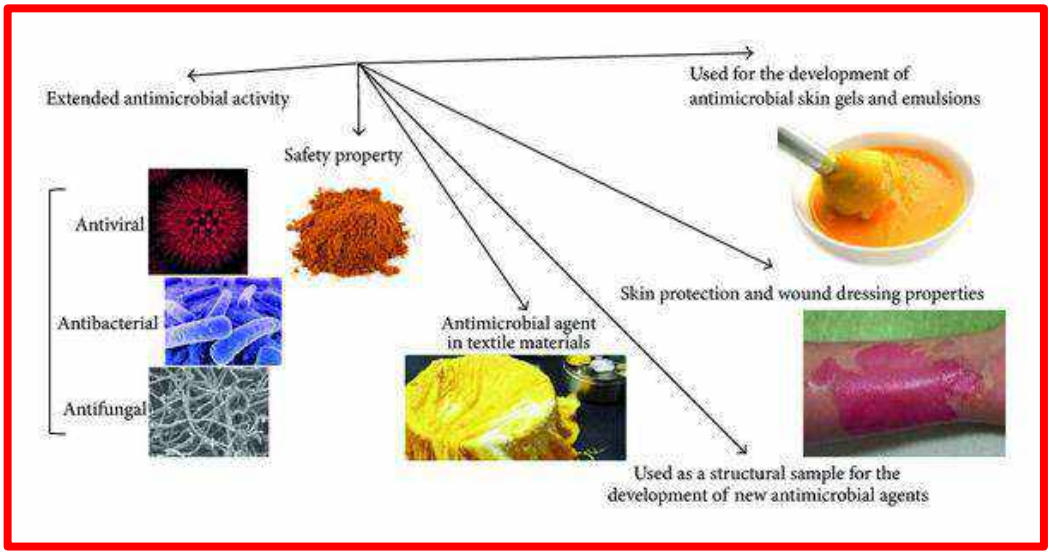


Figure 9: Application of turmeric.

"The bacteria hide under the gastric mucous layer where antibiotics do not penetrate effectively. This often leads to recurrent infections and gives rise to resistant strains," says Goycoolea, professor, the school of food science and nutrition in leeds in the UK. Curcumin is a natural anti-inflammatory compound. It helps our body to fight over foreign invaders and also has a role in repairing damage. Without inflammation, pathogens like bacteria could easily take over our body and may kill us. Hence this turmeric spice not only as a dye but also act as antibiotic material. It is strongly recommended in the skin related problems and anciently it was used for the wounds and now too it's continued. Turmeric is highly used by the women in their food items for colour and they apply to skin to enhance their beauty too. These all are possible only by knowing the antimicrobial activity of turmeric spice and its effect on the micro-organisms.

Figure 10: Turmeric powder.

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Department of Zoology (2019 – 20)

PROJECT WORK COMPLETION CERTIFICATE

This is to certify that following eight B.Sc Final year students have undertaken the project entitled Crop Damaging Insects in-partial fulfillment of the syllabus of Rani Channamma University, Belagavi during the year 2019-20. Following eight students have together successfully completed the said project under the guidance of Dr Sridevi I Puranik.

Sl. No	Gender	Name of the student	Fathers name	Roll Number	Exam Seat Number
1	Miss.	Akshata Upadhye	Ajit	145	S1715612
2	Miss.	Jasmin Tamboli	Rashid	149	S1715644
3	Miss.	Apurva Patil	Prakash	148	S1715621
4	Miss.	Pallavi Thoruse	Ashok	152	S1715682
5	Miss.	Akshata Mirje	Anil	146	S1715611
6	Miss.	Sakshi Mahshale	Sanjeev	214	S1715742
7	Miss.	Sonali Mali	Ganapati	186	S1715797
8	Miss.	Prachi Patil	Basavaraj	154	S1715692

Dr Sridevi I Puranik
PROJECT GUIDE

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ACKNOWLEDGMENT

We are very much thankful to the Principal, **Prof. U. R. Rajput** Sir for giving us kind permission for the farm visit to study crop damaging insects.

We extend our warm gratitude to the Head of the Dept. of Zoology, **Dr. N. R. Birsal** Sir for his support and encouragement for this project.

We are thankful to our guide **Prof. S. I. Puranik** madam for her excellent guidance. We are also thankful to our teaching staff for their support.

We thank all the group members and friends who worked together to make this project educative and informative.

INDEX

INTRODUCTION

As we know India is an Agriculture based country and the farmers are known as 'ANNADATAS' (The one who provides food) as all we depend on them directly or indirectly for food. Some of the farmers are totally depended on Agriculture for their livelihood (Clement, 2019).

Now-a-days, unfortunately our ANNADATA is suffering from many problems, which are affecting the crops and ultimately the yield and income of those farmers. These problems are mainly classified as Abiotic and Biotic.

Abiotic Problems

- Low precipitation
- Failure of proper irrigation methods
- Adverse climatic conditions
- Loss of soil fertility due to chemical fertilizers
- Improper agricultural practices, etc.

Biotic Problems

- Fungal infections.
- Bacterial infections.
- Viral infections.
- Pests.
- Rodents.
- Insects.

These biotic damagers mainly infect the green tender leaves, shoots, flowers and sometimes fruits for their survival i.e. for nutrition and shelter which ultimately results in the low yield sometime complete loss of crop.

Many types of insects have the potential to damage fruit and the vegetable crops. Various grasshoppers, weevils, beetles and small insect like trips and certain fly larvae can causes significant damage. Among the most common types of detrimental insects are the Lepidoptera (moths, butterflies) and the Homoptera (aphids, leafhoppers) (Douglas, 2018).

Damage caused by moth larvae often consists of ragged, chewed leaf edges or holes in leaves. Homopteran insects like aphids are often difficult to see without a magnifying lens but their

damage can be recognized by yellow speckles accompanied by a sticky film on leaf surfaces. Other insects cause various types of damage including defoliation, stem and fruit tunneling.

When investigating insect damage look for weak or stunted plants with damaged leaves or fruit. Check the base of plant near the ground and check the undersides of the leaves for insects and insects' eggs. Often the best time to spot insects in the process of feeding is at dusk, or in the early morning. Many insects are beneficial either for crop pollination or as predators of nuisance insects. Never use pesticides on an insect you cannot identify, and only use pesticide labeled for that particular insects (James, 2019).

Insect and disease complexes pest and disease problems in plants are often the result of more than one cause. These are called as 'Complexes'. For example, Aphids and leafhoppers often spread various plant diseases in the process of feeding. Or weak plants in nutrient deficient soils are sometime more susceptible to attack by various diseases and insects. In such cases it is not enough to simply treat a crop with a pesticide or fungicide (Kross *et al.,* 2019). Instead all causes of the complex should be addressed

Many insects and disease problems are preventable by maintaining proper crop health. It includes,

- Crop rotation
- Quarantine methods
- Disease resisting crop varieties
- Maintaining of proper soil nutrients
- Proper irrigation techniques
- Practice sanitation.

Information on specific insect and disease problems of some common crops can be found in the "Diagnostic Key Section". While the insects and diseases featured in the Diagnostic Key are by no means the only ones in Minnesota (Li *et al.,* 2020).

In this project, we are mainly dealing with some of the crop damaging insects, their effects on plants, their control measures and integrated pest (insect) management.

Black cutworm

Classification

Kingdom	Animalia
Phylum	Arthropoda
Class	Insecta
Order	Lepidoptera
Family	Nocetuidae
Genus	Agrotis
Species	ypsilon

Black cutworms are most often found in corn and cotton, yet it can cause problems in wheat, tobacco and some vegetable crops. Even though severe infestations rarely occur, Black cutworms should be on farmer's list of corn insects' pests to monitor.

Insect Black cutworm larvae spend the day just beneath the soil surface, feeding on corn and cotton seedlings, which then likely wilt and die. When soil moisture is adequate, the larvae climb to just above the soil surface at night to feed cut off the young plants at the base. Although plant loss in infested corn fields can range from 10% to 80%, a complete field loss is unlikely. Severe Black cutworm damage usually only occurs in patches within a field (Miller *et al.*, 2019).

Scouting

Being scouting for black cutworms soon after crop emergence. Look just below the soil surface where black cutworms can chew into seedling and pull it under a soil clod or a hole to feed on it. Pay extra attention to late planted fields and those with early season weeds.

Identification

Black cutworms are a common corn pest throughout the corn Belt and in the South. The black cutworm's species ranges from light grey to black in color, and larvae are 1-1/2 inches long when fully grown.

More than 45 days are required for eggs to develop into a larvae and adult moths after the pupal stage, adult moths emerge and lay eggs on surrounding weeds, patches of grass and crop residue.

Life Cycle

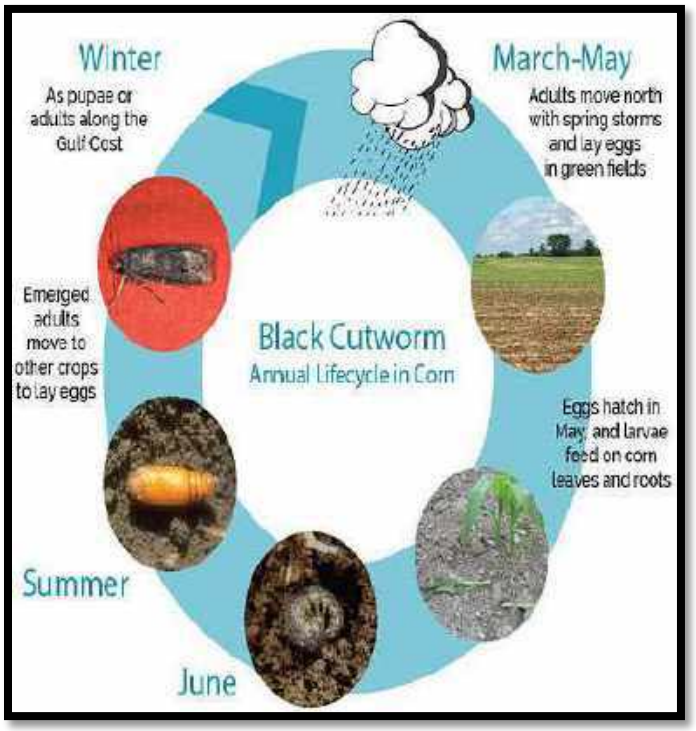


Figure 1. Life cycle of Black cutworm (Du Point Pioneer)

Best Management practices to control Black cutworm

In no-till or limited-till situations, Black cutworms may become established in the soil, overwinter and feed on newly planted seedlings. Because a wide variety of vegetation-including redroot pigweed and other weeds are hosts for black cutworm, remove existing crop residue through tillage, a burn down herbicide and residual pre plant herbicides taking out.

Taking out existing vegetation prior to planting will also provide better penetration 0f insecticide spray or granules. Season –long weed control helps prevent black cutworms from causing crop damage and harming yields and will help improve effectiveness of in – season insecticide treatment

The best approach to managing black cutworms in corn in prevention.

Aphis craccivora

Classification

Kingdom	Animalia
Phylum	Arthropoda
Class	Insecta
Order	Hemiptera
Family	Aphididae
Genus	Aphis
Species	craccivora

Aphis craccivora, variously known as the cowpea aphid, groundnut aphid or black legume aphid, is the true bug in the family aphididae. Originally of probable palearctic origin, it is now an invasive species of cosmopolitan distribution.

Aphis craccivoraia a small species of aphid. The female has a glossy black or dark brown body with prominent cauda (tail-like protrusion), and legs in some shade of brown or yellow. The antennae have six segments and there and the limb segments, cauda and cornicles are pale proximally (close to the body) and dark distally (further from the body). The adults do not have wax on their dorsal surface but the nymphs are lightly dusted with wax. Winged females are upto 2.2mm (0.1in) long and have cross-barring on the abdomen. Wingless females are a little smaller.

Life cycle

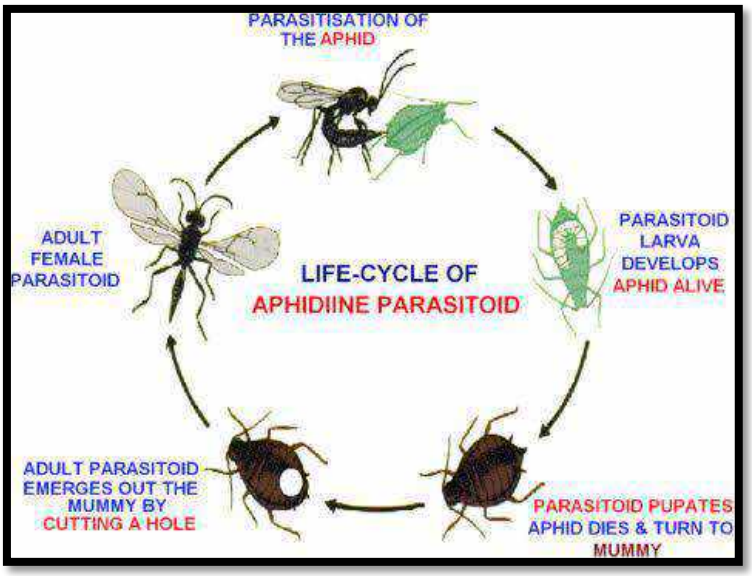


Figure2. Life cycle of Aphis craccivora (Source:ScienceDirect.com)

In the former USSR, Aphiscraccivora overwinters as eggs, often at the base of young alfalfa plants, but is also reported to overwinter on Acacia, camelthorn and perennial weeds. The eggs hatch in early spring and the first larvae are known as fundtrix (stem mothers) and feed at first on alfalfa. These aphids are all female and reproduce by parthenogenesis, producing nymphs which moult four times over the course of eight to twelve days. By and of April, winged females have migrated to other host plants, often Acacia, and later to cotton, on which crop this pest does much damage. It may move back to alfalfa later in the year in delarus, lupine is an important host plant and in Ukraine, Acacia is most affected. A female aphid lives for 9 to 25 days and can produce from 25 to 125 young during its life. There may bi up to Twenty generations in the year.

BY November winged forms have developed and eggs are laid before winter sets in. In warmer climates, parthenogenetic reproduction takes place throughout the year. The winged male insects are seldom encountered but have been observed in Germany, India and Argentina. The aphids tend to concentrate on the growing tips of plants, Young leaves, shoots, flowers and developing seed pods. They are often tended by ants which feed on the secretions they produce and deter predatros. Natural enemies include parasitic wasps, ladybirds, lacewing larvae and hoverfly larvae.

Control measures

Aphis craccivora Koch, is an important pest of cowpea Vigna unguiculata (L. Walp.) in most tropical regions where cowpea is grown. We used life table and population parameters of the cowpea aphids reared on five cowpea varieties to assess the degree of host plant resistance. The five varieties were Blackeye, B005-C, INIA-37, IT835-720-20 and TVX3671-14C-OID. The parameters measured were fecundity, survival, intrinsic rate of natural increase, pre-reproductive period and relative growth rate of cowpea aphids. Our hypothesis was that cowpea varieties resistant to *A. craccivora* would have significant effects on life table parameters of the aphid when compared to a susceptible variety. Mean fecundity, age-specific fecundity, and survival rates, intrinsic rate of natural increase (r m), pre-reproductive period and relative growth rate differed significantly among varieties (Sharma *et al.*, 2017). Fecundity, survival, intrinsic rate of natural increase and mean relative growth rate were significantly lower on variety IT835-720-20 compared to susceptible variety Blackeye. The pre-reproductive period was significantly delayed on variety IT835-720-20 compared to other varieties. The adverse effects of variety IT835-720-20 on life table parameters of *A. craccivora* indicate the presence of host plant resistance. Prolonged pre-reproductive period and reduction in reproductive performance of *A. craccivora* on variety IT835-720-20 may suggest that antibiosis is the modality of resistance. However, further detailed studies that include determination of biochemical and morphological characteristics that mediate resistance need to be carried out. IT835-720-20 is, therefore, a promising variety with useful genetic resource for cowpea breeding programs aimed at developing resistant varieties against A. craccivora.

Pyrilla perpusilla

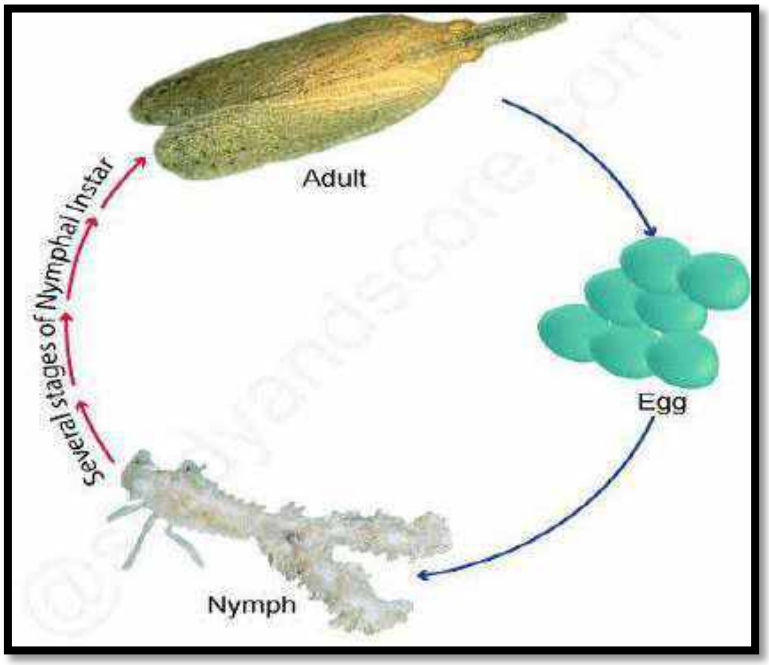
Classification

Kingdom	Animalia
Phylum	Arthropoda
Order	Hemiptera
Family	Fulgoridae
Genus	Pyrilla
Species	Perpusilla

Major host is sugarcane but it also attacks on wheat maze sorghum Bajra etc.

Life cycle

Life cycle consists of egg nymph and adult. Female lays about 300 to 500 eggs in clusters on the lower surface of leavesEgg hatch into nymphs after 7 to 22 days, creamy white in color bearing anal filaments. They suck the cells sap of leaves and moult 5 times in 6 to 8 weeks after moulting, nymphs' transfers into adults



Control Measures

1. Ratoon crops should be avoided since they may have infestation

2. Spraying of 0.25% endosufano or 0.25% fenitrothion, 0.12% to .025% of wetable powder of agrocide are used to kill the pest

3. Mixture of 0.25ltr to 035ltr of endrine of BHC and 10 ltr of kerosene oil is spread on the infected crop

4. Sugarcane stubble should be removed after harvesting the crops. It helps in killing the hibernating larvae.

PEST MANAGEMENT

1. **Insecticides**

- They are substances which kill and repel insects. Dried leaves of Margosa are added to drive away insects from store grains and clothes. Crushed leaves of Boeninghausenia albifora are used for protection against fleas and mosquitoes. Pyrethrum and nicotine are two natural insecticides which were in use before 1940. Afterwards four types of synthetic insecticides were discovered. They are organophosphates, carbamates and pyrethroids.

- Most of insecticides acts on nervous system or enzymes connected with transmission of impulses from one nerve to another or nerve to muscles. A few are also respiratory poisons (Soni *et al.*, 2019).
- Synthetic insecticides- A large number of synthetic insecticides are under use. They belong to different chemical groups. Major synthetic insecticides are divided into six groups organochlorines, organophosphates, carbamateas, pyrethroids, triazines and auxins derivatives.
- **Organochlorines:**
  - ✓ They are organic compounds or hydrocarbons to which are added several atoms of chlorines through the process called chlorination.
  - ✓ Common organochlorines are DDT, BHC, DDE, endosulphan, aldrine ect.
  - ✓ Aldrine is added to building foundations to prevent attack of termites.
  - ✓ Dieldrin is 5 times more potent than DDT.
  - ✓ Endrin is the most toxic of all the organochlorines.
- **Organophosphates:**
  - ✓ They are organic esters of phosphoric acid, and its derivatives.
  - ✓ The important organophosphates used as pesticides includes malathion, parathion, triothion, ethion, tetraethyl pyrophosphates and fenithrotion**.**
- **Carbamates**:
  - ✓ The pesticides are organic esters of hypothetical compounds, cabonic acids.
  - ✓ Being poisonous, they influence workers handling them.
  - ✓ Common carbamates used as insecticides are carbaryl, carbofuran, aldicarb, propoxur.
- **Pyrethroids**:
  - ✓ Pyrethrum is the safest insecticide.
  - ✓ Its synthetic derivatives are termed as Pyrethroids.
  - ✓ They are equally safe, quick acting and broad spectrum.
  - ✓ They are costlier; therefore, they are not much used in India.

2. **Bioinsecticides**

These are organisms or their products which are used to kill or repel the specific insects. They are of different types via Predators, Parasites and pathogens, sterile male, insect hormones and natural insecticides (Srinivasan *et al.*, 2019).

- **Predators:**

  These are specific natural organisms that are introduced to control plant pests without harming useful insects. Lady bug and praying mantis can control scale insects or aphids of vegetables, cotton and apple.

- **Parasites**:

  These are organisms that feed on other living organisms without devouring them.

- **Parasitoid:**

  These are the organisms that live a parasitic life in younger stages (egg and larva) but lead a free life later on.

- **Pathogens:**

  These are disease producing microorganisms. Egg parasitoids of *Trichogramma* are able to control a number of pests of cotton, sugarcane and pulses**.** Sporeine developed in Germany is the first commercial bio insecticide obtained from *Bacillus thuringiensis.*

Natural insecticides are insecticides and related pesticides which are obtained from microbes and plants, some examples are as follows

a. Azadirachtin: obtained from neem.
b. Rotenones: obtained from roots of *Derris elliptica* and *Lonchocarpus nicou*
c. Squill: obtained from red Squill
d. Nicotine: obtained from *Nicotina* species.
e. Pyrethrum: it is obtained from inflorescence of *Chrysanthemum cinerarifolium, C. coccineum, C. Marshallii*
f. Thuriocide: is a toxin produced by *B. thuringiesnsis.*

Different types of hormones used for controlling pests, like

a. Juvenile hormone: doesn't allow insect to reach the maturity.
b. Pheromone: Biochemicals used to disrupt mating behavour of insects.
c. Moulting hormone: it causes premature moulting of larvae resulting in death.

CONCLUSION

It was a wonderful experience to study about 'Crop Damaging Insects' there because in class rooms, we can only imagine. Going for this project, we were able to know about different types of crop damaging insects. It is a great combination of theoretical and practical knowledge with live examples in agricultural fields. It helped us to understand and grasp the concepts clearly and extend our thinking capacity and knowledge.

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PROJECT WORK COMPLETION CERTIFICATE

This is to certify that following six B.Sc Final year students have undertaken the project entitled **Production of selected biofertilizers** in-partial fulfillment of the syllabus of Rani Channamma University, Belagavi during the year 2019-20. Following six students have together successfully completed the said project under the guidance of Dr Sridevi I Puranik.

Sl. No	Gender	Name of the student	Fathers name	Roll Number	Exam Seat Number
1	Miss.	Chaitra Mathapati	Appayya	165	S1715635
2	Miss.	Rakshata Kamate	Vilas	177	S1715719
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INDEX

INTRODUCTION

In past 50 years history, the chemical pesticides and fertilizers have played a crucial role in busting the agricultural production, however they have a short history in modern agriculture. Their immediate action and low cost managed to bring them rapidly into the center of attention. Their toxic effects on environment, plant, animal and human life diverted the focus on ecofriendly plant protection. Moreover, the development of resistance in insects against common pesticides has not been solved yet.

Indiscriminate use of chemical pesticides contributed in loss of soil productivity along with addition of salts to the soil. To revive the soil health and living on alternate source has become essential concept of bio-fertilizer come forward, which can be a good supplement for a chemical fertilizer. Bio-fertilizers are nutrient availability systems in which biological process are involved.

The term biofertilizers includes selective microorganisms like bacteria, fungi and algae. Which are capable of fixing atmospheric nitrogen or convert soluble phosphate and potash in the soil into forms available to the plants. Biofertilizers is a cost effective, eco-friendly and renewable source of land nutrient they play a vital role in maintaining long term soil fertility and sustain ability.

The biofertilizer with nitrogen fixer and phosphate solubilizer fixes 20-40 Kg of nitrogen per acre. The biofertilizer maintain the soil fertility cost by using in the yield is assured with biofertilizer and continuous use of biofertilizer makes the soil very fertile for good yield. The biofertilizer can be manufacture in soil form or in liquid form for spraying on the plants.

Biofertilizer is a need of modern agriculture since demand for safe and residue free food is increasing. Therefore, to cater the need, it is necessary to promote the efforts for production of biofertilizers in the state in private sector to encourage the entrepreneurs.

The role of essential macronutrients such as nitrogen, phosphorus potassium and other secondary elements is well known for increasing the productivity of land.

Population explosion has escalated the fresher on higher productivity per unit of land. Modern agriculture emphasized using hybrid seeds. High yielding verities that are highly responsive to large doses of chemical fertilizers and irrigation. This has resulted in soil being deprived of

essential plant nutrients and nourishing organic matter that had always been available to plant when natural forming was being practiced historically.

Chemical fertilizers which are now being used extensively since the green revolution have depleted soil health by making the soil ecology non inhabitable for soil micro flora and micro fauna which are largely responsible for maintaining soil fertility and providing some essential and indispensable nutrients to plant. It has now become an imperative to restore the soil with a beneficial microbe population by using biofertilizers.

Biofertilizers contain live cells of specific isolated strains of bacteria and fungi which is formulated in suitable carriers. These microbes, upon application to soil under suitable conditions secret metabolites and enzymes which make the deficient element available to the plant in an assumable form. Nitrogen fixing bacteria fixes atmospheric nitrogen in soil while phospho bacteria solublizes insoluble fixed phophrous in soil, potassium mobilizing bacteria mobilizes the immobile potassium in soil and similarly other microbes mobilize/solublise the element in soil and make it available to the plant. VAM infected roots penetrate the soil effectively and make relatively unavailable elements such as phosphorous,copper and zinc available to the plant. These beneficial microorganisms work incognito to maintain the ecological balance by active participation in carbon nitrogen, Sulphur and phosphorus cycles in nature.

The current status of bio-fertilizer in India

The fertilizer consumption varies from 130, 125, 60 and 70 kg/ hectare (NPK) for north, south, west and east respectively making for a national average of approx. 90 kg per hectare. Some states like Punjab are using more than 167 kg nutrients per Hectare. Even the full potential of available technologies is not fully utilized due to the fact that nutrient input doesn't match the needs of crop and soil. In case of biofertilizers the production and the supply of microbial cultures, the quality of the culture and the lack of publicity are affecting the popularity as nutrient sources. The government has no control over manufacture of biofertilizers for any of the state of India. Only a few entrepreneurs possess ISI mark for their products and Most of the products are of substandard quality. Due to these laxities on a part of govt. the farmers confused about their rates, availability and expiry dates. The necessary action by govt. and its policies will certainly go to a long way in the further development of biofertilizers**.**

Biofertilizer production at Biocenter Belagavi

1. Nitrogen fixing bacteria
2. Phosphorus solublising bacteria

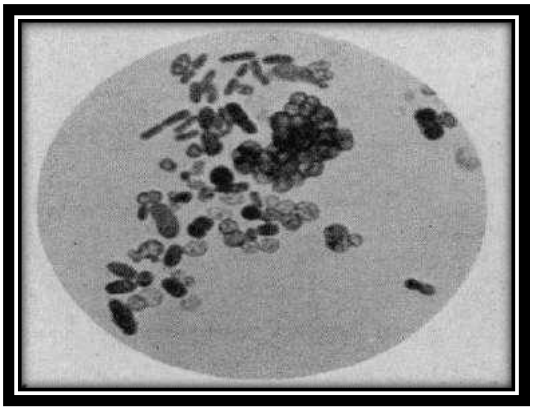
3. Potassium mobilizing bacteria
4. Ferrous mobilizing bacteria
5. Zinc mobilizing bacteria
6. Sulphur mobilizing bacteria
7. Mangnees solublising microbe
8. Vesicular arbuscular mycorrhizae (VAM)

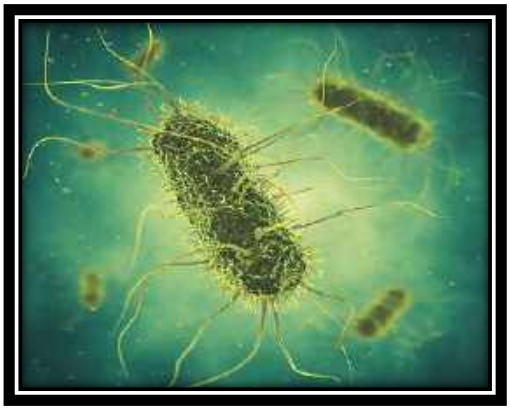
Biofertilizers are a suitable supplement to chemical fertilizers to meet the integrated nutrients demand of the crops. Application of biofertilizers result in increased mineral and water uptake, root development, vegetative growth and yield of good quality. They are ecofriendly, nontoxic, easy to use, economical biosolutions that improve soil health and crop productivity

Based on the type of microorganisms, the biofertilizers can be classified as

1) Bacterial biofertilizers: e.g. Rhizobium, Azospirillum, Azotobacter, Phosphobacteria
2) Fungal biofertilizers: e.g. Mycorhhiza.
3) Algal biofertilizers: e.g. Blue green algae and Azolla
4) Actinomycete biofertilizers: e.g. Frankia

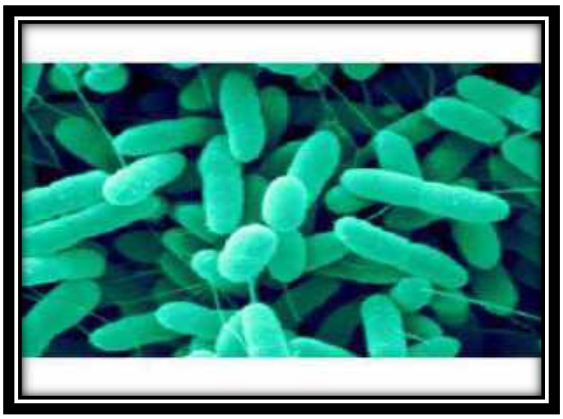
Azotobacter

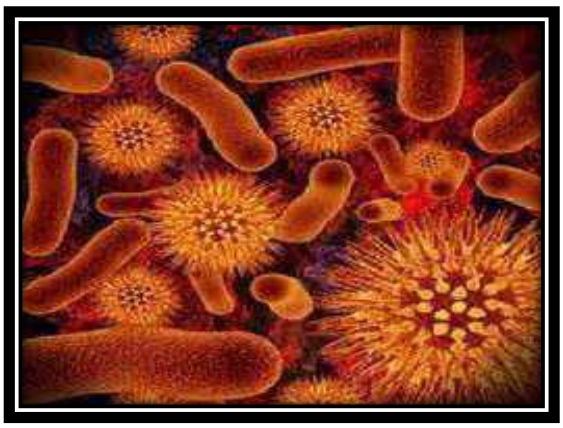




Azotobacter is one of the most important non-symbiotic N-fixing microorganisms present in neutral or alkaline soils and Azotobacter chorococcum is the most commonly occurring species in aerable soils. Apart from its ability to fix atmospheric nitrogen, Azotobacter is also known to synthesis biologically active growth promoting substances such as Indole Acetic Acid (IAA), Gibberellins and B-vitamins in culture media. The strains of Azotobacter also have fungistic properties against plant pathogens such as Fusarium,Alternaria and Helminthosporium. It produces growth promoting substances which improve seed germination and growth of extended root system. It produces polysaccharides which improve soil aggregation. Azotobacter suppresses the growth of saprophytic and pathogenic microorganisms near the root system of crop plants morphology.

Azospirillum



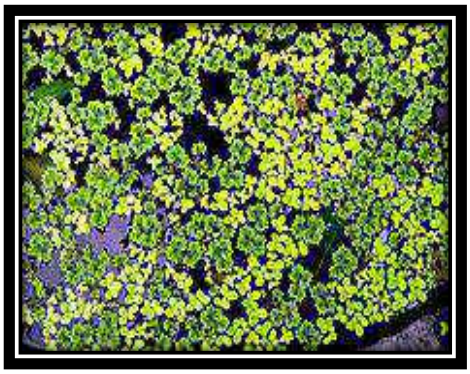


It is a common inhabitant of tropics. There are four major species of Azospirillum: a. lipoferum, b. brasilense, c. amazonense and d. seropedicae. Among these physiological types occurring within the genus Azospirillum viz., a.lipoferum and b. brasilense, one group has an oxidative metabolism and the other has the ability to ferment certain sugars by producing acid. Azospirillum form associative symbiosis with many plants particularly with those having the C_4 – dicarboxylic pathway of photosynthesis.

Azospirillum are chemo heterotrophic in nature which secrete growth regulatory substances. The use of Azzospirillum inoculants significantly increases the growth, chlorophyll contents and mycorrhizal infection in roots of plants which results in increased mineral and water uptake, root development, vegetable growth and crop yield. The optimum temperature for azospirillum growth is 32-35^{0}C. It contains associative nitrogenfixing bacteria. These nitrogen fixing organisms are free living; they live association with the root system of crop plants and helps in fixing nitrogen, through reduction of Atmospheric nitrogen to ammonia.

Azolla

Azolla is an aquatic fern (pteridophyte), floating on water surface of flooded rice fields, small ponds, and canals. The nitrogen-fixing capability of Azolla has led to Azolla being widely used as a biofertiliser, its size is 1-5 cm exept for a giant A.nilotica, generally it multiplies vegetatively, and often sexually. Seven extant Azolla species are recognized, and their distribution varies widely from temperature to tropical regions. A. niliotica, A. pinnata, A. filiculoides, A. rubra, A. cristata, A. Japonica and A. imbricate.



Azolla is useful as a "soya bean plant in rice field", because it can assimilate atmospheric nitrogen gas owing to the nitrogen fixation fixation by cyanobacteria (blue green algae) living in the cavities located at the lower side of upper (dorsal) lobes of leaf. Cyanobacteria are single or multi cell photosynthetic organisms. They are often called "algae", but belong to "bacteria". Most of them can assimilate atmospheric nitrogen under reduced oxygen pressure. This reaction is called Nitrogen fixation. Some can do nitrogen fixation under ordinary oxygen pressure and most of them have large cells, called Heterocyst specialized for nitrogen fixation.

Azolla can, therefore, grow on the water deficient nitrogen compounds, and is high in nitrogen and protein. It fixes nitrogen as high as 3-5 kg N per ha per day under the optimum condition. Azolla multiplies at the daily mean temperature of 15-30^{0}C. Optimum temperature is about 25^{0}C.

Tricoderma viridae

Trichoderma viridae is an antagonistic filamentous fungus that is widely distributed in soil, plant material, decaying vegetation, wood which is highly effective for the control of seed and soil born diseases of majority of economically important crops especially vegetables, plantation crops, species, fruit crops, pulses and oil seeds, this bio-control agent when applied along with seed, colonizes the seed and multiplies on the surface of the seed and kills not only the pathogens present on the surface of the seed but also gives protection against soil-borne pathogens until life time of crop by action of mycoparasitism and antibiosis. Seed treatment with *Trichoderma viridae* has registered higher germination in a number of agriculture and horticulture crops

Its effective control pf soil-borne diseases caused by *Rhizoctonia solani*, *Macrophomina phseolina* and Fusarium species makes it very important weapon against disease such as root rot, seedling disease, charcoal rot, wilt, damping off, collar root, etc., *Triochoderma viridae* is a potent biocontrol agent and used extensively for control of soil born diseases. Used in damping off caused by Pythium sp., Phytophtora sp., root rot caused by pellicularis filamentosa, Seedling blight caused by Pythium, Collar rot caused by Pellicularia rolfsii, Dry rot and Charcol rot caused by Macrophomina phaseoli, Loose smut caused by Ustilago segetum, Black scurf caused by *Rhizoctonia solani*, phytophtora foot rot in black pepper. Effective against silver leaf on plum, peach and nectarine, Botrytis caused by botrytis cineria, Effective against rots on a wide range of crops, caused by fusarium, Rhizoctonia, and pythium, and sclerotium forming pathogens such as Sclerotinia & Sclerotium. Apart from this also successfully in controlling damping off in cardamom and tomato, Fruit rot and leaf blight in Capsicum and Chili, Rhizome rot / soft rot in ginger, seedling disease of cotton, root rot pf soybean, root rot of Cowpea, charcoal rot sorghum and root rot of mung bean caused by *Macrophomina phaseolina*.

Materials required

• Rice/Wheat/ Sorghum/ Maize
• Mother Culture (may be procured from CIPMCs or State biocontrol laboratory)
• 8" x 12 " plastic bag
• Cotton
• Rubber band

• Plastic pipe of 1 ½ inch length and 1 1/2 cm - 2 cm diameter having both side open (or even a bamboo of same size and diameter, can be used removing the internodes)
• Pressure cooker of 5 Lts. or above
• Heating system (gas/electric heater)
• Stone/wood
• Fresh Water
• Candle
• Spoon

Protocol of production

a. Mass production of Biofertilizers

- Media preparation and starter culture

  Bacteria require different nutrients for their growth. These include:

  a) Organic carbon source,
  b) nitrogen source and
  c) A variety of other elements dissolved in water.

Blue green algae that can fix atmospheric carbon dioxide, does not require any carbon source and the nitrogen fixing bacteria, which can fix atmospheric nitrogen, do not require any nitrogen source. A medium is an aquatic solution of a variety of organic and inorganic compounds that can supplement the above requirements for the growth of different microorganisms. Generally, media are of two types: a) general media and b) specific media. General media is constituted for the growth of most of the organisms. Such a media contains all the ingredients required for the growth of any microorganisms. Such a media contains all the ingredients required for the growth of any microorganism. A specific medium is constituted for the growth of specific group of microorganisms again, according to the physical appearance, media are of two types: a) liquid media and b) solid media. The liquid medium is solidified by the addition of solidifying agent – agar-agar. Liquid medium can harbor bacterial growth suspended in the media, whereas solid medium harbors microbial growth on the surface. Solid media may be prepared as slant or plate.

b. Sterilization pf medium in autoclave

The media is the autoclaved at 121^0C temperature and 15LB pressure. The process is as follows.

1. Check the water level of the autoclave to note whether the heating coil is completely immersed in water, add water, if necessary.
2. Put the conical flasks, petridishes and the beaker with test tubes inside the basket of the autoclave.
3. Set the lid, tie the screws of the autoclave and switch on the power supply.
4. Keep the outlet of the steam open and wait until the inside air is completely released from the autoclave and only steam is coming out.

5. When the inside air is completely released close the outlet and observe the meter indicating the inside pressure.
6. When the pressure rises to 15lbs, adjust the regulating valve to keep the pressure constant.
7. Keep this pressure for 30 min and then close the regulating valve and switch off the power supply
8. When the pressure comes down to zero. Open the regulatory valve to release the steam and then open the lid and take out the contents.

c. Prepare slants and Plates

The slants are necessary for culture storage. The slant preparation process is as follows

1. Put the test tubes containing medium in slanting position on the table with the help of a wooden blade and allow cooling down. The medium will be solid after cooling down thus slant are prepared.
2. Take the conical flask containing molten media with agar-agar and the petridish in the laminar flow cabinet and the allow the medium to cool down to 50c.
3. Open each petridish by slightly lifting the upper lid, pour 15-20 ml of medium and close the lid.
4. Keep to cool down and solidify and thus plates are prepared.

d. Preparation of starter culture:

The starter culture is a little amount of bacterial suspension, which is added to medium to start the growth of that bacterium, twin flask is a pair of flasks of identical size joined together by a latex tube, for the preparation of starter culture, this type of flask is used. Each flask contains a side arm below the neck position. The latex tube joining the two flasks is held together by this glass tube. The benefit of the use of the twin flask is the contamination can be avoided.

e. Fermentation:

A fermenter is a device in which the optimum conditions for the microbial growth and activity is established artificially. This device is used for the production of microbial metabolites such as antibiotics or enzymes: it may also be used for the growth of microorganisms i.e. production of microorganism itself.

A low-cost production unit has been developed for the production of microbial inoculants to be used as biofertilizers such as Rhizobium, Azobacter, and phosphate solublizing bacteria. This device can be prepared by investing small amount of money as compared to the scientific fermenter used in laboratories for research purposes**.**

Sterilization of the fermenter:

Fermenter is a metallic vessel for moist sterilization of any article. The principle of moist sterilization lies in the fact that when water is boiled in a closed system. The water vapor produced due to boiling accumulates within the vessel and increases the inside pressure. Thus, the boiling point of increases beyond 100◦c, which is boiling point of water in normal

atmospheric pressure. In this condition, the steam, released from the boiling water is of higher temperature. If any article placed in this vessel in such condition, the high temperature destroys the microorganisms present in or on the article.

f. Inoculation, Growth, Quality Testing and Termination of Growth

Inoculation means addition of starter culture to the medium in the fermenter. For the production of microbial biofertilizers a small amount of suspension of the desired bacterium in pure form is inoculated to the medium. Care should be taken to maintain the quality of starter culture, as extent of purity (no contaminants should be allowed), size of the starter culture (in terms of culture volume and density of cell) and stage growth. Greater the size of starter culture, lesser the chance of contamination. If the starter culture is inoculated in its log phase, rapid initial growth will occur. Maintenance of proper physical and chemical environment inside the fermenter is essential for proper growth of microorganism. Quality testing, in this case, is enumeration of cell density and its purity broth. When the cell density reaches the desired level, growth is terminated and the culture ready for mixing with carrier. The time period required for optimum cell density is thus standardized.

g. Carrier Preparation:

Carrier is a medium, which can carry the microorganisms in sufficient quantities and keep them viable under specified conditions and easy to supply to the farmers a good carrier should have the following qualities:

- Highly absorptive (water holding capacity) and easy to process.
- Non-toxic to microorganisms
- Easy to sterilize
- Available in adequate amount and low cost
- Provide good adhesion to seed.
- Has good buffering capacity.

Different carriers are available in the market like, charcoal, peat, lignite, rice husk etc. but considering all the above qualities Azolla powder in the most suitable carrier in this region. This is due to

1. It has high water holding capacity (360%)
2. It has good pH buffering capacity.
3. It contains nutrient so bacteria can remain viable for long period.
4. It is easily available in this region.

h. Formulation:

Inoculation of the carrier with the culture broth means the mixing of broth and carrier. This operation must be done in aseptic conditions to avoid any contamination.

i. Quality control of formulation:

The quality of the carrier- based inoculums depends upon the viable cell count and the presence or absence of contaminants. A good culture must contain about 10^7-10^8 viable cells or CFUs pre g of culture. No contaminants are permissible at 10^{-5} – 10^{-6} dilutions. These critical values differ according to the type of biofertilizer. As per I.S.I. in case of Rhizobium, the carrier-based culture must contain at least 10^7 cell or CFUs per g of culture and no contaminants are possible below 10^{-6} dilution. In case of Azobacter, so the enumeration of cells density and contaminants are important task in the production of carrier based microbial biofertilizer.

Bioactivity of Azobacter:

Nitrigenase is the enzyme catalyzing the reduction of nitrogen into ammonia. This enzyme can also reduce acetylene into ethylene as well. Acetylene and ethylene can easily be measured by a gas chromatography. In a closed system, if a portion of gas is substituted by acetylene and acetylene is allowed to be reduced for a certain period, the portion of acetylene and ethylene can be measured by passing the mixture of gas through the column of gas chromatograph and measuring the peak developed.

The nitrogenase activity (hence, the nitrogen fixation activity) of Azotobacter or other free-living bacteria can be extrapolated by Acetylene Reduction Assay (ARA) method, but this technique cannot be applied in case of Rhizobium as this bacterium cannot fix Nitrogen in free condition. In this case the plant containing the nodules is to be taken for assay.

Methodology

Take 200g of Rice/Wheat/Jower/Maize in the poly pack and add 200 ml of fresh water in the pack (if grains contain dust then wash it twice before adding fresh water). Place the plastic pipe/Bamboo in the middle of the plastic pack (opening end) ins such a way that level of the pipe and plastic remain equal. Tie if with the help of rubber band. Plug the opening end of the pipe tightly with the help of the cotton. Cover the cotton plug with a paper using rubber band. Place the thick paper inside the pressure cooker surrounding the cooker wall. Place the stone/wood in the cooker and add water into the cooker just below the stone/wood. Place the plastic pack inside the cooker and put it on heating system. Wait until 3 times gas release from the cooker (3 whistles). Remove the packet from the cooker until totally cool down.

Inoculation method

Place a candle at the corner of the room and wait for 3-4 min. Wash hand and the spoon with Dettol. Open the paper cover from the plastic pack. Take mother culture (Talc based) by using opposite end of the spoon and pour it in to the plastic pack, removing cotton plug in front of candle. Plug it again and keep the plastic pack in room temperature for 10-12 days. The entire grain-based medium will turn green due to sporulation of Trichoderma

Precautions

- Do not open the cotton plug until use.

- Keep it in a cold place (Refrigirator preferably after sporulation)
- Avoid direct sunlight until use

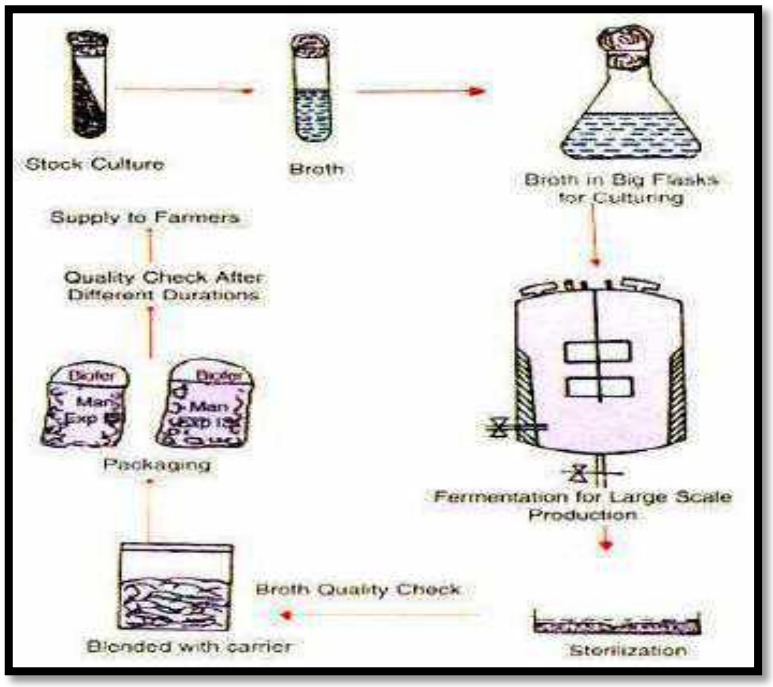


Figure1. Commercial production of Bio-fertilizer

Benefits of using bio-fertilizers

1. Increasing harvest yields

2. An average increase in crop yields by 20 to 37 percent.

3. Algae-based fertilizers give improved yields in rice at rates ranging between 10 and 45 %.

4. Improving soil structure

5. The use of microbial bio-fertilizers improves the soil structure by influencing the aggregation of the soil particles

6. Better water relation

Arbuscular mycorrhizal colonization induces drought tolerance in plants by:

✓ Improving leaf water and turgor potential,

✓ Maintaining stomata functioning and transpiration,

✓ Increasing root length and development.

7. Lowering production costs

8. Made from easily obtained organic materials such as rice husks, soil, bamboo and vegetables etc.

9. Reduce the input expenses by replacing the cost of chemical fertilizers.

1 0. Providing protection against drought and some soil-borne diseases v

Aquatic cyanobacteria provide natural growth hormones, proteins, vitamins and minerals to the soil.

Azotobacter infuse the soil with antibiotic pesticide and inhibit the spread of soil-borne pathogens like Pythium and Phytophthora.

11. Suppressing the incidence of insect pests and plant diseases Biofertilizers strengthen the soil profile, leave water sources untainted and improve plant growth without detrimental side effects.

Advantages

We can list the basic advantages of using biofertilizers:

- They help to achieve high yields of crops by enriching the soil with nutrients and useful microorganisms necessary for plant growth.
- They replace the chemical fertilizers, as the latter are not beneficial for plants. Chemical fertilizers decrease the plant growth and pollute the environment by releasing harmful chemicals.
- Plant growth can be increased because biofertilizers contain natural components which do not harm the plants but do the opposite.
- They are eco-friendly due to the fact that they protect the environment against pollutants.
- If the soil is free of chemicals, it will retain its fertility, which will be beneficial for the plants as well as the environment, because the plants will be protected against diseases and the environment will be free of pollutants.
- Biofertilizers destroy those harmful components from the soil which cause diseases in plants. By using biofertilizers, plants can also be protected against drought and other restrictive conditions.
- Biofertilizers are cost effective. They are not costly and even low-income farmers can make use of them.

Effects

- Gives much lower nutrient density - it requires large amounts to get enough for most crops
- Requires a different type of machinery to apply from that used for chemical fertilizers
- Sometimes is hard to locate in certain areas; odor; difficult to store
- Specific to the plants
- Requires skills in production and application.

- There is inadequate awareness about the use and benefits of biofertilizers.

Bio-fertilizers and bio-control agents recommended for horticultural crops

Sl. No.	Crop	Plantations
01	**Plantation/Spices** a.Coconut, arecanut and others	25g Azospirillum, 25g PSM,100g VAM, 10g Trichoderma and 10g Pseudomonas per plant
02	**Fruits** a.banana	50g Azospirillum or Azatobacter,50g PSM 150-200g VAM, 10g Trichoderma and 10g Pseudomonas per plant
	b.Mango,Sapota and pomegranate	50g Azatobacter, 50g PSM,100g VAM,25g Trichoderma and 25g Pseudomonas per plant
	c.Grapes	30g Azatobacter, 30g PSM, 100g VAM,10g Trichoderma, and 10g Pseudomonas per plant
03	**Vegetables** a.Legumes	2-2.5 kg Rhizobium, 2.5 kg Azospirillum, 1 kg PSM, 20 kg VAM, 1 Kg Trichoderma and 1 kg Pseudomonas per ha
	b.Potato	3.5-4 kg Azatobacter, 20kg VAM, 2 kg Trichoderma, and 1 kg Pseudomonas applied per ha at the time of planting
04	**Flowers** a.Rose	25 g Azospirillum, 25 g PSM , 25 g VAM, 10g Trichoderma and 10g Pseudomonas per plant
	b.Jasmine	25g Azospirillum, 25g PSM, 25g VAM, 10g Trichoderma, 10g Pseudomonas per plant

CONCLUSION

Biofertilizers increase the availability of plant nutrients and can help in maintenance of the soil fertility over a long period. As discussed earlier, some microorganisms have the beneficial role of biological nitrogen fixation to supply nitrogen to crops, solubilizing insoluble phosphates to plant available (soluble) forms and synthesizing biomass for manurring of crops like rice, groundnut, maize etc. Biofertilizer are therefore economical, renewable and eco-friendly, but they cannot totally replace chemical fertilizers. Biofertilizers use is as important component of Integrated Nutrient Management and organic farming. These technologies are becoming vital in modern-day agricultural practices. The changing scenario of agricultural practices and environmental hazards associated with chemical fertilizers demad a more significant role of biofertilizers in coming years.

PHOTO GALLERY

Bio-fertilizer productions at Bio-center Belagavi

Students Project: "Production of selected biofertilizers"

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K.L.E.Society's
BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE,
CHIKKODI – 591201 District – Belagavi (Karnataka state, India)
(ACCREDITED AT 'A' GRADE BY NAAC WITH CGPA OF 3.26 IN THE THIRD CYCLE)

Department of Zoology (2019 – 20)

PROJECT WORK COMPLETION CERTIFICATE

This is to certify that following eight B.Sc Final year students have undertaken the project entitled ***Study of Hardness of Bore well water from selected Chikodi villages*** in-partial fulfillment of the syllabus of Rani Channamma University, Belagavi during the year 2019-20. Following eight students have together successfully completed the said project under the guidance of Dr Sridevi I Puranik.

Sl. No	Gender	Name of the student	Fathers name	Roll Number	Exam Seat Number
1	Miss	Laxmi Metri	Mallappa	151	S1715662
2	Miss	Pooja Pujari	Rajshekhar	153	S1715688
3	Miss	Shivani Metri	Mallappa	158	S1715771
4	Miss	Soumya Shedbale	Sagar	160	S1715802
5	Miss	Bhavana Sarapure	Chandrakant	164	S1715631
6	Miss	Revati Khot	Raju	178	S1715726
7	Miss	Sapana Shiraguppe	Vidyasagar	181	S1715749
8	Miss	Savita Halakarni	Siddappa	183	S1715754

Dr Sridevi I Puranik
PROJECT GUIDE

Dr N R Birasal
HEAD
DEPARTMENT OF ZOOLOGY

Prof U R Rajput
PRINCIPAL
KLES'S Basavaprabhu Kore
Arts, Science and Commerce College
CHIKODI - 591 201

Project Team Members

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7	Miss	Sapana Shiraguppe	Vidyasagar	181	S1715749
8	Miss	Savita Halakarni	Siddappa	183	S1715754

Acknowledgement

We the students express our sincere gratitude to our principal Prof. U. R. Rajput, KLE Society's B. K. College Chikodi for providing facilities.

We are extremely lucky to have wonderful association with our Head, Department of Zoology Dr. N. R. Birasal for encouraging and allow us to carry out the project on the topic "Study of Hardness of Bore well water from selected Chikodi villages". He gave us the idea to undertake the project and carry out titrations of the water samples at our department laboratory.

It is our privilege to express our sincere regards to our project guide Prof. Sridevi I. Puranik for her valuable inputs, able guidance, encouragement, whole hearted co-operation and constructive criticisms throughout the duration of our project.

We take this opportunity to thank our faculty members Miss Trupti P Khidrapure, Megha P Kapurkar and non teaching staff. We pay our respect to our parents for their love and encouragement throughout our career.

Last but not the least we express our thank to our friends for their co-operation and support

Content

Introduction

Water Quality can be defined as the physical, chemical and biological characteristics of water, usually in respect to its suitability for a designated use. Water can be used for drinking, fisheries, agriculture and recreation or for industry. Each of these designated uses has different defined chemical, physical and biological standards necessary to fulfill the respective purpose. For example, there are stringent standards for water to be used for drinking or swimming compared to that used in agriculture or industry.

One of the primary goals of the World Health Organization (WHO) and its Member States is that "all people, whatever their stage of development and their social and economic conditions, have the right to have access to an adequate supply of safe drinking water". A major WHO function to achieve such goals is the responsibility "to propose ... regulations, and to make recommendations with respect to international health matters ...." (*WHO 2011*). Against this backdrop, the project is undertaken

After many years of research, water quality standards are put in place to ensure the suitability of efficient use of water for a designated purpose. Water quality analysis is to measure the required parameters of water, following standard methods, to check whether they are in accordance with the approved standards or not. Water quality analysis is required mainly for monitoring purpose. Importance of such assessment includes:

1. To check whether the water quality is in compliance with the standards and hence, suitable or not for the designated use

2. To monitor the efficiency of a system, working for water quality maintenance

3. To check whether up-gradation / change of an existing system is required and to decide what changes should take place

4. To monitor whether water quality is in compliance with rules and regulations. Water quality analysis is of extremely necessary in the sectors of: Public Health (especially for drinking water) and industrial use

Hardness is property of water which prevents the formation of foaming and it increases the boiling point of water. The major cat-ions which are importing the hardness of water are calcium and magnesium. The an-ions which are responsible for hardness of water are Bicarbonates, Carbonates, Sulphates and Chlorides.

The hardness of water is temporarily associated with Carbonates and Bicarbonates and it is permanently associated with Sulphates and Chlorides.

In the past five decades or so evidence has been accumulating about an environmental factor, which appears to be influencing mortality, in particular, cardiovascular mortality, and this is the hardness of the drinking water (*Pallav Sengupta, 2013*)

Hard water is a water substance that contains cat-ions which has a charge of +2 also Ca^{2+} and $Mg^{2+.}$ These ions stand for calcium and magnesium. Hardness of water is mainly caused by calcium and magnesium salts.

Water hardness is also caused by iron, aluminum and other metals also but only to little extent. Water hardness that is caused by bicarbonates and carbonates from the calcium and magnesium represent temporary hardness. This means that they can be removed by boiling the water. This softens the carbonates in the water.

Another type of hardness is residual hardness (non-carbonated). In other words, it is permanent water hardness. To soften this type of hardness it is necessary to add sodium carbonate, lime and filtration through natural zeolites. Natural zeolites absorb the water hardness which then produce metallic ions and then release sodium ions to the water.

Control of water pollution has reached to its peak. Prevention of water pollution is a challenge in all developing countries and in a few developed countries. The prevention of pollution at source, the precautionary principle and the prior licensing of wastewater discharges by competent authorities have become key elements of successful policies for preventing, controlling and reducing inputs of hazardous substances, nutrients and other water pollutants from point source into aquatic ecosystems.

In some situations, even stricter requirements are necessary. A partial ban on the use of some compounds or even the total prohibition of the import is essential. Use of certain substances such as DDT and lead or mercury based pesticides, may harm the human health because these constituents get percolated into the ground water.

Some water pollutants like copper, zinc, manganese, boron and phosphorus become extremely toxic in high concentration. However, these are needed in trace amounts. The concentration above the range may likely to affect the water quality.

India being an agrarian country, our farmers depends mainly on groundwater for irrigation. With increasing population, lesser holdings and spreading urbanization, deeper bore wells are dug for groundwater abstraction.

Bore well and tube wells, are very similar. Both are basically vertical drilled wells, bored into an underground aquifer in the earth's surface, to extract water for various purposes. The difference in the two lies in the (a) type of casing used (b) depth of the casing and (c) type of soil where they are drilled.

Casing to support the external surfaces of the borehole against collapse may be needed at certain depths. Casings are usually made up PVC pipes. Electrical pumps are normally used to pump out the water from the bore wells. These types of pumps may increase the depletion of the ground water table.

Due to human and industrial activities, the ground water gets contaminated. This is the serious problem now a day. Thus, the analysis of the water quality is very important to preserve and keep the natural ecosystem intact. The assessment of the ground water quality was carried out in the different wards of Chikodi.

The most important resource for the survival of human beings is the availability of fresh drinking water. The water samples analysis are crucial for drinking water quality (*Nitasha Khatri,Sanjiv Tyagi and Deepak Rawtani, 2019*)

The quality of drinking water is vital concern for mankind since it is directly linked with human health. People of rural areas located in many villages in India are mainly dependent on ground water for drinking and other domestic needs. Thus, it is necessary to assess the physic-chemical analysis of drinking water in the view of health of human beings living in villages (*S V Dorairaju et al 2012*)

The quality of water is a vital concern for mankind, since it is directly linked with human welfare. It is a matter of history that fiscal pollution of drinking water caused water born diseases. At present, the menace of water born diseases and epidemics still booms large on the horizons of developing countries. Polluted water is the culprit in such cases. Water is the most widely distributed and abundant substances found in nature. The irony is that our planet is awash with water.

For centuries, human have been disposing off waste products by burning, placing them in streams, storing them on ground or putting them in the ground. Human induced influences on surface water quality reflect not only waste discharge directly into a stream, but also include contaminated surface runoff. The quality of ground water is most commonly affected by waste disposed and land use. (*Anwar Khalid Amir et al, 2011*)

Degradation of water resources in rural and urban area due to industrialization, urbanization, overpopulation and modern lifestyle is becoming serious issue for the mankind. These resources are being deteriorated by various ways at high alarming rate. As water is one of the basic amenity for human being, waterborne diseases have adverse impact on human health.

Use of contaminated water for domestic purposes and irrigation have irreversible disadvantages on human civilization. So pre and post monsoon study of physico-chemical characteristics of ground water including bore well is essential (*R V Kupwade and A D Langade, 2013*)**.**

Water is a major natural resource, a basic human need and precious natural asset, which should be conserved for future uses in a balanced manner. About 85 % of rural population in India is solely depended on ground water, which is depleting at a faster rate (*Mohd Nafees, 2015*).

Water supplied to consumer should not have any impurities which cause taste, odour, colour, toxicity and injuries to human health. The different impurities in water which cause undesirable effects may be classified into physical, chemical, bacteriological and radiological . The parameters like pH, total dissolved solids, total suspended solids, total hardness, calcium hardness, magnesium hardness, copper, iron, chlorides, sulphates, nitrates and fluorides contribute for the quality index of the potable water (*R.E. Khadsan and Mangesh V. Kadu, 2018*)

The present work is aimed at assessing the water quality index for the ground water in Chikodi. The ground water samples of selected wards were collected for the analysis. The study of ground water sample suggests that the evaluation of water quality parameters as well as water quality management practices should be carried out periodically to protect the water resources.

Materials and methods

Materials:

Glass wares: Burette, Pipette, Conical flask, measuring cylinder etc.

Reagents:

EDTA Solution: (0.01) Dissolve 3.7 to 3gm of Disodium salt of EDTA in distilled water to prepare 1 litter of solution.

Buffer Solution: Dissolve 16.9gms of ammonium chloride (NH_3Cl) in 1.43ml of concentration ammonium Hydroxide. (NH_3OH). Dissolve 1.179gm of disodium EDTA and 0.780gm of magnesium sulfate ($MgSo_4$).$7H_2O$ in 50ml of distilled water mix both i) and ii) solution and dilute to 250ml with distilled water.

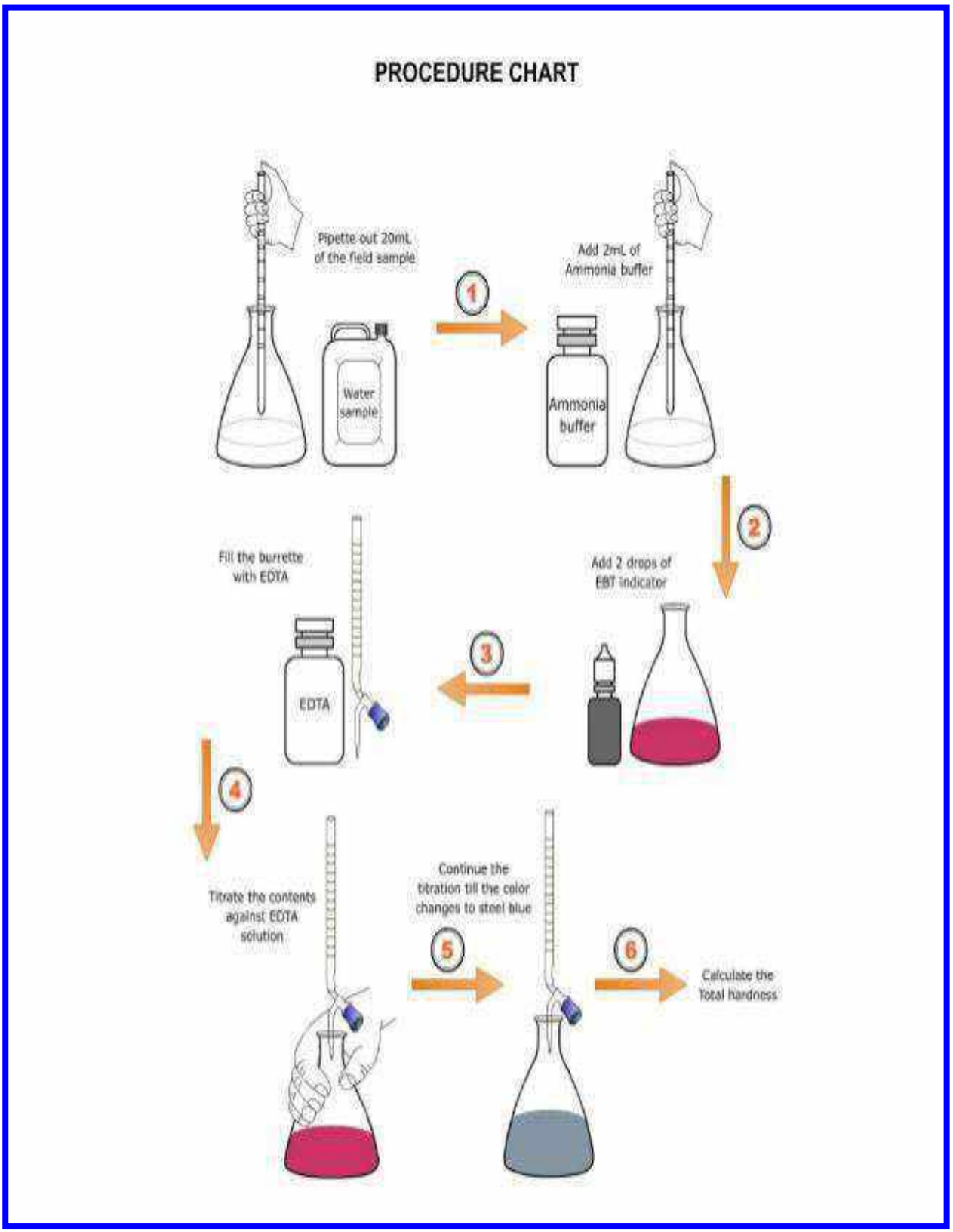
Eriochrome Black-T Indicator; grind 0.40gm of Erichrome Black-T with 100gm of sodium chloride. (NaCl).

Water hardness is a measure of divalent cat-ions (primarily calcium and magnesium) present in the water and is expressed as mg/L or (ppm = Parts Per Million). Hardness as calcium carbonate. **(Reference:** B. Krishna Kumari, 2016)

Methods

While coming to the college, we have collected water samples from chikodi town, from five different areas in the morning hours between 8 – 9 AM in the plastic bottles. The water samples were immediately brought to the laboratory for the estimation of hardness of water. Evening also while going from the college, we have collected five different samples from five different areas. The following methods are as follows.

1. Take 50ml of water sample in conical flask.
2. Add 1ml of buffer solution in to it.
3. Add approximately Eriochrome black T indicator solution which turns in to red wine color titrate against 0.01 EDTA solutions.


PROCEDURE CHART
Pipette out 20mL of the field sample
Water sample
1
Add 2mL of Ammonia buffer
Ammonia buffer
2
Add 2 drops of EBT indicator
3
Fill the burrette with EDTA
EDTA
4
Titrate the contents against EDTA solution
Continue the titration till the color changes to steel blue
5
6
Calculate the total hardness

Results

Burette : 0.01N EDTA Solution

Conical flask : 50 ml of water sample + Buffer solution

Indicator : Erichrome black T

End point : wine red to blue color

Table 1: Analysis of hardness of water samples collected from Chikodi town

Inference	Pilot Reading ml.	Burette Reading ml.			Mean Burette Reading ml.
		I	II	III	
Final	2-3	2.1	2.2	2.2	2.2
Initial		0.0	0.0	0.0	
Difference		2.1	2.2	2.2	

Hardness of water $CaCO_3$ = $\frac{\text{Mean Burette Reading} \times 1000}{\text{Volume Of Sample Titrated}}$

= $\frac{2.2 \times 1000}{50} = 44$

Hence, Hardness of water sample collected from Chikodi town is 44 mg/litter

Table 2: Analysis of hardness of water samples collected fromKerur.

Inference	Pilot Reading ml.	Burette Reading ml.			Mean Burette Reading ml.
		I	II	III	
Final	1-2	1.5	1.7	1.7	1.6
Initial		0.0	0.0	0.0	
Difference		1.5	1.7	1.7	

Hardness of water $CaCO_3$ = $\frac{\text{Mean Burette Reading} \times 1000}{\text{Volume Of Sample Titrated}}$

= $\frac{1.6 \times 1000}{50} = 32$

∴ **Hardness of water sample collected from Kerur is 32 mg/litter**

Table 3: Analysis of hardness of water samples collected from Ankali.

Inference	Pilot Reading ml.	Burette Reading In ml.			Mean Burette Reading ml.
		I	II	III	
Final	1-2	1.8	1.9	1.9	1.8
Initial		0.0	0.0	0.0	
Difference		1.8	1.9	1.9	

Hardness of water $CaCO_3$ = $\frac{\text{Mean Burette Reading} \times 1000}{\text{Volume Of Sample Titrated}}$

= $\frac{1.8 \times 1000}{50} = 36$

∴ Hardness of water collected from Ankali is 36 mg/litter

Table 4: Analysis of hardness of water samples collected from Manjari.

Inference	Pilot Reading ml.	Burette Reading ml.			MeanBurette Reading ml.
		I	II	III	
Final	1-2	1.8	2.0	2.0	1.9
Initial		0.0	0.0	0.0	
Difference		1.8	2.0	2.0	

Hardness of water $CaCO_3$ = $\frac{\text{Mean Burette Reading} \times 1000}{\text{Volume Of Sample Titrated}}$

= $\frac{1.9 \times 1000}{50} = 38$

∴ Hardness of water collected from Manjari is 38 mg/litter

Table 5: Analysis of hardness of water samples collected from Nasalapur.

Inference	Pilot Reading ml.	Burette Reading ml.			Mean Burette Reading ml.
		I	II	III	
Final	2-3	2.0	2.1	2.1	2.0
Initial		0.0	0.0	0.0	
Difference		2.0	2.1	2.1	

Hardness of water $CaCO_3$ = $\frac{\text{Mean Burette Reading} \times 1000}{\text{Volume Of Sample Titrated}}$

= $\frac{2.0 \times 1000}{50} = 40$

∴ Hardness of water collected from Nasalapur is 40 mg/litter

Table 6: Analysis of hardness of water samples collected from Raibag.

Inference	Pilot Reading ml.	Burette Reading ml.			Mean Burette Reading ml.
		I	II	III	
Final	2-3	2.4	2.3	2.2	2.3
Initial		0.0	0.0	0.0	
Difference		2.4	2.3	2.2	

Hardness of water $CaCO_3$ = $\frac{\text{Mean Burette Reading} \times 1000}{\text{Volume Of Sample Titrated}}$

$= \frac{2.3 \times 1000}{50} = 46$

∴ Hardness of water collected from Raibag is 46 mg/litter

Table 7: Hardness of water samples collected at Bagewadi.

Inference	Pilot Reading ml.	Burette Reading ml.			Mean Burette Reading ml.
		I	II	III	
Final	2-3	2.4	2.2	2.2	2.2
Initial		0.0	0.0	0.0	
Difference		2.4	2.2	2.2	

Hardness of water $CaCO_3$ = $\frac{\text{Mean Burette Reading} \times 1000}{\text{Volume Of Sample Titrated}}$

$= \frac{2.2 \times 1000}{50} = 44$

∴ Hardness of water collected from Bagewadi is 44 mg/litter

Table 8: Hardness of water samples collected in Shamanewadi.

Inference	Pilot Reading ml.	Burette Reading ml.			Mean Burette Reading ml.
		I	II	III	
Final	2-3	2.1	2.0	2.0	2.0
Initial		0.0	0.0	0.0	
Difference		2.1	2.0	2.0	

Hardness of water $CaCO_3$ = $\frac{\text{Mean Burette Reading} \times 1000}{\text{Volume Of Sample Titrated}}$

$= \frac{2.0 \times 1000}{50} = 40$

∴ Hardness of water collected from Shamanewadi is 40 mg/litter

Table 9: Analysis of hardness of water samples collected from Shirgaon.

Inference	Pilot Readingml.	Burette Reading ml.			Mean Burette Reading ml.
		I	II	III	
Final	2-3	2.2	2.3	2.3	2.2
Initial		0.0	0.0	0.0	
Difference		2.1	2.0	2.0	

Hardness of water $CaCO_3 = \frac{\text{Mean Burette Reading} \times 1000}{\text{Volume Of Sample Titrated}}$

$= \frac{2.2 \times 1000}{50} = 44$

∴ Hardness of water collected from Shirgaon is 44 mg/litter

Table 10: Analysis of hardness of water samples collected from Sadalaga.

Inference	Pilot Reading ml.	Burette Reading ml.			Mean Burette Reading ml.
		I	II	III	
Final	2-3	2.4	2.5	2.5	2.4
Initial		0.0	0.0	0.0	
Difference		2.1	2.0	2.0	

Hardness of water $CaCO_3 = \frac{\text{Mean Burette Reading} \times 1000}{\text{Volume Of Sample Titrated}}$

$= \frac{2.4 \times 1000}{50} = 48$

∴ Hardness of water collected from Sadalaga is 48 mg/litter

Table 11: Hardness of water measured in different samples of Chikodi Taluk

Sl. No.	Name of the Village	Hardness of water mg/liter
1.	Chikodi	44
2.	Kerur	32
3.	Ankali	36
4.	Manjari	38
5.	Nasalapur	40
6.	Raibag	46
7.	Bagewadi	44
8.	Shamanewadi	40
9.	Shiragaon	44
10.	Sadalaga	*48 (Highest)

Our team members opinion and comparison with a few previous findings

Hardness is important for drinking water. Drinking water may be a source of calcium and magnesium. Hardness is a type of property which makes water to form an insoluble precipitate with soap and primarily due to presence of calcium and magnesium ions. Precipitation, which is the purest of natural waters, is the most dominant source of ground water recharge. Substantial increase in concentration of dissolved salts may be brought about in the soil zone due to high evaporation rate.

In India, water resource is mainly depends on ground water and surface water. However, surface water is under great threat than ground water because of pollutants, urbanization, industrialization and the use of pesticides in the agricultural sector.

In taluks like Chikodi, Raibag, Gokak the evaporation is very high. Therefore, an increase in salt concentration may occur in the zone of aeration by dissolution of soluble minerals, especially carbonates of calcium and magnesium. Calcium and magnesium ions may be rich in humus.

First life on the earth comes from water. Water is extremely essential for the survival of all living organisms and also essential for our health and our economy. Water is vital for human needs, for homes and gardens, for agriculture, industry, and the environment. Fresh water is the major need of human life.

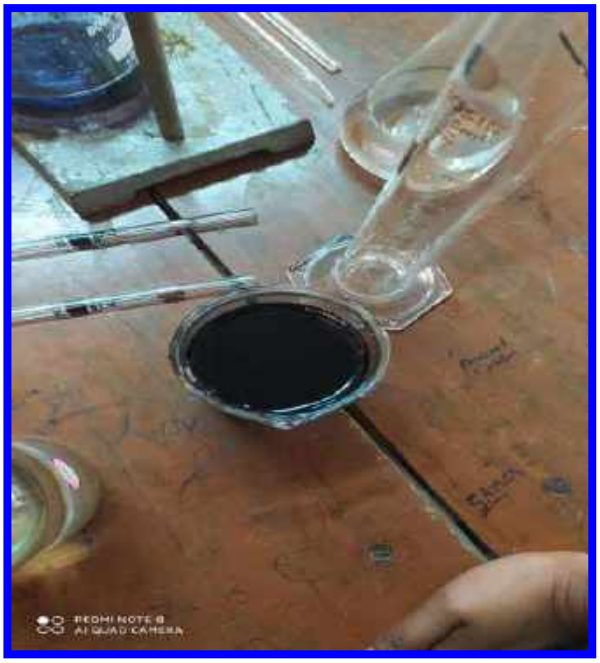
Drinking water quality is a vital concern for mankind since it is directly linked with public health. Drinking water quality has always been a major issue in many countries, especially in developing countries. Although safe drinking water is a basic demand for the people of all over the world, a huge percentage of people of the world are deprived from the pure drinking water (*Tanjila Alam Prosun et al 2018*)

One of the critical areas of environmental assessment is water quality, because of its significance in maintaining the health of human beings and that of the ecosystem. River water is a vital freshwater ecosystem and is very critical for sustainable development. The study of water quality is necessary to determine the health status of any water body. (*S. Priya et al 2016*)

The hardness of water is not a pollution parameter but indicates water quality. According to some classification, water having hardness up to 75 mg/l is classified as soft, 76 – 150 mg/l is moderately soft, 151 – 300 mg/l as hard and more than 300 mg/l as very hard. Based on the present finding, the water sample collected from the all the 10 spots was considered as soft water because of low hardness.

It was a wonderful experience to study about hardness of water, because in class rooms, we can only imagine. By doing this project we were able to know how to determine the hardness of water. Hardness of water which is expressed as CaCo3 mg/liter is a great combination of theoretical and practical knowledge. It helped us to understand and grasp the concepts clearly and extend our thinking capacity.

A few pictures the students project



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K.L.E.Society's
BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE,
CHIKKODI – 591201 District – Belagavi (Karnataka state, India)
(ACCREDITED AT 'A' GRADE BY NAAC WITH CGPA OF 3.26 IN THE THIRD CYCLE)

Department of Zoology (2019 – 20)

PROJECT WORK COMPLETION CERTIFICATE

This is to certify that following nine B.Sc Final year students have undertaken the project entitled **Local breeds of Buffalo at Chikodi** in-partial fulfillment of the syllabus of Rani Channamma University, Belagavi during the year 2019-20. Following nine students have together successfully completed the said project under the guidance of Dr Sridevi I Puranik.

Sl. No	Gender	Name of the student	Fathers name	Roll Number	Exam Seat Number
1	Mr.	Shubham Jakate	Ramachandra	159	S1715789
2	Mr.	Sachin Kore	Ramu	156	S1715738
3	Mr.	Manjunath Bhoje	Mahadev	170	S1715668
4	Mr.	Chetan Sadalge	Suresh	212	S1715637
5	Mr.	Preetam Pawar	Ashok	174	S1715701
6	Mr.	Aniket Bekkeri	Kallappa	147	S1715617
7	Mr.	Aroodh Mallapure	Mallikarjun	163	S1715623
8	Mr.	Pratik Kattimani	Shashidhar	173	S1715697
9	Mr.	Raghunath Pawar	Annasab	237	S1715715

Dr Sridevi I Puranik
PROJECT GUIDE

Dr N R Birasal
HEAD
DEPARTMENT OF ZOOLOGY

Prof U R Rajput
PRINCIPAL
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CHIKODI - 591 201

Project Team Members

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9.	Mr.	Raghunath Pawar	Annasab	237	S1715715

ACKNOWLEDGEMENT

It gives us pleasure to have an opportunity here, to acknowledge and to express our gratitude to all those who have been helped to carry our project. Although it is impossible to give individual thanks to all we remember here we are grateful to one and all.

We are indebted to our beloved Principal **Prof. U. R. Rajput** for his all kind of help in this regard. With deep sense of gratitude let us express indebtedness to **Dr. N. R. Birsal,** Head Department of zoology for his support and for his helpful hands in carrying this project successfully.

We sincerely thankful to our guide **Prof. Mrs. S. I. Puranik** Assistant professor for her constant guiding throughout this project work.

We are also thankful to the owner of Baragale farms, Kadapur, Chikodi who gave us the information of all the breeds, milk production, maintenance of fodder and farm.

CONTENTS

INTRODUCTION

The specific group of domesticated animals with a homogenous appearance, behavior and other characteristics that distinguish them from other animals of the same species arrives through selective breeding (Ciptadi *et al.*, 2019). Animal breeding is a segment of animal science that addresses the evaluation of the genetic value of domestic live stock.

Objectives of Buffalo breeding

- Scientific way of approach is should be made in the maintenance of the farms.
- To enhancing the productivity of livestock.
- Creating the awareness among the farmers about In-situ& Ex-situ conservation of breeds

Economic importance

Economic importance implies both production of high quality and quantity milk. It enhances the growth of disease resistance verities against the wild climatic conditions. It has market value as the domesticated livestock to the other countries. The coat of the buffalos used in the leather production (tanning process). The dung is used in the major production of biogas and manure. It's also used in the development of new desirable trait buffalos (Ganguly, 2018). Buffalos are being raised to get good quality of beef. Rearing of buffalos in a form provides an opportunity to get employed.

Breeding systems

1. **Pure breeding:** It is an organism that always passes down certain phenotypic traits to its offspring of many generations.
2. **Inbreeding:** It is a process of mating of genetically similar organisms.
3. **Out crossing:** The crossing between different breeds and no common ancestors.
4. **Cross breeding**: A cross breed is an organism with pure bred parents of two different breeds, verities or populations.
5. **Single trait selection:** The quickest way to make progress in that individual trait.
6. **Balanced trait selection:** A number of selective processes by which multiple alleles are actively maintained in the gene pool of a population at frequencies larger than expected from genetic drift alone.

Types of breeds

I. Indigenous breeds: Indigenous breed are the once which developed in the particular area (Ksheersagar, 2018; Pant & Mukherjee, 1971).

a. Murrah group

1. Murrah
2. Nilliravi
3. kundi
4. Godavari

b. Gujarat group

1. Surti
2. Jaffarabadi
3. Mahsana

c. Utter Pradesh group

1. Bhadawari
2. Arai

d. Central India group

1. Nagpuri
2. Pandhepuri
3. Manda
4. Jeangi
5. Kalhandi
6. Sambalpur

e. South India group

1. Toda
2. South kinara

II. Exotic breed: exotic breeds are the once which have come from the other countries or originally belong to other countries.

1. Australian buffalo (Australia)
2. Azeri (Iran)
3. Baio (North Brazil)
4. Azikheli (Pakistan)
5. Bangadeshi (Bangladesh)

6. Bulgarin (Bulgaria)
7. Egyptian (Egypt)
8. Burmese (Burma/Myanmar)
9. Lime (Nepal)
10. Carabao (Philippines)
11. Parkote (Nepal)

Buffalo breeding farms at Chikodi

1. **Bargale farms, Chikodi**

   It is located at Kadapur, Chikodi owned by Shri. Ramu Baragale. The farm covers the area of about 60/30 square feet. The farm has 55 varieties of buffaloes. The farm is well maintained by 4 employees of the farm. It is well ventilated present in the mid-city of Chikodi taluk hence is reachable to local as well as outside market. The initial investment of farm is 7lac, income 25000 per week. The farm is rectangular in shape, having 3 columns with 20 buffalos in each, water and fodder is supplied 3times a day, milking is done 2 times a day using machines, washing is done everyday (Kornel, 1999).

2. **Mallikarjun farms, Chikodi**

   It is located at Kerur, Chikodi owned by Shri. Mallikarjun kore. The farm covers the area of about 40/20 square feet. The farm has 30 varieties of buffaloes. The farm is well maintained by 3 employees of the farm. It is well ventilated present in the mid-city of Chikodi taluk hence is reachable to local as well as outside market. The starting invest of farm is 4lac, income 18000 per week. The farm is having 2 columns with 15 buffalos in each, water and fodder is supplied 3times a day, milking is done 2 times a day (hand milked), washing is done every day.

1. Murrah

- **Breed local name:** Murrah

- **Taxonomic classification**

  Kingdom-Animalia

  Phylum-Chordata

  Class-mammalia

  Order-Artiodactyl

  Family-Bovidae

  Genus-Buvalus

  Species-Buvalus bubalis

- **Breed registration by AnGR/Accession number**:
  (INDIA_BUFFALO_0500_MURRAH_01001

- **Location:** Kerur

- **Peculiar characters:**

  i. Most commonly called as water buffalo. There are two verities of its
  a. swamp buffalo=48 chromosomes and **b.** River buffalo having 50 chromosomes.

  ii. Found in north-west of the sub-Indian continent, buffalos have long been selected for milk yield and curled horn.

  iii. It is the most important well-known buffalo breed in the world. Population size: 2,000,000.

- **Physical characters**

  i. Black in colour, massive and stocky animal, heavy bones, hornes are short and tightly curl red, placid.

	HEIGHT (cm)	WEIGHT (kg)
MALE	142	750
FEMALE	133	650

  ii. Buffalos are traditionally managed in domestic conditions together with the calf. They are hand milked twice a day, they are fed different kinds of roughages (barley & wheat straw, cornstalks, sugarcane residuals)

  iii. In addition, they are given concentrate (Hindi) mixtures, if grazing is available, they graze all day long, they are naturally mated. Some villages also provide artificially insemination.

  iv. From its origin in center of Haryana, it has spread to the Punjab, Ravi & sutley valleys, North Sindh & Uttar Pradesh.it has been exported to brazil, Bulgaria & many countries of eastern Asia.

- **Dairy yield**

Milk yield per lactation	=	1750 kg
Lactation length per day	=	4.3 kg
Milk fat	=	6.5 to 9.5%
Products	=	milk, curd, butter, ghee, cheese

3. Mehsana

- **Breed local name:** Mehsani or Mahesani
- **Taxonomic classification**

  Kingdom-Animalia

  Phylum-Chordata

  Class-mammalia

  Order-Artiodactyls

  Family-Bovidae

  Genus-Buvalus

  Species-Buvalus carabenensis
- **Breed registration by AnGR/Accession number**: (INDIA_GOAT_0400_MEHSANA_06016
- **Location**-Anakli
- **Peculiar characters**

  i. The existence of the meshana breed in north Gujarat (India) is referred to in 1940.it is the result of a selection of Indian breeds of buffalo.

  ii. Population size is 400,000

  iii. Characters' are intermediate between surti and murrah. jet black skin and hair are preferred. horns are sickle shaped but with more curve than the surti. The udder is well developed and well set. Milk veins are prominent.

  iv. The body is longer than murrah but limbs are lighter, these are also good for heavy work.

v. The breed is known as persistent milker and regular breeder.

- **Physical characters**

	HEIGHT (cm)	WEIGHT (kg)
MALE	138	570
FEMALE	128	439

i. Eyes are very prominent. Black and bright, bulging from their socket with folds of skin on upper lids.

ii. Buffalos are traditionally managed under domestic conditions together with the calf. They are hand milked twice a day.

iii. They are fed different roughages (barley, wheat straw, cornstalks, sugarcane residuals) in addition they are given concentrated mixtures if grazing is available, they graze all day long. they are naturally mated.

iv. Some villages artificially inseminated.

- **Dairy performance**

Milk yield per lactation = 1200kg

Lactation length per day = 4.37kg

Milk fat = 5 to 9.5%

Products = milk, curd, butter, ghee, heese, paneer

4. Pandharpuri

- **Breed local name:** Pandharpuri

- **Taxonomic classification-**

  Kingdom-Animalia

  Phylum-Chordata

  Class-mammalia

  Order-Artiodactyls

  Family-Bovidae

  Genus-Buvalus

  Species-Buvalus bubalis

- **Breed registration by AnGR/Accession number:** INDIA_BUFFALO_1100_PANDHARPURI_01008
- **Location:** kadapur
- **Peculiar characters**

  i. The pandharpuri buffalo is dairy buffalo breed and raised mainly for milk production. It had royal patronage from Kolhapur for supply of fresh milk to the wrestlers of Kolhapur

  ii. These animals also famous for their better reproductive ability, producing calf every 12 to 13 months.

  iii. Its medium sized animal having long narrow face, very prominent and straight nasel bone comparatively narrow frontal bone and long compact body.

iv. Its horns are very long, curved backwards and usually twisted outwards.

v. The majority of animals are black with white markings found on the forehead, legs and switch of tail.

vi. The animals are docile in temperament.

vii. The tail is long and reaching below its hock.

	HEIGHT (cm)	WEIGHT (kg)
MALE	135	470
FEMALE	130	450

- **Dairy performance**

Milk yield per lactation = 1790kg

Lactation length per day = 5.11kg

Milk fat = 8%

Products = milk, curd, butter, ghee, cheese, paneer

5. Surti

- **Breed local name:** Gujrati
- **Taxonomic classification**

  Kingdom-Animalia

  Phylum-Chordata

  Class-mammalia

  Order-Artiodactyls

  Family-Bovidae

  Genus-Buvalus

  Species-Buvalusarnee
- **Breed registration by AnGR/Accession number-** (INDIA_BUFFALO_0440_SURTI_01005

- **Location** –kadapur

- **Peculiar characters**

i. The surti buffalos are of medium size and docile temperament

ii. Horns are sickle shaped and flat which grows in downward and backward direction

iii. The breed has got a fairly brod and long head with a covex shape at the top in between horns

iv. The skin colour is black or brown.

v. Surti is additionally colled as gujarati, nadiadi, deccani.

vi. Surti breed has got a unique straight back good specimens have two white collars.

vii. The coat colour of surti breed is rusty brown or silver grey.

viii. The udder is well developed, finely shaped and squarely placed between the hind legs

ix. The tail is fairly long, thin and flexible ending in a white tuft.

x. Regular estrous cycle and easy conception is its speciality.

xi. This breed eats a lot of straw and grains, oil seeds and we can add the leguminous fodder to compensate for nutrient retirements

	HEIGHT (cm)	WEIGHT (kg)
MALE	130	499
FEMALE	125	408

- **Dairy performance**

Milk yield per lactation	=1600 to 1700 kg
Lactation length per day	= 5.5 kg
Milk fat	=7 to 7.5%
Products	= milk, curd, butter, ghee, cheese, paneer

6. Jafarabadi

- **Breed local name:** Jaffari
- **Taxonomic classification**

  Kingdom-Animalia

  Phylum-Chordata

  Class-mammalia

  Order-Artiodactyls

  Family-Bovidae

  Genus-Buvalus

  Species-Buvalus bubalis

- **Breed registration by AnGR/Accession number**: (INDIA_BUFFALO_0400_JAFFARABADI_01006
- **Location**: Kadapur
- **Peculiar characters**

i. Jaffarabadi is the heaviest of all the Indian breeds of buffalos

ii. It's also called as bhavnagri, gir or jaffari. The breed is named after the town of jaffarabad

iii. The head and neck are massive. The fore head is very prominent and wide with slite depression in the middle.

iv. The horns are heavy, inclined to droop at each side of the neck and then turning up at a point, but less tightly curved than murrah

v. The colour is usually black, but few animals having a grey colour and white spots on fore head. Feet and tail switch are also same. The bullocks are heavy and used for ploughing and carting.

vi. Head- the bone of the forehead is white and covers the eyes partially to give its characteristic, Sleepy eyes appearance especially is adult males.

vii. The udder is well developed with funnel shaped teats, the animals are mostly maintained by traditional breeds called maldharis, who are nomada.

	HEIGHT (cm)	WEIGHT (kg)
MALE	142	600-1500
FEMALE	140	700-800

- **Dairy performance**

Milk yield per lactation = 2150 to 2340kg

Lactation length per day = 6 to 7 kg

Milk fat = 7.7%

Products = milk, curd, butter, ghee, cheese, butter

6. Nagpuri

- **Breed local name:** Barari

- **Taxonomic classification**

  Kingdom-Animalia
  Phylum-Chordata
  Class-mammalia
  Order-Artiodactyls
  Family-Bovidae
  Genus-Buvalus
  Species-Buvalus

- **Breed registration by AnGR/Accession number**: (INDIA_BUFFALO_1100_NAGPURI_01007
- **Location**: Ankali
- **Peculiar characters**

  i. These are black colored animals with white patches on face, legs and tail, this breed is also called by name barari.
  ii. The face is long and thin the neck is somewhat long
  iii. The horns are long (50-65cm long) flat and curved, bending backwards on each side of the back almost to the shoulders (Reddy, 2019).

iv. The nagpuri buffalo has smaller and lighter body when compared to other breed, the neval flap is short or almost absent.

v. Their limbs are light and tail is squat and short reaching below hocks

vi. The nagpuri buffalos are moderately good for milk producers. The males are also used for heavy draught but they are comparatively slow.

vii. They are well adapted to the harsh semi-arid conditions and can with stand extreme climatic conditions as high as 47°C

viii. Feeding- they are fed with a different kinds of roughages barley and wheat straw, sugar cane residuals, corn stalks. If grazing is available, they graze all day long.

	HEIGHT (cm)	WEIGHT (kg)
MALE	140	522
FEMALE	130	408

- **Dairy performance**

Milk yield per lactation	= 1039kg
Lactation length per day	= 4kg
Milk fat	=8.25%
Products	= milk, curd, butter, ghee, cheese, paneer,

CONCLUSION

To conclude the initiation of creating the awareness among the farmers about GMOS to have them in their farmland to serve enough for the rapidly developing human race. The total number of estimated breeds as per our project is 6 which are of the following types:

1. Murrah
2. Mehsana
3. Pandharuri
4. Surti
5. Jaffarabadi
6. Nagpuri

The above all 6 verities of breeds are mainly concern with the production of high quality of milk and resistant to the environmental stresses.

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Department of Zoology (2019 – 20)

PROJECT WORK COMPLETION CERTIFICATE

This is to certify that following six B.Sc Final year students have undertaken the project entitled **Adulteration of Milk** in-partial fulfillment of the syllabus of Rani Channamma University, Belagavi during the year 2019-20. Following six students have together successfully completed the said project under the guidance of Dr Sridevi I Puranik.

Sl. No	Gender	Name of the student	Fathers name	Roll Number	Exam Seat Number
1	Miss.	Sonali Bandagar	Sanjay	187	S1715798
2	Miss.	Pooja Khot	Sanjay	241	S1715686
3	Miss.	Jayashree Mali	Appasaheb	150	S1715645
4	Miss.	Prajakta Latawade	Arun	155	S1715694
5	Miss.	Tanuja Shindhe	Appasaheb	161	S1715613
6	Miss.	Samreen Jamadar	Jahangeer	157	S1715743

Dr Sridevi I Puranik
PROJECT GUIDE

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We express our sincere thanks to lab technician shivanand who has provided with all the required facilities for our work. We especially thanks my friends and last, but least, our parents are also an important inspiration for us, so with due regards we express my gratitude to them.

INDEX

INTRODUCTION

Adulteration of milk reduces the quality of milk and can even make it hazardous. Adulterants like soap, acid, starch, table sugar and chemicals like formalin may be added to the milk. Most of the chemicals used as adulterants are poisonous and cause health hazards. Adulterant means any material which is or could be employed for making the food unsafe or substandard or misbranded or containing extraneous matter; Food is adulterated if its quality is lowered or affected by the addition of substances which are injuries to health or by the removal of substances which are nutritious (Bania *et al.,* 2001). It is defined as the act of intentionally debasing the quality of food offered for sale either by the admixture or substitution of inferior substances or by the removal of valuable ingredient.

Food Adulteration first discovered in 1820 by the German chemist Friedrich Accumulated. He identified many toxic metals in food and drinks. Frederick Accum was the first to raise the alarm about food Adulteration. By that time Accum had become aware of the problem through his analytical work and this led him to publish "A treatise on adulterations of food Adulteration (Chen *et al.*, 2017).

Food Adulteration is an act of intentionally debasing the quality of food offered for sale either by the admixture or substitution of inferior substances or by removal of some valuable ingredient, food Adulteration takes into account not only the intentional addition or substitution or abstraction of substances which adversely affect nature, substances and quality the period of growth, harvesting, storage, processing, transport and distribution (Deng *et al.*, 2020).

Milk is very valuable food, readily digested and absorbed. It contains of nutrients, which needed for proper growth and maintenance of body. Milk and milk products form a significant part of the diet a sustainable amount of our food expenditures goes to milk and other dairy products. Milk is an important component of diets for all humans as it is high in essential amino acids that are most likely to be deficient in diets based on vegetable protein (DeVries *et al.,* 2017). Milk is considered to be the ideal food because of its abundant nutrients required by both infants and adults. Milk contains 87% water, 3.3% protein, 3.9% fats, 5% lactose and0.7% ash. In addition, it is a raw component to different food products (Reddy *et al.,* 2017). For example, casein protein can be separated and then Brocken down to provide a nitrogen source for infant formula and special diets for critically ill people. In addition, it is one of the best sources for protein, fat, carbohydrates, vitamin and minerals. Hence, milk is a highly nutritional product that can be used for a wide range of different products (Moncayo *et al.,* 2017).

Although milk is a high cost source of protein and fat relative to vegetable sources, it is readily saleable particularly in the more effluent urban areas of developing countries. Improving milk production is therefore an important tool for improving the quality of life particularly for rural people in developing countries. However, the production level of dairy animal is not satisfying the consumer demand worldwide. This became one of the driving forces for milk Adulteration by the producer. Possible reasons behind it may not only include demand and supply gap, but also perishable nature of milk, low purchasing capability of customer and lack of suitable detection methods also aggravated the problem. The motivation for food fraud is economic, but the impact is the real public health concern (Nurseitova *et al.*, 2019).

Milk and dairy product adulteration came into global concern after breakthrough of melamine contamination in Chinese infant milk products in 2008. However, history of milk Adulteration is very old. swill milk scandal has been reported in 1850 which killed 8000 infants in New York alone (Ruiz-Valdepeñas *et al.*, 2019). Milk Adulteration is significantly worse in developing and underdeveloped countries due to absence of adequate monitoring and lack of proper enforcement policies (Pandey *et al.*, 2019).

Material

- **Samples:** Buffalo milk, Goat milk and pasteurized packet milk
- **Chemicals**: iodine solution, Hydrochloric acid, Concentrated sulphuric acid, Citric acid, 5% barium chloride, Silver nitrate, Potassium sulphate, Vanadium Pentoxide, Resorcinol.
- Red litmus paper, Soybean/ arhar powder, Sugar.

Methods for Detection of common adulterants in Milk (Poonia *et al.*, 2017).

1. **Water:** The presence of water can be detected by putting a drop of milk on a polished slanting surface. The drop of pure milk flows slowly leaving a white trail behind it, whereas milk adulterated with water will flow immediately without leaving a mark.
2. **Starch:** Add a few drops of tincture of iodine or iodine solution. Formation of blue colour indicates the presence of starch.
3. **Urea:** Take a tea spoon of milk in a test tube. Add half teaspoon of soybean or archaeology powder, mix up the contents thoroughly by shaking the test tube. After 5

RESULTS

TEST: Test for Buffalo and Goat Samples.

Sl. No.	TEST	RESULT		
		Buffalo	Goat	Packet Milk
1	**Water:** The presence of water can be detected by putting a drop of mix on a polished slanting surface.	Absent	Absent	Present
2	**Starch:** Add few drops of tincture of iodine solution. Formation of blue colour indicates the presence of starch.	Absent	Absent	Absent
3	**Detergent:** shake 5-10 mL of sample with an equal amount of water. Lather indicates the presence of detergent.	Absent	Absent	Absent
4	**Vanaspati:** Take 3 ml of milk in test tube. Add 10drops of Hydrochloric acid. Mix one teaspoonful of Sugar. After 5 minutes, examine the mix. The red colouration indicates the presence of Vanaspati in milk.	Absent	Absent	Absent
5	**Formalin:** Take 10ml of milk in a test tube and add 5ml of conc. Sulphuric acid from the sides of the wall without shaking. If a violet or blue ring appears at the intersection of 2 layers then it shows presence of formalin.	Absent	Absent	Absent
6	**Ammonium sulphate:** Take 5ml of hot milk in a test tube add a suitable acid. Ex. Citric acid. The whey obtained is separated & filtered. Take the whey in another test tube & add 0.5ml of 5% barium chloride. Appearance of precipitate indicates the presence of ammonium sulphate.	Absent	Absent	Absent
7	**Salt:** Take 5ml of Silver nitrate reagent in a test tube. Add 2-3 drops of Potassium dichromate reagent. Add 1ml of milk in above test tube and mix thoroughly. If the contents of the test tube turn yellow, then milk contain salt.	Absent	Absent	Present
8	**Hydrogen peroxide:** To 10ml of milk sample in test tube. Add 10-15 drops of Vanadium pentoxide reagent & mix. Pink or red colour indicates presence of hydrogen peroxide.	Absent	Absent	Absent
9	**Sugar:** Take 3ml of milk in a test tube. Add 2ml of Hydrochloric acid. heat the test tube after adding 50mg of Resorcinol. The red colouration indicates the use of sugar in the milk.	Absent	Absent	Absent
10	**Urea:** Take a teaspoon of milk in a test tube. Add half teaspoon of Soybean/Arhar powder, mix up the contents thoroughly by shaking test tube. After 5minute, dip a Red litmus paper in it. Remove the paper after half a minute. A change in colour from red to blue indicates the presence of urea in the milk.	Absent	Absent	Present

CONCLUSION

By everyone support we successfully completed our project of Adulteration of milk in which we studied the collected milk adulterated with common salt, water and urea being the most common adulterant in packet milk. No adulterants were found in buffalo and goat milk. So we conclude that these are safe for children to drink. Thus, it was found that all the so collected milk had varied proportion of common adulterants which might be detrimental to human health, therefore a governing body should periodically check these products for presence of these harmful ingredients.

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Department of Zoology (2019 – 20)

PROJECT WORK COMPLETION CERTIFICATE

This is to certify that following five B.Sc Final year students have undertaken the project entitled **Study of Insect Pest Management** in-partial fulfillment of the syllabus of Rani Channamma University, Belagavi during the year 2019-20. Following five students have together successfully completed the said project under the guidance of Dr Sridevi I Puranik.

Sl. No	Gender	Name of the student	Fathers name	Roll Number	Exam Seat Number
1	Miss.	Akshata Walake	Anand	162	S1715613
2	Miss.	Sushila Hiremth	Ramayya	188	S1715810
3	Miss.	Preeti Wader	Laxam	236	S1715705
4	Miss.	Shweta Koli	Ashok	185	S1715792
5	Miss.	Laxmi Devangol	Mallappa	169	S1715659

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CONTENTS

INTRODUCTION

Pesticides are substances that are mean to control pests, including needs & these pesticides includes herbicides insect growth regulators Nematicides molluscicide bactericide antimicrobial fungicide pesticides are included to save as plant protection products which in general protect plant from weeds fungi or insects (Bruce *et al.,* 2019).

In general, a pesticide is a chemical/biological agent that deters incapacitates kills or otherwise discourages pests. Target pest can include insects, plant, pathogens, weeds molasses birds, mammals, fish, nematodes & microbes that destroy property cause nuisance / spread disease / along with this benefit, pesticides also have drawbacks, such as potential, toxicity to humans & other species (Gottlieb, 2019).

Initially by using this pesticide we can get high crop yield but the toxicity of this pesticides can be stored in this crop and the animals that will eat this crop they may be affected by the harmful disease (Wilches *et al.,* 2019). So, cause of all this more usage of pesticide is not good.

In insect pest management there are different methods to control pests as follows:

Physical Pest Control:

Physical pest control is a method of getting rid of insects and small rodents by killing, removing or setting up barriers that will prevent further distraction of one's plants (Mansour *et al.,* 2017). These methods are used in primarily for crop growing, but some methods can be applied to as well.

Types of Physical Pest Controls:

Barriers:

Row covers are useful for keeping insects out of one's plants, typically used for horticultural crops. They are made thin and light to allow plants to still absorb sunshine and water from the air.

Fire:

For formers fire has been a powerful technique used to destroy insect that lie there. Unfortunately, this can present some drawbacks. Fire can make the soil much less effective or get rid of insects that are beneficial to the plants. Also, there is no guaranty that will actually solve the pest problems since there may be larvae below the surface of the soil.

Animals:

Dogs, cats and others animals have been historically used for the pest control.

The Rat Terrier is American dog bread with a background as a farm dog and hunting companion. Specifically bread for killing rats, today's rats Terrier is an intelligent and active small dog that is kept both for pest control and as a family pet cats are also valued for companionship and for their ability to vermin.

Temperature control:

Placing produce inside of cold storage container lengthiness how long the produce lasts while also handing the growth of insects inside of them. Another method to use to heat, as it will kill the insect larvae in certain types of produce .an example would be mangoes, where they are place into a hot water bath in order to kill eggs and larvae.

Chemical Pest Control:

Methods have been used for thousands of years by civilization which has much less knowledge than current population Sumerians found out that sulfur gives that great results in insect extermination.

Types:

Fungicides:

These are chemical compounds are organic organisms with bio cider properties. Which help for the destruction of fungi and fungal spores. Fungi may cause severe disruption of any agricultural process. The major active ingredients of almost any fungicide is sulfur, which may turn out to be 0.5% of what is contained inside some of the heavier fungicides.

Insecticides:

Insecticides are any chemical substances that are used for insect extermination. They successfully help to eliminate insects and any life stage, including larvaecides, eggs and larvae.

Nematicides:

Nematicides are a chemical pesticide which kills nematodes that parasitize on plants. The use of this chemical pesticide is very important for potato crops because of the soil borne nematodes. Off course Nematicides may be natural such as extracts of neem oil (Mariyappillai *et al.,* 2019). In case the Nematicides are natural. You can enhance their effect by manually inserting them deeper in the soil. Rainfall would also help but if the insecticides has been sprayed as a liquid.

Rodenticides:

These are chemical pesticides design specifically for the extermination of rodents such as rats and mice. Most rodents often sense the treat and observe the rodenticide for a long time before consuming it (Masciocchi *et al.,* 2017). This is known as a poison shyness and to reduce this, scientists now develop rodenticides with a very strong residual effect.

Biological Method of Pest Control:

This control or bio-control is a method of bio controlling pests such as insects, mites, weeds and plant daises using other organisms. It relies on predation, parasitism, and herb ivory, are other natural mechanisms but typically also involves an active human management role. It can be an important component of integrated pest management IPM programs (Ojumoola *et al.,* 2019).

Biological control can have side effects on biodiversity through attacks on no target species by any of the same. Mechanism, especially when a species is a introduces without through understanding of the possible consequences.

Types:

These are the three basic biological pest control strategies as follows:

Importation:

Importation or classical biological control involves the introduction of pest natural enemies to a new local where they do not occur naturally early instances were after unofficial and not based on research and some introduced species become serious pests themselves. To be most effective at controlling a pest a biological control agent requires a colonizing ability which allows to it to keep pace with changes to the habitat in space and time. Control is a greatest of the agent has a temporal persistence so that it can maintain its population even in the temporary absence of the target species and it is opportunities forger, enabling it to rapidly a pest population.

Augmentation:

Involves the supplement release of natural enemies that occur in a particular area, boosting the naturally occurring populations there. Inoculative release small number of control agents is released at intervals to allow them to reproduce, in the hope of setting up longer term control and thus keeping the pest down to low level, constituting prevention rather than cure. In inundated release in contrast, large numbers are released in the hope of rapidly reducing a damaging pest population. Correcting a problem that has already has arisen augmentation can be affective but is not guaranteed to work and depends on the precise detail of the interactions between pest and control agent.

Conservation:

This of excising natural enemies in an environment is the third method of biological pest control. Natural enemies are already adopted to the habitat and to the target pests and their conservation can be simple and cost effective, as when nectar producing crop plants are grown in the borders of rice fields. These provide nectars to support parasitoids and predators and plant hoper pests and have been demonstrated to be so effective that famers sprayed 70% less

insecticides and enjoyed yields similarly found to be present in tussock grasses by field boundary hedges in England but they spread to slowly to reach the centers of fields control.

DUPONT CORAGEN

Coragen helps in remarkable protection & optimize yields & quality in your fields by achieving consistent & long-lasting control of key pests. It protects over 100 vegetable corps as well as others such as tobacco, sweet corn, potato, strawberries, mint, hops & others from a broad spectrum of Lepidopteron pests, including fruitworms, ballworms, armyworms, loopels, borers, hornworms, diamondback moths, silverleaf whitefly nymphs (suppression), leafminer laroae Colorado potato beetles & others.

Coragen insect control handless immature & adult stages of key lepidopteron pests for excellent &crop protection. Coragen insect control has minimal impact on pollinations & others beneficial insects when used in accordance with the label making it an ideal fit in integrated pest.

Chemical Composition

It is composed of two main components:

1) Chlorantraniliplole 0.4% GR having the trade name Ferterra.

2) Chlorantraniliprole 18.5% SC having the trade name coragen.

Fig 3.1. Dupont coragen insecticide

Advantages

1) Protects vegetables, tobacco, sweet corn, potatoes, strawberries, mint, hops & other crops from a broad spectrum of lepidopeteran pests, including silver leaf white leaf nymphs, leaf miner larvae, Colorado potato beetles & others.

2) Fast protection: lepidopteran pests stop feeding within minute after exposure.

3) Minimal impact on bees & other pollination & ideal for IMP programs.

4) Single active to be used at rate & timing of choosing for resistance management & added flexibility.

Infected plant

Fig.3.2. Early shoot borer infestation in the sugar cane crop.

Early shoot borer (Chilo infescatllus)

The damage from early shoot borer causes yield losses up to 35%. The pest attacks the crop during the early growth stages, before the inter nodes formation. The damage occurs as the dead hearts; the base of the dead heart gets rotten and emits the offensive smell. After the pest manages to kill one shoot, it migrates to another. The crop is also vulnerable to the pest attack in the years of scant rainfall when the temperature remains usually high with low relative humidity.

EMBOZ

Fig. 4.1. Emboz Insecticide

It is produced by the bacterium stretomyces avermitilis, belongs to the avermectin family of compounds all of which exhibit toxicity for nematodes, arthropods, & several other pests. & it is derived from abamectin by replacement of an epi-amino-methyl group by a hydroxyl group at 4-position. & it is the mixture of 2 homologue compounds termed B1a & B1b which differ on the C-25 side chain by one methylene group. B1a contains a sec-butyl group which B1b has an isopropyl group. & emboz is a mixture containing of 10% B1b & 90% B1a.

Avermectine biosynthesis is classified into 3 stages. The formation of the polyketide derived initial a glycone, modification of the initial aglycone produces avermectine aglycone, & glycosylation of avermectins. & it is widely used for cotton & sugar cane plants.

Chemical Composition:

1. 2, 4-dichlorophenoxyacetic acid.
2. Aldrin /dieldreine.
3. Atrazine.
4. Chlorodane.
5. Chloredecone

6. Endosulfan
7. Endrin

Advantages

- It is widely used I controlling lepidopterous pests (order of insects that as larvae are caterpillars & as adults have 4 broad wings including butterflies, moths, & skippers).
- It has been shown to possess a greater ability to reduce the colonization success of engraver beetles & associated wood bores in loblolly pines.
- It is the greatest reduce against these species with respect to the amount of larval feeding, length, & number egg gallevies.

Infected Plants

Fig.4.2. Maize is affected by insect Indian meal moth.

Indian meal moth (Plodia interpunctella)

Nature of damage

This insect is a pest only of stored grain and does not infest maize in the field.

Description and life cycle:

Moths about 1 cm long which have 3 bands (a narrow reddish brown one and a wider one of the same color separated by a whitish band). Can be observe around infested grain stores. The moths lay their eggs on the surface of stored grain, one can find a dense silken webbing produced by light yellowish larvae, which eventually. Acquire a greenish or pinkish tint. Full grown larvae leave the inside of the grain and pupate in white, silken cocoons on the outside of the infested grain mass.

CHANDIKA 505

Chemical composition:

Chlorophyll a. (purity 94%) 50% W/W, cypermethrin a. (purity 92%) 5% W/W, emulsifiers A (A blend of calcium salt of alkyl benzene sulfonic acid & polythonar propoxy ethers of fatty alcohol) 2.4% W/W, Aromatic hydrocarbon (Aromax) QS. Total 100.00% W/w.

Fig 5.1. Chandika 505 insecticide

Recommendation:

It is recommended for the control of Aphide, Jassid, thrips, whitefly, American bollworm, spotted bollworm, and pink worm etc. on cotton.

Drug therapy:

Atropinise, the patient immediately & maintain full atropinization by repeated doses of 2-4mg. at 5-10min interval for hours together. The need for further atropine administration is indicated by the continuation of symptoms. As much as 25-50mg may be required in a day. The extent of the salvation is useful criterion to follow in adjusting the dosage of atropine. Administer 1-2gm of 2 P.A.M. Diluted in 10cc distilled H20 and injected intravenously very slowly taking 5-10min.

Precautions: Avoid inhalation & skin contact. Destroy empty containers.

Infected Plant

Fig.5.1. Cotton Plant Infected by Bollworm.

Cotton Bollworm

Cotton bollworm larvae damage bolls and squares. Larvae chew holds into the base of bolls and may hollow out locks. Moist frass usually accumulate around the base of the ball. Larvae may also chew shallow gouges in the boll surface, which can become infected with rot organisms.

DHANVAN-20

Is an organic – phosphate insecticide it is effective against various sucking boring & leaf feeding insects on paddy, sugarcane, cotton, pulses, oilseeds, vegetable & fruit trees. It is also used for termite control in building forestry & field crops (Onstad *et al.*, 2019).

Chemical composition:

1. Chloropyriphos technical 21.5 (based on 94% a. I W/W)
2. Solvent (aromex) -72.5%W/W
3. Emulsifier (anionic – alkyl aryl)
4. Sulphonate, non – ionic –polyoxy
5. Ethylene other

Fig.6.1. Dhanvan-20 Insecticides

Precaution:

Use gloves, goggles, gas mask & protective clothing while handling apply only in the detection of wind.

Storage:

Store in its original pack under lock & key out of the reach of children & animals, in a dry & cool place away from open flame.

Disposal:

Empty container must be broken & buried ½ meter deep in soil away from habitation & not left in the open to prevent its reuse.

Symptoms of poisoning:

Headache giddiness, nausea, vomiting blurred vision excessive lachrymation and salivation.

Antidote:

Atropinize the patient immediately and maintain full atropnization by repeated doses of 2 to4mg at 5 to 10min interval, administer 1 to 2gm of 2-P.A.M diluted in 10ml distilled water intravenously very slowly takens 10 to 15 min.

First-Aid:

Wash the contaminated skin & irrigate eyes with normal saline, Gastric lava with 5% sodium bicarbonate if ingested.

Infected Plant

Fig.6.2. Maize plant is infected by the insect wire worm.

Wire Worm

Many species of families Elateridae (melanotus, Agriotes, and are among the important

genera) and Tenebrionidae (Eleodes species).

Nature of damage:

Patchy seedlings emergence, wilting and tilllering of seedlings, and lodging of older plants are signs of wire worm injury, although these symptoms may also be associated with other soil insects. In pastures, hay crops, and cereal crops, large wire worm population may develop, injuring the base of the stem, cutting the roots, and boring into the large roots of older plants. Heavy infestation will reduce the root system and cause plants to lodge.

Description and life cycle:

A careful search of the soil surrounding wire worm damaged seed or seedlings will expose segmented, thin, cylindrical worms, which when recently hatched are small (10mm long), soft, and white and when mature are 40mm long shiny, smooth. , deep yellow or brownish, and hard but flexible. After hatching the larvae begin searching for and feeding upon seeds and roots. Within several months to several years, the larvae into white, soft pupae inside cells in the soil, from which they eventually emerge as adults "click beetles" because, when turned upside down, they make an audible clicking sound in flipping themselves back over. The beetles are active fliers, have a hard, elongated, somewhat flat shell, and are brownish to almost black and from 0.5 to 2 cm in length. Female beetles burrow into the soil to lay eggs.

HILBAN 20 EC:

Hilban is a broad-spectrum insecticide with contact and stomach action. Non-systematic but penetrate deeply into the plant tissues. For the control of insect pests of paddy, beans, grams, sugarcane, cotton.

Control of aphids, thrips, beetles, lepidopterous larvae in ornamentals, fruits and vegetables, cotton, paddy, oil seeds, sugarcane, groundnut, mustard, brinjal, cabbage, onion, apple, citrus, tobacco etc. Highly effective against soil grubs and termites (Phillips, 2019).

It is also recommended for termite control in crop fields and can be used in building constructions for Termite proofing.

Fig 6.1. Hilban 20 E.C Insecticides

Dosage: 5ml in a liter of water and spray.

Caution: Poison, take precaution while using.

Symptoms of poisoning:

1) Head ache
2) Vomiting
3) Nausea

Infected Plant

Fig. 6.1 Aphids Infected to Wheat Plant.

Aphids

These insects can literally suck the life out of a fruit full wheat harvest. Aphids can live in wheat, sucking the sap from the plant, North Carolina state university explain. The damage of taking this sap is to fold. First it directly damages the plants lively hood by interfering with its ability to gate sustenance.\secondly, aphids can also pass the barley yellow dwarf virus to the plant (Pfeiffer *et al.*, 2017).

NCSU pointed out that aphids can affect a variety of cereals, but the English grain aphids and the bird cherry oat aphids are the only once with an impact on smaller grains like wheat. These pests can colonize wheat plants in the spearing or travel from nearby grain and infect wheat as late as the fall (Ware, 2019).

Seed treatments are typically the best defense against aphids and the diseases they could spread. A treatment with imidacloprid or thiamethoxam or often use to stop the colony from the developing in the first place.

RESULT

The many insects harm the crops which is economically and also a commercial disadvantage and the insects affects the crops may be in larval stage or in germination stage or in bloom period.

1) The major insect which harms the maize is wireworms, Indian meal moth and black ear wings they harm maize when it is in third or fourth leaf stage.

2) The major insect which harms the cotton plant are cotton bollworm and pink bollworm. They harm the cotton plant in the larval stage.

3) The major insect which harms the Wheat plant are Aphids and Army worms, they also harm the wheat plant during the larval stage.

4) The major insect which harms the sugar cane is borers and they infect the sugar cane during the germination phase.

5) The major insect which harms the sorghum plant in sorghum midge and they infect the sorghum plant during the bloom period.

This insect economically cause very much loss which decreases the level of production of crops.

CONCLUSION

It was a wonderful experience to study about "Study of Insect Pest Management" There, because in the class rooms we can only imagine. Going for this project we get to know how the pests or insects can be controlled by using pesticides in order to increase the crop yield and learn the methods to control the pests or insects like chemical method, physical method, biological method, and Natural method etc.

This project helped us to understand grasp the concepts clearly about how the pest or insect harming crop in agricultural field and extend our thinking capacity.

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K.L.E. Society's
Basavaprabhu Kore Arts, Science and Commerce College, Chikodi – 591 201.

(Accredited at 'A' with 3.26 CGPA in 3rd Cycle of A & A)

Department of Chemistry

A PROJECT REPORT

ON

"Preparation of Bio-Diesel"

Submitted by

1. Preetam Hiremath
2. Supriya Balikai
3. Poornima Kumbar
4. Priyanka Chougala
5. Snehal Ninganure
6. Sapna Patil

Project Supervisor

Shri. Shantinath S. Latthe

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CERTIFICATE

Date: 19-06-2020

This is to certify that the following students of KLE Soceity's Basavaprabhu Kore Arts, Science and Commerce College Chikodi, Department of Chemistry belonging to VI semester have successfully completed the project work titled "Preparation of Bio- Diesel" during the year 2019-20.

Name of the students	Register Number
1. Preetam Hiremath	S1715700
2. Supriya Balikai	S1715890
3. Poornima Kumbar	S1715691
4. Priyanka Chougala	S1715608
5. Snehal Ninganure	S1715796
6. Sapna Patil	S1715750

Shri. S. S. Latthe
Project Supervisor

Shri. S. B. Vanjire
Head of the Department

Shri. U. R. Rajaput
Principal

ACKNOWLEDGEMENT

We express our profound gratitude and sincere thanks to our beloved teacher and project supervisor **Shri. Shantinath S. Latthe,** Chemistry Department, KLE Society's Basavaprabhu Kore Arts, Science and Commerce College Chikodi. It gives us a great pleasure to acknowledge the dedicated efforts, sustained interests, affection and all kinds of encouragement that we have received from him, throughout our project work.

We are extremely thankful to **Shri. U. R. Rajput,** Principal, KLE Society's Basavaprabhu Kore Arts, Science and Commerce College Chikodi and **Shri. S. B. Vanjire,** Head, Department of Chemistry for providing all the necessary facilities during our project work. We would also like to thank **Dr. S. M. Patil, Shri Raju, Smt G. B. Jambagi, Miss. S. D. Kotabagi and Miss. P. B. Dubale** and all the teachers of Department of Chemistry KLE's B K College Chikodi, for their keen interest, valuable discussion, everlasting encouragement, inspiring guidance and incessant help.

We specially want to thank our dear colleagues for team work, valuable discussion and cooperation.

We thank all the non-teaching staff for their help during our project work.

We owe our special gratitude to **parents,** whose blessings sacrifices and moral support made this endeavour of our reality.

Finally, we thank all those who helped us directly or indirectly to complete this work.

Date: 19-06-2020

1. Preetam Hiremath

2. Supriya Balikai

3. Poornima Kumbar

4. Priyanka Chougala

5. Snehal Ninganure

6. Sapna Patil

CONTENT

Introduction

Bio-diesel is an eco-friendly, alternative diesel fuel prepared from domestic renewable resources i.e. vegetable oils (edible or non- edible oil) and animal fats. These natural oils and fats are made up mainly of triglycerides. These triglycerides when rea w striking similarity to petroleum derived diesel and are called "Bio-diesel". As India is deficient in edible oils, non-edible oil may be material of choice for producing bio diesel. For this purpose Jatropha curcas considered as most potential source for it. Bio diesel is produced by transesterification of oil obtains from the plant.

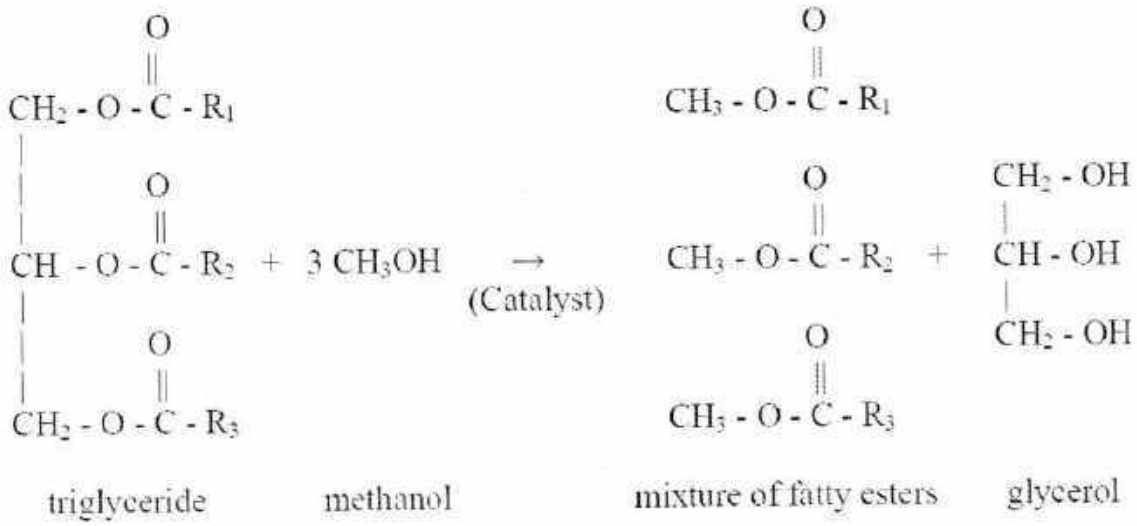
Jatropha Curcas has been identified for India as the most suitable Tree Borne Oilseed (TBO) for production of bio-diesel both in view of the non-edible oil available from it and its presence throughout the country. The capacity of Jatropha Curcas to rehabilitate degraded or dry lands, from which the poor mostly derive their sustenance, by improving land's water retention capacity, makes it additionally suitable for up-gradation of land resources. Presently, in some Indian villages, farmers are extracting oil from Jatropha and after settling and decanting it they are mixing the filtered oil with diesel fuel.

Although, so far the farmers have not observed any damage to their machinery, yet this remains to be tested and PCRA is working on it. The fact remains that this oil needs to be converted to bio-diesel through a chemical reaction – trans-esterification. This reaction is relatively simple and does not require any exotic material. IOC (R&D) has been using a laboratory scale plant of 100 kg/day capacity for trans-esterification; designing of larger capacity plants is in the offing. These large plants are useful for centralized production of bio-diesel. Production of bio-diesel in smaller plants of capacity e.g. 5 to 20 kg/day may also be started at decentralized level.

Making Biodiesel

Biodiesel is a mixture of methyl esters of fatty acids (long chain carboxylic acids). It has similar properties to the diesel fuel made from crude oil that is used to fuel many vehicles. It can be made easily from vegetable cooking oil that contains compounds of fatty acids. Enough fuel can be produced in this activity to burn in a later activity, although it is not pure enough to actually be used as fuel in a car or lorry. The synthesis is a simple chemical reaction that produces biodiesel and propane-1,2,3-triol (glycerol). Cooking oil is mixed with methanol and potassium hydroxide is added as a catalyst. The products separate into two layers, with the biodiesel on the top. The biodiesel is separated and washed, and is then ready for further experimentation.

Chemical reaction:



What you will need

- Eye protection
- Access to a top pan balance
- One 250 cm3 conical flask

- Two 100 cm3 beakers
- One 100 cm3 measuring cylinder
- Five plastic teat pipettes
- Distilled or deionised water
- 100 cm3 vegetable-based cooking oil
- 15 cm3 methanol (highly flammable, toxic by inhalation, if swallowed, and by skin absorption)
- 1 cm3 potassium hydroxide solution 50% (corrosive).

Procedure:

1. Measure 100 cm3 of vegetable oil into the 250 cm3 flask. Weigh the flask before and after to determine the mass of oil you used.
2. Carefully add 15 cm3 of methanol.
3. Slowly add 1 cm3 of 50% potassium hydroxide.
4. Stir or swirl the mixture for 10 minutes.
5. Allow the mixture to stand until it separates into two layers.
6. Carefully remove the top layer (this is impure biodiesel) using a teat pipette.
7. Wash the product by shaking it with 10 cm3 of distilled or deionised water.
8. Allow the mixture to stand until it separates into two layers.
9. Carefully remove the top layer of biodiesel using a teat pipette.

10. Weigh the amount of biodiesel you have collected and compare it to the amount of vegetable oil you started with.

Methods of analysis and calculations

1. Calculation of Yield

In order to characterize the quantity and the quality of the produced biodiesel several techniques were utilized. The volume of biodiesel product was first measured and the volume yield percentage was calculated according to the following:

Volume Yield % = (Volume of the product/ Volume of the oil fed) 100

= (95 ml / 100) 100

= 95 %

2. Measuring density of biodiesel

Density of biodiesel is determined by specific gravity bottle method. The density is calculated

Record of Observations:

1. Weight of empty specific gravity bottle W_1 = 13.89 g
2. Weight of empty specific gravity bottle + water W_2 = 25.01 g
3. Weight of empty specific gravity bottle + Biodiesel W_3 = 23.76 g
4. Weight of water $W_W = W_2 - W_1 = 11.12$ g
5. Weight of Biodiesel $W_B = W_3 - W_1 = 9.87$ g

Determination of Density

Density of Biodiesel = Weight of Biodiesel / Weight of Water

$= 9.87 / 11.12$

$= 0.88\ g/cm^3$

Conclusion

Biodiesel is currently about one and a half times more expensive than petroleum diesel fuel. Part of this cost is because the most common source of oil is the soybean, which only is only 20% oil. However, the costs of biodiesel can be reduced by making biodiesel from recycled cooking oils rather than from new soy beans, or by making it from plant matter with higher oil content.

It takes energy to produce biodiesel fuel from soy crops, including the energy of sowing, fertilizing and harvesting.

Biodiesel fuel can damage rubber hoses in some engines, particularly in cars built before 1994. You should check with the manufacturer before using biodiesel to see if you need to replace any hoses or rubber seals.

Biodiesel cleans the dirt from the engine. This dirt then collects in the fuel filter, which can clog it. Clogging occurs most often when biodiesel is first used after a period of operation with petroleum diesel, so filters should be changed after the first several hours of biodiesel use.

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Photo Gallery:

Group Photo

Density Determination

Bio-diesel

Students performing experiment

KLE Society's

BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE, CHIKODI

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DEPARTMENT OF CHEMISTRY

REPORT

ON

INDUSTRIAL VISIT

TO

SHREE DOODHAGANGA KRISHNA SAHAKARI SAKKARE KARKHANE NIYAMIT

Chikodi, Examba Nanadi road, Nanadiwadi, Belagavi, Karnatak State , India

ON

4/04/2019

Arranged for B.Sc final year students

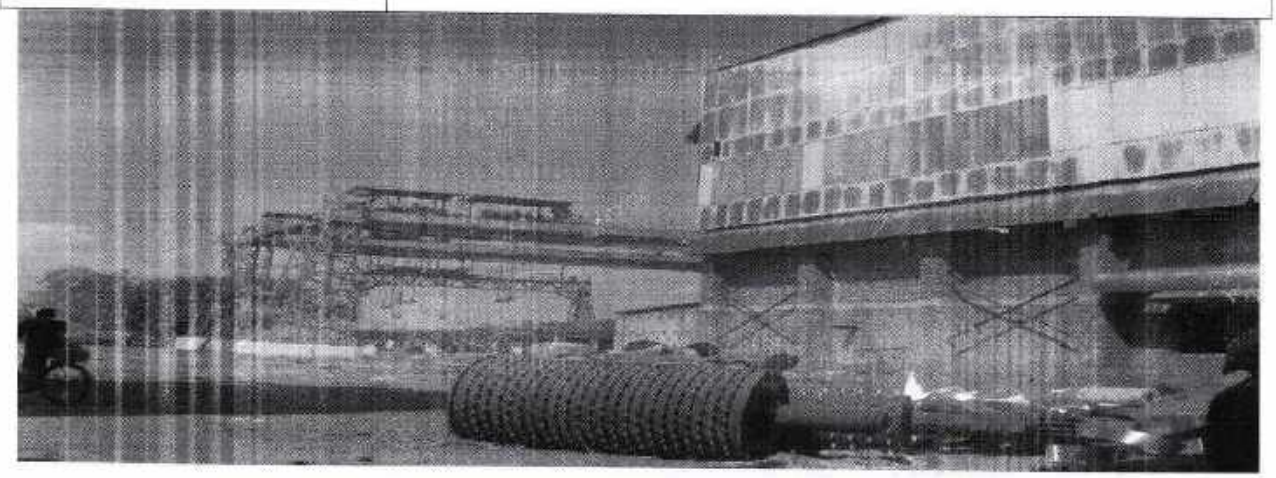
INDUSTRIAL VISIT REPORT

One Day Educational Industrial Visit To Shree Doodhaganga Krishna Sahakari Sakkare Karkhane Niyamit Chikodi, Examba Nanadi road ,Nanadiwadi, Belagavi-591247,Karnatak State , India.

Our college arranged one day Educational visit to **Shree Doodhaganga Krishna Sahakari Sakkare Karkhane Niyamit** Chikodi,Examba Nanadi road ,Nanadiwadi, on 4th April 2019 for B.Sc final year (VI sem) students of Chemistry Department . This industrial tour was helpful to impart the practical knowledge of sugar production amongst the students and the faculty members.

Name of company	Shree Doodhaganga Krishna Sahakari Sakkare Karkhane
Address of company	Post: chikodi, Examba Nanadi road, Nanadiwadi, Belagavi-591247, Karnatak State , India
Chairman of company	Shri. Amit P. kore
Established year	1974
Nature of business	Producing sugar, Power , Spirits.
Capacity	5500 TCD TO 10000 ,Cogeneration Power Plant 20.5 MWhr to 50 MWhr & 30 KLPD Ethanol.
Date of visit	4th April 2019
Branch involved	Department of chemistry (B.Sc. PCM And CBZ VI sem)
Concerned subject	B.Sc.VIth sem Chemistry Paper –II Prctical Curriculum.
Total students	128

Transport facility	College bus
Faculty coordinators	1.Prof.Raju 2.S.B.Banakar 3.S.M.Patil 4. G.B. Jambagi 5.S.S.Latte 6.P.M.Palankar 7.S.D.Kotabagi 8.P.B.Dubale
Objectives	1. To impart the knowledge of waste production of useful chemicals(Ethanol) out of waste during manufacture. 2.To understand the different process implemented to prepare sugar from sugarcane. 3.To make them familiar with the actual process of manufacturing of sugar.



Outcome	Demonstrating live concept of Fluid flow operation, Mechanical operation, heat transfer operation, mass transfer operation, Environmental issues Management, chemical process industries, process equipment design, project plant design etc.

HOD Head of the Department of Chemistry B. K. College, CHIKODI - 591 201

PRINCIPAL B.K.Arts, Science & Commerce CHIKODI - 591201.

K.L.E. SOCIETY'S
BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE, CHIKODI – 591 201.

(Accredited at 'A' Grade by NAAC with CGPA Of 3.26 In 3rd Cycle)

Date:31/03/2019

Department of Chemistry

Notice

As every year department of chemistry is organizing an Industrial visit to Shree Doodhaganga Krishna Sahakari Sakkare Karkhane Niyamit Chikodi (DKSSK Chikodi), On 04 April, 2019 for B.Sc final year students.

Objectives of Industrial visit:
1. To create awareness about manufacturing process of industry.
2.To give industrial exposure.

Departure Time: 8:30 A.M on 4th April, 2019

Arrival Time:6:00 P.M. on 4 th April, 2019

Name of Industry: Shree Doodhaganga Krishna Shakari Sakkare Karkhane Niyamit Chikodi (DKSSK Chikodi), *Examba Nanadi Rd, Nanadiwadi, Karnataka State , India*

All B.Sc. Final year students are required to register their names along with 100/- Rs. In department of chemistry on or before 1st **April , 2019** without fail.

Note: Industrial visit is compulsory for all B.Sc. final year students.

Head of the
Department of Chemistry
B. K. College, CHIKODI - 591 201

KLE Society's
BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE, CHIKODI
(Accredited at 'A' with 3.26 CGPA in 3rd Cycle of A & A)

Date:31/03/2019

To,
The Managing Director,
Shree Doodhaganga Krishna Shakari Sakkare Karkhane
Niyamit Chikodi (DKSSK Chikodi),
Examba Nanadi Rd, Nanadiwadi, Karnataka State , India

Sir,

Sub: Seeking Permission for Industrial Visit to your esteemed organization.

As part of the Rani Channamma University Belagavi, curriculum of B.Sc. third year students have industrial visit. To facilitate the onsite working procedure of a esteemed organization such as yours and the curriculum demand, we request you for the industrial visit. Kindly permit us to visit your esteemed organization for a team of 45 students 3 groups (Including staff member) on 4th April 2019.

Kindly grant us permission for the industrial visit and make the necessary arrangement for the same. We look forward to a positive reply from your side.

Thanking You,

Yours Sincerely,

Prof. S.B. Vanjire,
Head of the Department of chemistry,
KLE'S B.K.College , Chikodi-591201, Dist: Belagavi
Contact: 7349747434

Website: www.klesbkcollegechikodi.edu.in

31 MAR 2019
Shree Doodhaganga Krishna
Sahakari Sakkare Karkhane
Niyamit,Chikodi-591247

K.L.E. Society's
BASAVAPRABHU KORE
ARTS, SCIENCE AND COMMERCE COLLEGE,
CHIKODI – 591 201 (District Belagavi)
(Accredited at 'A' grade by NAAC with CGPA of 3.26 in the 3rd Cycle)
Website: www.klesbkcollegechikodi.edu.in e-mail: kles_bkcc@rediffmail.com Ph: 08338 – 272176

DEPARTMENT OF ZOOLOGY

B.Sc Fourth Semester

2018 – 2019

REG NO: S.1715682 ROLL NO: 152

CERTIFICATE

Date: 30th March 2019

This is to certify that Mr / Miss Pallavi A. Thorushe has satisfactorily completed the field visit for Fourth Semester as prescribed in the practical syllabus by the Rani Chennamma University Belagavi, during the year 2018-2019.

Staff-member in-charge

Head of the Department
HEAD
DEPARTMENT OF ZOOLOGY

Examiners

(1)

(2) 12/04/19

List of the student who have participated in study tour

Sl. No	Roll No	Name of the student
1	145	AKSHATA AJIT UPADHYE
2	146	AKSHATA ANIL MIRJE
3	147	ANIKET KALLAPPA BEKKERI
4	148	APURVA PRAKASH PATIL
5	149	JASMIN RASHID TAMBOLI
6	150	JAYASHREE APPASAHEB MALI
7	151	LAXMI MALLAPPA METRI
8	152	PALLAVI ASHOK THORUSHE
9	153	POOJA RAJSHEKHAR PUJARI
10	154	PRACHI BASAVARAJ PATIL
11	155	PRAJAKTA ARUN LATAWADE
12	156	SACHIN RAMU KORE
13	157	SAMAREEN JAHANGIR JAMADAR
14	158	SHIVANI MALLAPPA METRI
15	159	SHUBHAM RAMACHANDRA JAKATE
16	160	SOUMYA SAGAR SHEDBALE
17	161	TANUJA APPASAHEB SHINDHE
18	162	AKSHATA ANAND WALAKE
19	163	AROODH MALLIKARJUN MALLAPURE
20	164	BHAVANA CHANDRAKANT SARAPURE
21	165	CHAITRA APPAYYA MATHAPATI
22	166	CHAITRA GOPAL MUKKANNAVAR
23	167	KAVITA PARAPPA GODI
24	168	LAXMI KUMAR KAMATE
25	169	LAXMI MALLAPPA DEVANGOL
26	170	MANJUNATH MAHADEV BHOJE
27	171	MEGHASHRI GAJANAN GUNDAKALLE

ACKNOWLEDGEMENTS

We are indebted to our beloved Principal Dr M. T. Kurani for his all kind of help in this regard.

With deep sense of gratitude let us express indebtedness to Dr N. R. Birasal Head, Department of Zoology for his support to undertake this field visit on "*Mimicry & Camouflage for survival*"

We sincerely thank Dr N. R. Birasal Head, Department of Zoology, our teachers Miss Shweta R. Potadar and Miss Trupti P. Khidrapure for their continuous support to undertake this visit and guiding us.

We are also thankful to Shivagouda patil and Venkatesh Kamble Peons and our friends who helped us in making this visit safe and interesting.

Introduction

We planned a field visit which is compulsory according to our syllabus. Studying in class rooms is not enough at least in some portion of theoretical syllabus. Class room study may not expose us to a reality and hence observation in field is inevitable. As it is two day visit, we confined our visit to Dandeli and Ulavi. Both towns are situated amidst dry deciduous forest and hence we could get more probability to study the mimicry and camouflage of animals. The study tour was conducted on 22nd and 23rd March 2019.

Explanation about the Mimicry and camouflage at Dandeli.

Mimicry can be defined as the resemblance in external appearance, shape and color between members of widely distinct families. According to International Zoological Congress "Mimicry is superficial but close resemblance of one organism to another or to a natural objects among which it lives, that secure its concealment, protection or some other advantage". One which imitates is called as mimic and which is being imitated is called model. There are several types of mimicry and the following are few important:

- **Protective mimicry**: in this type animal mimics some other organism or the natural object in form, color or behavior and protects itself from predators or enemies.
- **Warning Mimicry**: in this type of mimicry non-poisonous and harmless animals mimics the harmful animal to escape from its predator.
- **Batesian mimicry**: "relatively palatable and unprotected species of animals imitate the relatively poisonous and unpalatable or well protected species and thereby enjoying protection against predation"
- **Mullerian mimicry**: where two or more unpalatable or harmful species resemble each other mutually advertise themselves for protection.
- **Aggressive mimicry**: this type of mimicry is not for protection but to attack the prey. In such type mimic predators resemble prey to approach its victim easily.
- **Concealing mimicry**: very common type of mimicry in which animals mimic the shape and color of the organisms or object to conceal themselves either by changing their colouration or seeks the background which matches with their color (Camouflage).

Chameleon: They live in warm habitats that range from rain forest to desert condition with various species occurring at Africa, Madagascar, and South Europe and across South Asia. They inhabit all kinds of tropical and rain forest habitats. Chameleon comes first to mind whenever we hear the word animal color change. They have the cells called iridophores cell containing nanoparticles of different size, shapes and organizations. These are important to its dramatic color change. Chameleon can change the structural arrangement of upper cell layer by relaxing and exciting the skin by doing so they adjust this layer and reflect light or different wave length leading to color change.

Stick Insect

Stick insects occur at high altitudes in temperate and tropical temperatures and in dry and wet conditions. It generally lives in bushy areas but some species live entirely on grass land. These are nocturnal insects. Stick insect mimics the stick (dry stick) perfectly with long legs and antenna. Its walking looks like twiggy branches movement that it is sometimes impossible to distinguish between dry stick and stick insect its avoids predators by camouflaging with dry sticks of surrounding area.

Leaf Insect: All leaf insects belonging to order Phasmida, lives in tropical climates. Leaf insects are camouflaged (using mimicry) to take on the appearance of leaves these are also referred as 'walking leafs'. They do this so accurately that predators often are not able to distinguish them from real leaves. In some species the edge of the leaf insect's body even has the appearance of bite marks. To further confuse predators, when the leaf insect walks, it rocks back and forth, to mimic a real leaf being blown by the wind.

Grass hopper: Grasshoppers are found on all continent except Antartica. They are found in temperate, tropical, terrestrial areas. Most grasshoppers prefer dry open habitat with lots of grass and other low plants, though some live in forest, many grasshoppers can be seen in farmers field too. Grass hoppers are known to exhibit perfect camouflage. There are nearly 18,000 different species worldwide. When detected many species attempt to startle the predator with a brilliantly-coloured wing-flash while jumping and launching themselves into air. Some grasshoppers such as rainbow grasshopper have warning coloration which deters predator.

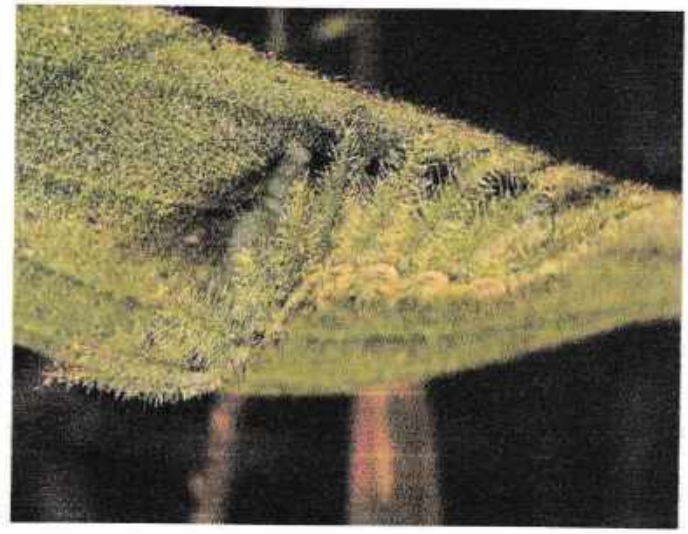
Butterfly mimicry: *Plate from Henry Walter Bates (1862) illustrating Batesian mimicry between Dismorphia species (top row, third row) and various Ithomiini (Nymphalidae, second row, bottom row).*

Batesian mimicry is a form of mimicry where a harmless species has evolved to imitate the warning signals of a harmful species directed at a predator of them both. It is named after the English naturalist Henry Walter Bates, after his work on butterflies in the rainforests of Brazil

Eye hawked moth: It is found in wide areas of Africa, Asia and certain Hawaiian islands, it's a migratory species flying to parts of eastern and southern Europe during summer. They are mostly found in Gardens, woodland, suburban areas etc. This moth bears a conspicuous spot resembling eye this spot lure predators to non-essential body part and confuse them like which the direction the insect may be heading in. They even fool them into thinking their prey is another species entirely or their may b some other dangerous animal nearby, and thus they take this advantage and escape from predator

Caterpillar:

We can find caterpillar almost everywhere from sandy beach to meadow to mountain forests worldwide. Caterpillars use camouflage to protect themselves from predators until they pupate. They are naturally camouflaged to match the types of plants. Their parents lay eggs on the backside of leaves and change their color based on their diet or location.



Conclusion: It was a wonderful experience to study "Mimicry and Camouflage of animals" in the natural habitats, because in the class rooms, we can only imagine. By undertaking this study tour, we were able to observe some live examples exhibiting mimicry and camouflage. It was the great combination of theoretical and practical knowledge with live examples inhabiting the natural forests. It is the classic example of *experiential learning* for us. Every time, our teachers were used to say in the classes that, natural science students will learn better in the forest. In nutshell, it helped us to understand and grasp the concepts clearly and extend our thinking capacity.

K.L.E. Society's
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DEPARTMENT OF ZOOLOGY

B.Sc Second Semester

2018 – 2019

REG NO: 51816625 ROLL NO: 208

CERTIFICATE

Date: 8th ~~March~~ APRIL 2019

This is to certify that Mr / Miss Amar. P. Babannavar has satisfactorily completed the field visit for Second Semester as prescribed in the practical syllabus by the Rani Chennamma University Belagavi, during the year 2018-2019.

Staff-member in-charge

Head of the Department
HEAD
DEPARTMENT OF ZOOLOGY

Examiners

(1)

(2) 10/04/19

List of the students who took part in study tour

Sl. No	Roll No	Name of the student
1	180	ADESH VINOD KULKARNI
2	181	AKSHATA ANAND BADANIKAI
3	182	AKSHAY RAMACHANDRA KUDACHE
4	183	CHANDRAKANT BALASAHEB KATKAR
5	184	LAXMI ANNASAHEB JAINAPURE
6	185	MAYURI ANNASAHEB KHOT
7	186	MURALI GOUTAM MANJAREKAR
8	187	PANKAJ SAYAJI GAYAKWAD
9	188	POORNIMA ANNASAB MADIWAL
10	189	PRIYANKA SURYAKANT SHIRAGAVE
11	190	PRIYANKA ASHOK SHINGAI
12	191	RADHA DUNDAPPA GHATAGE
13	192	SAKSHI BHARATESH AINAPURE
14	193	SANIYA SHABBIR GOUNDI
15	194	SANJANA SUNIL METRI
16	195	SHUBHAM MARUTI ATAKAR
17	196	SNEHA SUBHAS YARANALE
18	197	SOURABH DHONDIRAM SHINDE
19	198	SOURABHA DNYANADEV ARAGE
20	199	SUCHITA PANDURANG GAYAKAWAD
21	200	SUPRIYA MARUTI CHAVAN
22	201	SUPRIYA RAMACHANDRA LATE
23	202	TEJASHRI MALLAPPA SARWAD
24	203	UMMEHANI SALIM JAKATI
25	204	VAISHNAVI SUKHADEV CHAVARE
26	205	VINOD CHIDANAND DATTAWADE
27	206	ADARSH ANNAPPA KAMANI
28	207	AKSHATA AJIT PATIL
29	208	AMAR PONANJI BABANNAVAR
30	209	ARCHANA MURGESH BAGATI
31	210	BHIMAPPA LAXMAN HOSATTI
32	211	DIVYANI NAGAPPA MAGADUM
33	212	MAHANTESHGOUDA BASANGOUD PATIL
34	213	NAJMUSSAQIB GULAB SAYYAD
35	214	NANDA DHARMANNA SHINGADI
36	215	NARAYAN ANNAPPA UPPAR
37	216	OMKAR SHANKAR SHINDHE
38	217	PALLAVI SUBHASH HIREMATH
39	218	PRADNYA ANIL HANDAGE
40	219	PRAGATI NEMINATH BOLAWADEE
41	220	PRATIBHA SADASHIV CHOUGALE

42	221	PRATIKSHA SANJEEV KAMBLE
43	222	PRIYANKA SATYAPPA TERADALE
44	223	RAJENDRA NAGENDRA MARASRAKAR
45	224	RAVINA SHIVANAND PUJARI
46	225	ROHINI POPAT KABBURE
47	226	SACHIN GHATTIGEPPA MANTOOR
48	227	SACHIN SANGAPPA SUBBANNAVAR
49	228	SAGAR BHIMAPPA GONDE
50	229	SAGAR MUTALIK MURAGANNAWAR
51	230	SANDEEP SAHADEV GURAV
52	231	SAVITRI NARASAGOUDA PATIL
53	232	SHAMBHAVI VILAS SHIRALAKAR
54	233	SHASHIKIRAN PRABHAKAR KANDHARE
55	234	SHILPA KALLAPPA BEDADURGE
56	235	SHIVANAND SUBHAS GIDDALI
57	236	TEJASHWINI PRAKASH TOPUGOL
58	237	VAISHNAVI PARAMANAND PANCHAM
59	238	VITTAL BALAPPA SANADI
60	255	KIRAN KALLAPPA HANCHINAL
61	256	MAHESH MAHALINGAYYA MATHAPATI
62	257	MARTAND ASHOK PANNALE

ACKNOWLEDGEMENTS

We are indebted to our beloved Principal Dr M. T. Kurani for his all kind of help in this regard.

With deep sense of gratitude let us express indebtedness to Dr N. R. Birasal Head, Department of Zoology for his support to undertake this study tour on "*Diversity of animals*"

We sincerely thank Dr N. R. Birasal Head, Department of Zoology, our teachers Miss Shweta R. Potadar and Miss Trupti P. Khidrapure for their continuous support to undertake this visit and guiding us.

We are also thankful to Shivagouda patil, Peon and our friends who helped us in making this visit safe and interesting.

Introduction

We planned a study tour to Bankapur Peacock sanctuary, Gudavi bird sanctuary and Tyavarakoppa lion and tiger safari which is compulsory according to our syllabus. Studying in class rooms is not enough at least in some portion of theoretical syllabus. Class room study may not expose us to a reality and hence observation in field is inevitable. As it is two day visit, we confined our visit to Bankapur, Gudavi and Tyavarakoppa. We had the opportunity to look at the animals and their habitat. The study tour was conducted on 4th and 5th April 2019.

Gudavi bird sanctuary:

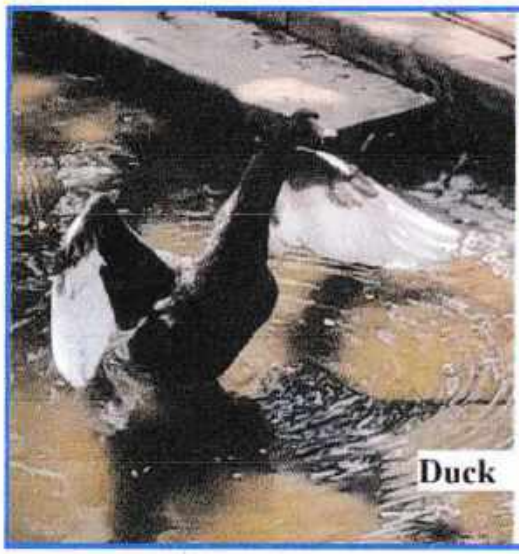
Gudavi Bird Sanctuary is located in the Soraba taluk of Sagara Subdivision of Karnataka state. Gudavi Bird Sanctuary is located on the Banavasi Road. It is 16 km from Sorab town. The bird sanctuary is one of the best five sanctuaries of Karnataka. It is spread over an area of 0.74 square km. According to forest department officials of the sanctuary, 217 different species of birds belonging to 48 families are found at this place. A natural lake and the trees gives shelter to this birds. The picturesque Gudavi Lake with trees all along its banks is a beautiful sight during winter. It is a small seasonal lake and is filled with water mostly in the rainy season. Various avian species migrate from across the globe in different seasons for breeding. It is one of the best sanctuaries of Karnataka state and well maintained. Though we could not see any birds (not being the winter season), but we could see the artificial habitat created for the birds to breed. This artificial habitat gets flooded with water during rainy season. Platform, watch towers are built for bird watchers to have a closer look at the birds.

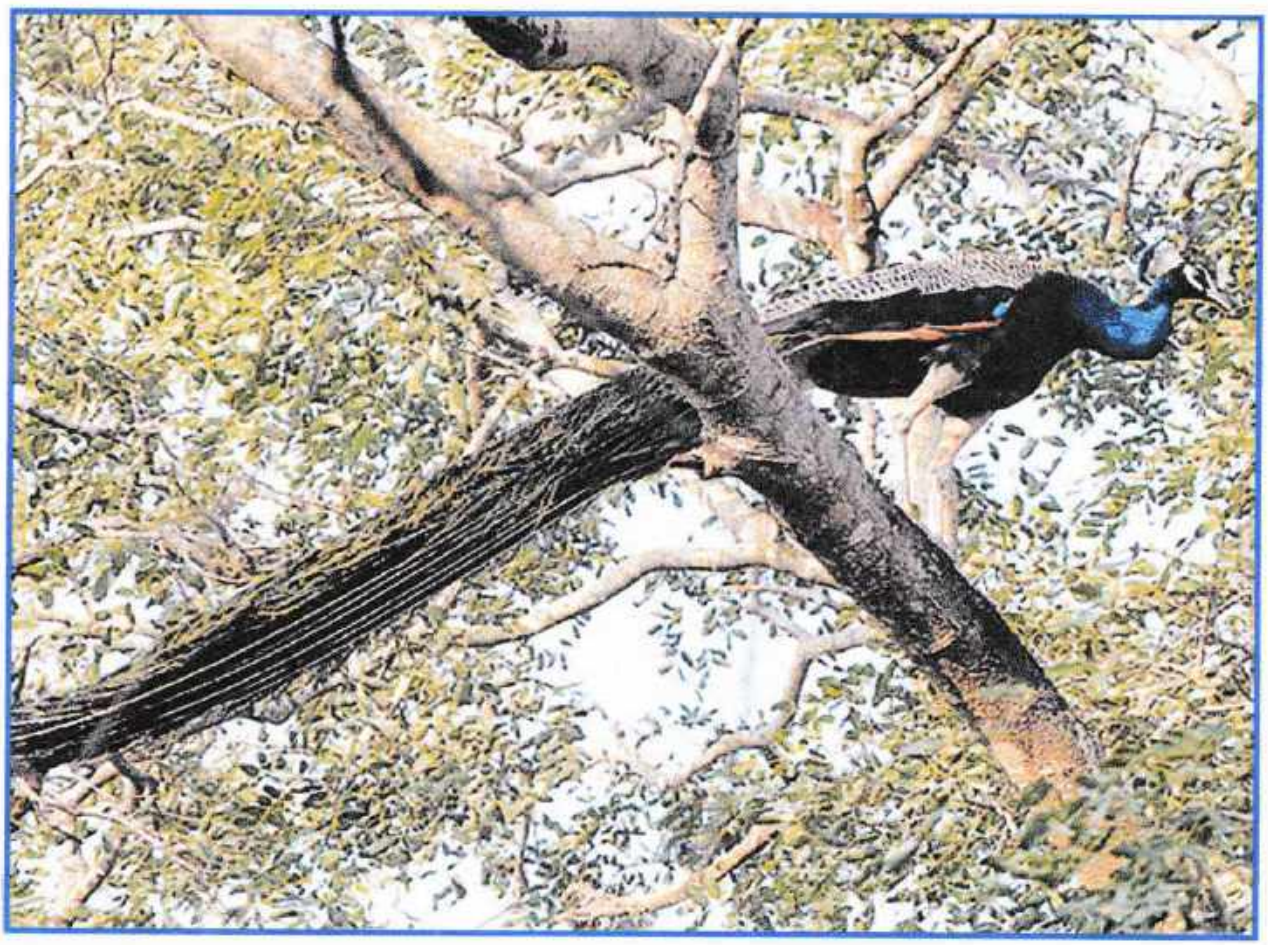
Here are the pictures of a few common birds found in Gudavi according to officials

Tyavarakoppa Lion, Tiger Safari, Zoo

Tyavarekoppa Lion and Tiger Safari is located in Shimoga district with an area of 250 hectares (2.5 km^2). It 10 km from Shimoga. It was established in 1988. It is Karnataka's second safari park, after Bannerghatta National Park near Bangalore. It is established to breed both lion and tiger in captivity. Apart from the safari, the area is known for a few rare animals well maintained in the zoo.

Following are the pictures of a few animals maintained in the zoo and we saw all these animals.





Conclusion: It was a wonderful experience to study "Animals in their natural habitats", because in the class rooms, we can only imagine. By undertaking this study tour, we were able to observe some animals found wandering in their natural habitat. It was the great combination of theoretical and practical knowledge with examples found inhabiting the natural forests. It is the classic example of *experiential learning* for us. Every time, our teachers were used to say in the classes that, natural science students will learn better in the forest. In nutshell, it helped us to understand and grasp the concepts clearly and extend our thinking capacity.

To,

The Principal
Basavaprabhu Kore College,
Chikodi.

Sub: Permission to go for Botanical study tour regd.....

Respected Sir,

With respect to the above cited subject M.Sc. 1st semester students and faculty members of P.G. Department of Botany have planned to go to **Amboli** for study tour as it is mandatory according to 1st semester M.Sc. Botany syllabus of Rani Channamma University. We planned our visit to the above said location on 16/10/2018. In this regard I request you to kindly permit us for the same and do the needful.

Thanking You,

The Co-ordinator,
P.G. Department of Botany

THE CO-ORDINATOR
P.G. Department of Botany
B.K. College, Chikodi

Place: Chikodi
Date: 12/10/2018

Enclosure: List of Students and faculty members

15-10-18
PRINCIPAL
B. K. Arts, Science & Commerce College
CHIKODI - 591 201

P.G. DEPARTMENT OF BOTANY

Basavaprabhu Kore Art's, Science and Commerce College, Chikodi

M.Sc. I Semester

List of Students and Staff attending the study tour

Sl. No.	Name of the student	Contact number	Signature
01	Ms. AnkitaMagadum	7829627757	
02	Mr. ArunkumarPujeri	9945879925	
03	Mr. BaleshHavani	9916565614	
04	Ms. LaxmiHalingali	9108031008	
05	Ms. MayuriJasud	9902939251	
06	Ms. NazmeenMakandarBawa	8722070877	
07	Ms. Pragati Patil	7795437668	
08	Ms. PriyankaSalunkhe	8197556205	
09	Mr. SagarKammar	7829289100	
10	Mr. SandeshKustigar	9731988415	
11	Mr. SatishDandinnavar	7259546165	
12	Ms. Savita Hirekudi	9902753707	
13	Mr. ShivanandJadagoudar	8123421561	
14	Ms. SujataBandagar	7026805420	
15	Ms. SwapnaBenurakar	9916255845	
16	Mr. Vasudev Patil	8123795079	
17	Ms. VidyaSattigoudar	8496947075	
18	Ms. VijayalaxmiDanannavar	7975703942	
19	Ms. TejaswiniKambar	7338109403	

List of the staff members

Sl.No.	Name	Designation
1	Dr. G.P. Yelvattimath	Associate Professor
2	Dr. Kambhar S. V.	Lecturer
3	Dr. R.R. Patil	Lecturer
4	Mr. Shivanand Patil	Non-teaching staff

THE CO-ORDINATOR
P.G. Department of Botany
B.K. College, Chikodi

ONE DAY BOTANICAL FIELD TRIP

A STUDY TOUR REPORT SUBMITTED TO RANI CHANNAMMA UNIVERSITY, BELAGAVI, FOR PARTIAL FULFILLMENT OF PRACTICAL II

M.Sc. I SEMESTER

SUPERVISED

BY

DR. SIDANAND V. KAMBHAR M.Sc., Ph.D., K-SET

DR. RAHUL R. PATIL M.Sc., Ph.D., K-SET

P.G. DEPARTMENT OF BOTANY

BASAVAPRABHU KORE ART'S, SCIENCE AND COMMERCE COLLEGE, CHIKODI- 591 201

BELAGAVI, KARNATAKA

OCTOBER 2018

CERTIFICATE

Date: Examination Seat No._____

This is to certify that Kum./ Shri_____

is the student of M.Sc. _____ Semester has satisfactorily completed the One Day Botanical field trip for partial fulfillment of Practical II (1.3: Systematic Botany of Angiosperms) prescribed by the Rani Channamma University, Belagavi for the year 201__-201__.

Signature of the Course In-charge

The Co-ordinator
P.G. Dept. of Botany

ACKNOWLEDGEMENT

I would like to thanks our beloved Principal Dr. M.T. Kurani who permitted us to visit study area and also for providing all the facilities and support during our study tour.

I would also like to express my sincere thanks to our respected Co-ordinator Dr. G. P. Yelavattimath for providing me an opportunity to undergo such wonderful tour, which helps us in getting practical knowledge about our field work.

I wish to pay high regards to my loving parents and grandparents for their sincere encouragement and motivation throughout my career.

I acknowledge a very special thanks to our teaching faculty Dr. Sidanand V. Kambhar and Dr. Rahul R. Patil for providing the detailed information about the various aspects with respect to plant collection methods, identification, precautions in field collection during the entire tour.

I would like to mention sincere thanks to my class friends for their constant help and encouragement throughout the tour programme.

TABLE OF CONTENTS

Introduction

Botanical studies of a local region not only are of a didactic value, but they are also the source of information for students on diversity of nature and a necessity for protection of the region they live in. Going outdoors, visiting nearby and farther surroundings, together with students and teachers, can observe the principal properties, record and collect plants or analyze and describe plant communities and vegetation of the given region. As a part of M.Sc. curriculum, one day field trip was organized on 16-10-2018 by Post Graduate Department of Botany, KLE Society's Basavaprabhu Kore Art's, Science and Commerce College, Chikodi under Rani Channamma University, Belagavi, Karnataka.

We gathered in our college campus at around 6:30 am and started journey from the college at 7:00 am with the guidance and company of our lecturer and class friends. We reached our first destination around 9.30 am at Ramthirth temple, Medhewadi Village in Ajara Taluka in Kolhapur District of Maharashtra State, next reached at Hiranyakeshwar temple near Amboli falls at 12.30 pm and subsequently reached at Kavale sad point in Amboli around 4.30 pm. Return journey started at 6.00 pm and reached our college campus successfully at 8.00 pm.

The study area i.e. Amboli is a hill station in Sindhudurg district, south Maharashtra, India. It lies in the Sahayadri Hills of Western India, located an altitude of 690 m (2,260 ft). It is last hill station before the coastal highlands of Goa. It is considered one of the world's "Eco Hot-Spots" and it surrounds with unusual flora and fauna. The source of the Hiranyakeshi river lies in the hills around Amboli village, and an ancient Shiva temple (called Hiranyakeshwar) sits at the cave where the water emerges. The main attraction for tourists is the incredibly-high rainfall (7 m average, per year) and the numerous waterfalls and mist during the monsoons.

The Ramthirth temple area around the river's origin being a sacred groove is protected by the locals. It abounds with natural beauty particularly during the monsoon months when fresh rain water transforms the landscape into a lush green oasis with different types of mushrooms which sprout out along its banks. There are also a variety of plants like *Creteva adansonii* DC. (Capparaceae), *Melastoma malabathricum* L. (Melastomataceae) and *Phyllanthus lawii* Grah. (Euphorbiaceae) are dominant there.

List of Students and Staff

Sl. No.	Name of the student
01	Ms. Ankita Magadum
02	Mr. Arunkumar Pujeri
03	Mr. Balesh Havani
04	Ms. Laxmi Halingali
05	Ms. Mayuri Jasud
06	Ms. Nazmeen Makandar Bawa
07	Ms. Pragati Patil
08	Ms. Priyanka Salunkhe
09	Mr. Sagar Kammar
10	Mr. Sandesh Kustigar
11	Mr. Satish Dandinnavar
12	Ms. Savita Hirekudi
13	Mr. Shivanand Jadagoudar
14	Ms. Sujata Bandagar
15	Ms. Swapna Benurakar
16	Mr. Vasudev Patil
17	Ms. Vidya Sattigoudar
18	Ms. Vijayalaxmi Danannavar
19	Ms. Tejaswini Kambar

List of the staff members

Sl.No.	Name	Designation
1	Dr. Sidanand V. Kambhar	Lecturer
2	Dr. Rahul R. Patil	Lecturer

Observations

A total 43 species belonging to 29 families have been collected and identified with aid of flora (see, Table). Among 43 species, some of the notable species are *Nilgirianthus heyneanus* (Nees) Bremak., a shrubby, branches hirsute. Spikes 3-4 together, on trichotomous peduncles. Flowers with corolla blue collected at Kavale sad point Amboli. *Mallotus philippensis* (Lam.) Muell.-Arg., a small trees, fruit produces a red dye found near Hiranyakeshwar temple. Similarly, *Phyllanthus lawii* Grah., a slender plant, flowers are small, in fasciles in leaf axils.

The *Tragia muelleriana* Pax et Hoffm, plant with stinging hairs. The species of *Nothapodytes nimmoniana* (J. Grah.) Mabberley is highly medicinal plant containing anticancer property. The member of *Melastoma malabathricum* L. is dominated in study area and identified easily based on three subparallel prominent nerves on leaf and dimorphic stamens. A small tree *Ligustrum perrottetii* A. DC. with flowers with thyrsoid panicles with white fragrant flowers. A member of Urticaceae *Boehmeria macrophylla* Hornem., a small perennial herbs, the fibre of the stem is of excellent quality.

Sl. No.	Family name	Botanical name
1	Acanthaceae	*Lepidagathis prostrata* Dalz.
2	Acanthaceae	*Nilgirianthus heyneanus* (Nees) Bremak.
3	Amaranthaceae	*Achyranthes coynei* Sant.
4	Apiaceae	*Pimpinella heyneana* (DC.) Kurz.
5	Asteraceae	*Cyathocline purpurea* (Buch.-Ham. ex D. Don.) O Ktze
6	Asteraceae	*Elephantopus scaber* L.
7	Asteraceae	*Phyllocephalum scabridum* (DC.) Krikman
8	Asteraceae	*Senecio bombayensis* Balakr.
9	Asteraceae	*Tricholepis amplexicaulis* Cl.
10	Capparaceae	*Creteva adansonii* DC.
11	Clusiaceae	*Garcinia indica* (Thou.) Chois
12	Clusiaceae	*Garcinia talbotii* Raiz. ex Sant.
13	Commelinaceae	*Murdannia simplex* (Vahl) Brenan
14	Dioscoreaceae	*Dioscorea pentaphylla* L.
15	Ebenaceae	*Diospyros montana* Roxb.

Sl. No.	Family name	Botanical name
16	Eriocaulaceae	*Eriocaulon setaceum* L.
17	Euphorbiaceae	*Mallotus philippensis* (Lam.) Muell.-Arg.
18	Euphorbiaceae	*Phyllanthus lawii* Grah.
19	Euphorbiaceae	*Tragia muelleriana* Pax et Hoffm
20	Fabaceae	*Desmodium triquetrum* (L.) DC.
21	Fabaceae	*Vigna vexillata* (L.) A. Rich.
22	Gentianaceae	*Canscora diffusa* (Vahl) R. Br.
23	Gesneriaceae	*Rhynchoglossum notonianum* (Wall) Burtt.
24	Gesneriaceae	*Rhynchoglossum obliquum* Blume
25	Hypoxidaceae	*Curculigo orchioides* Gaertn.
26	Icacinaceae	*Nothapodytes nimmoniana* (J. Grah.) Mabberley
27	Lamiaceae	*Scutellaria discolor* Wall ex Benth.
28	Malvaceae	*Hibiscus hispidissimus* Grif.
29	Malvaceae	*Kyadia calycina* Roxb.
30	Melastomaceae	*Melastoma malabathricum* L.
31	Melastomaceae	*Memecylon umbellatum* Burm. f.
32	Menispermaceae	*Cyclea peltata* (Lamk.) Hook.f. & Thom.
33	Oleaceae	*Ligustrum perrottetii* A. DC.
34	Orchidaceae	*Habenaria grandifloriformis* Blatt. & McCann
35	Polygonaceae	*Persicaria barbata* (L.) Hara
36	Rubiaceae	*Canthium dicoccum* (Gaertn.) Teys & Binn
37	Rubiaceae	*Mussaenda glabrata* (Hook.f.) Hutch ex Gamble
38	Rubiaceae	*Neanotis foetida* (Hook.f.) W. H. Lewis
39	Smilacaceae	*Smilax zeylanica* L.
40	Symplocaceae	*Symplocos racemosa* Roxb.
41	Urticaceae	*Boehmeria macrophylla* Hornem.
42	Verbenaceae	*Clerodendrum wallichii* Merr.
43	Vitaceae	*Cayratia tenuifolia* (Wight & Arn.) Gagnep.

Objectives of Study Tour

- Visiting forest area is an important task to acquire an in-depth knowledge about the forests, which helps us to know about various ecosystems.
- Identification of different trees/shrubs/climbers and herb species in the filed with simple tricks.
- To observe invasive exotics, which are responsible for various threats to the biodiversity and diseases affecting the growth of the plant.
- To know about the different wildlife species, their habitats and niche, their interaction with various ecosystems, threat due to poaching and hunting, and what are the protection measures carried out by local peoples.
- A visit would provide a conceptual knowledge and experience about the advances into the field of taxonomy and it would also help in knowing about how research work will be carried out.
- We will know about the sustainable and economical ways of conserving the forests and ways of increasing forest cover.

Learning from the Study Tour

- After attending this tour, I have acquainted myself with the objective of conservation and management of Biodiversity, Forests and Ecosystems.
- I have familiarized myself with the different taxonomic families in the forest area.
- This study tour has helped me a lot in getting the knowledge about the cultural, social and biological diversity in study area.
- I have also acquainted myself with the knowledge of climatic conditions prevailing in study area.

Conclusion

- As we know it, Forests and its resources are universally required for the continuation of human society. It is very essential to create awareness among peoples to use minimum resources from the forest in turns they should involve in forest management in a sustainable manner.
- Loss of forest resources exceeds national boundaries and affects the entire planet. Hence, the roles of various national and international agencies become vitally important in order to minimize any potential downside and to maximize the upside. Governments, NGOs, intergovernmental panels and the like must work more closely in order to resolve the pressing issues facing the forests. In many cases a collaborative approach will provide a solution which is more acceptable to all parties, and more robust than a solution that is developed unilaterally.
- It is with a great deal of urgency that we must turn that record around and ensure that we have sustainably managed forests for the generations that are to follow. Only a long term global commitment to conservation and sustainable development can reverse the tide of uncontrolled deforestation.

Figure 1. *Boehmeria macrophylla* Hornem. (Urticaceae); 2. *Dioscorea pentaphylla* L. (Dioscoreaceae); 3. *Melastoma malabathricum* L. (Melastomataceae); 4. *Ligustrum perrottetii* A. DC. (Oleaceae); 5. *Nilgirianthus heyneanus* (Nees) Bremak. (Acanthaceae); 6. *Nothapodytes nimmoniana* (J. Grah.) Mabberley (Icacinaceae); 7. *Scutellaria discolor* Wall ex Benth. (Lamiaceae); 8. *Senecio bombayensis* Balakr. (Asteraceae); 9. *Tragia muelleriana* Pax et Hoffm (Euphorbiaceae); 10. Group photo in Ramthirth temple, Medhewadi Village, Ajara; 11. Group photo near Hiranyakeshwar temple forest, Amboli

K.L.E. SOCIETY'S

BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE,CHIKODI-591201

PG DEPARTMENT OF COMMERCE AND MANAGEMENT

CERTIFICATE

This is to certify that **Mr. Shivaputra G.Rukade**has satisfactorily completed the project work entitled **"A STUDY ON N0N PERFORMING ASSET UNDERTAKEN AT JANATA CO-OPERATIVE BANK HARUGERI,BRANCH RAIBAG"**for the partial fulfillment of DEGREE IN MASTER OF COMMERCE in **RANI CHANNAMMA UNIVERSITY, BELAGAVI** during the academic year 2018-2019.

Shri. B.B.KALATIPPI
PROJECT GUIDE

Prof. B.S. MALI
CO-ORDINATOR

Dr. M. T. KURANI
PRINCIPAL

PRINCIPAL
B. K. Arts, Science & Commerce College
CHIKODI - 591 201.

NAAC-'A'

ಜನತಾ ಸಹಕಾರ ಬ್ಯಾಂಕ ನಿಯಮಿತ,
ಹಾರೂಗೇರಿ-591220.
ತ. ರಾಯಬಾಗ)
JANATA CO-OPERATIVE BANK LTD; HARUGERI-591220.
ESTD. 1977
R.B.I. LICENCE
NO. : U.B.D. KAN-1499P
Tq. Raibag) ☎ : (08331) 257054, 257747 E-mail : janata_hg@rediffmail.com (Dist. Belgaum

Ref. No.

Date : 6 JUN 2019

CERTIFICATE

This is to certify that **Mr. Shivaputra Gurunath Rukade** M.Com 4th semester student of P G Department of Commerce and Management K L E Society's B K College Chikodi has done his project work entitled as **"Non Performing Asset of Janata Co-Operative Bank Ltd.; Harugeri Branch: Raibag".**

During his 4th semester period i.e., from February 2019 to May 2019, during this period his conduct was good. We wish all the best in his future career, we wish all the success in his future and all the best.

For, Janata Co-op. Bank Ltd.,
Harugrel (HO) Br. Raibag

Br. Manager

CHAPTER-1

RESEARCH METHODOLOGY

INCTTRODUCTION

Finance is essential for every business enterprise to carry out its activities because Finance is one of basic requirements of all economic activates.

The word 'bank ' is derived from the Italian word ,"banc" the French word, ''Basque" the Latin word ,"bancs" Which means a bench or desk used for changing Currency and lending money.

Bank are the financial mediation playing very important role in economic Development of all the nations of the world and form the core of money market so banking is the life blood of modern commerce.

A BANK is an institution which deals in money and credit In other words bank is an Institution accepting money as deposit for lending besides the accepting the deposit and Lending money bank possess the character of an agent because of its various agency services Since all the banking function are carried on with the aim of making profit, it is regarded as a commercial institution.

Finance is the set of activities dealing with the management of fund. More specifically, it is the decision of collection and use of funds. It is a branch of economics that studies the management of money and other assets.

Finance is also the science and art of determining if the funds of an organization are being used properly. Though financial analysis, companies and the business can take decision and corrective actions towards the sources of income and expenses and investments that need to be made in order to stay competitive.

Finance is the blood of business. It flows in mostly form scale of goods and Services. It flows out for meeting various types of expenditure. The activating element in any business which may be on industrial or commercial undertaking is the finance. Business finance has been defined as those activities which have to do with the provision and management of fund for the satisfactory conduct of business. Business finance is defined as that business activity which is concerned with the acquisition and Conservation of capital fund in meeting

the financial needs and overall objectives of business enterprises so we can say Business finance is mainly developed around three objectives.

Firstly to obtain and adequate supply of capital for the needs of the business.
Secondly to conserve and increase capital through management.
Thirdly to make profit from the use of funds this is an overall of a business enterprise. Before industrial revolution, finance was not of much importance. The methods of production were simple.

BANKING MEANS:

Accepting for the purpose of lending and investment of deposits of money ,from the public , repayable on demand. Order or otherwise and withdraw able by cheque, draft, order or otherwise. Depositors have to be paid interest the members of Souharda have to be paid dividends. Deposited money will have to be discreetly lent to deserving members(non members),so that the souharda achieves the aims and objectives of souharda mentioned In the bylaws approved by the RCS.

DEFENITION OF BANKING:

As per section 5 (b) the Banking Regulation Act "The acceptance for the purpose of Lending or deposits of money from the public repayable on demand, order or otherwise as Withdraw able by cheque, draft, and order or otherwise".

Statement:

The project Non performing asset in **JANATA CO-OPERATIVE BANK Ltd , RAIBAG.**

Scope of the study:

- The present case study on "**JANATA CO OPERATIVE BANK Ltd .,RAIBAG**''covers a study on

- The scope of the study here was confined to the organization only
- The study confines to find out the strategy required to reduce the NPAs.
- The concentration is given only in understanding the NPAs growth with the reference of **JANATA CO-OPERATIVE BANK Ltd., RAIBAG.**
- The data is purely based on the secondary data and collected from website and Journal.
- The scope is limited to drawn conclusion from analysis and interpretation of the Primary and secondary data of the **JANATA CO OPERATIVE BANK., Ltd RAIBAG.**

Objectives of the study:

- To analyze non-performing assets of Bank.
- To evaluate the **JANATA CO- OPERATIVE BANK** assets quality
- To know Cause of NPAs from Borrowers point of view
- To know Cause of NPAs from Bankers point of view
- To know Cause of NPAs from Academicians point of view
- To identify effectiveness of the risk management system undertaken by bank
- To offer useful suggestion to reduce the NPAs in the bank.

Research Methodology:

The present study is mainly based on the primary and secondary data viz.; discussion, annual reports of the bank for the respective year is from 2012 to 2016.The necessary primary data is collected through informal discussion with the secretary, founder, and accounts executive and with the numbers of the bank.

Tools for data collection:

The tools for data collection are divided into two parts i.e.

1. Primary data

2. Secondary data

1) Primary data :

The help and guidance **of Shri A. A. Gurav** are collecting this data who is the Manager of **"JANATA CO OPRETIVE BANK Ltd., RAIBAG"** .The conversation helped to have an idea about the bank,

Source of primary data:

- Questionnaire
- Observation
- Discussion

2) Secondary Data:

Secondary data which includes the annual report of the society for the society for the past year, helped to study the financial aspects of the society .This data shows about the gain/loss In the financial statement of the bank. It is the data, which gives relevant information in the different fields of **JANATA CO-OPERATIVE BANK Ltd, RAIBAG.** The secondary data also includes the data collected from other sources mentioned below.

Secondary data source data collection:

- Annual Report
- Internet
- Books
- Reference Material.

SAMPLE SIZE -

The present study is based on sampling method. To know main causes of NPA from borrower, bankers, and academicians point of view 10 persons from each is selected on convenience sampling technique hence the total sample size is 30 the data primary data is collected with the help of questionnaire from 30 sample respondents.

CHAPTER- 2

INDUSTRY AND BANK PROFILE

INDUSTRY PROFILE

Meaning of co-operative bank:

The term co-operative is derived from the Latin word co-opera, where the word Co means 'With' and operatic means 'to work', Thus co-operation means working together So those who want to work together with some common economic objective can form a Society which is termed a s "co-operative bank". It is a voluntary association of persons Who work together to promote their economic interest. It works on the principle of self-help as well as mutual help.

Co-operative bank means retail and commercial banking organized on a co-operative basis. It includes retail banking ,as carried out by credit unions, mutual savings and loan associations, building societies and co-operatives, as well as commercial banking services provided by mutual organization such as co-operative federations to co-operative businesses.

A co operative so bank is a voluntary association started with the aim of service of its members. It is a form of business where individuals belonging to the same class join their hands for the promotion of their common size.

Definition of co-operative bank:

A type of common property ownership, such as when the residents of a multi unit Housing complex own shares in the corporation that owns the property rather than owning their own units.

Section 4, of the Indian co-operative bank Act, 1912 defines a co operative "as a bank which has its objective the promotion of economic interest of its member's accordance with Co-operative principles"

According to Calvert, a co-operative denotes a co operative denotes a form of organization wherein persons voluntarily associate together as human being on the basis of equality for the promotion of economic interests of themselves.

The principle of co-operative bank:

1. Voluntary association:

The membership of a co-operative organization is voluntary and opens the all adult person having common interest. Any person can become a member of, The Organization irrespective of caste, creed color, sex and religion.

2. Autonomy:

A co operative bank is a self –governing institution. It enjoys the Status of autonomy because it is self-sufficient, self-renewing, and self- Controlling Organization. It has a continues existence because it is not affected on the death of any member of the bank.

3. Capital:

The capital of a co-operative organization is raised from its members in the form of share capital. As the share capital is not sufficient to meet its operational cost, it borrows loan from the government or apex co-operative organization.

4. Service motive:

It is organized to render service to its members and not to make profit. It main principle is to serve the members of the bank.

5. Democratic management:

The management of a co-operative bank is done on democratic line. The management is vested in the band of a managing committee elected by the members. The general body of the member's rules and regulations for the management, the managing committee functions within the framework of the principles framed by the general body.

6. Government control:

The co- -operative organization is subject to the rules and regulation of government because it is the co-operative bank Act, 1919.

Characteristics of co –operative bank:

A co operative bank is a special type of business organization different from other forms of organization you have learnt earlier .Let us discuss its characteristics.

1. **Open membership**:

The membership of a co operative bank is open to all those when have a common interest. A minimum of ten members are Required to form a co operative bank. The co-operative bank. Act does not specify the maximum number of member for any co Operative bank. However, after the formation of the bank, the Member may specify the maximum number of members.

2. **Voluntary Association**

Members join the co operative bank voluntarily, that is by Choice .A member can join the bank as and when he likes , Continue for as long as he likes, and leave the bank at will.

3. **State control**:

To protect the interest of members, co operative bank are placed under state control through registration. While being registered a bank has to submit details about the members and the business it is to Undertake. It has to maintain books of accounts, which are to be audited government auditors.

4. **Sources of finance:**

In a cooperative bank, all the members contribute capital. However, it can easily raise loans and secure grants from government after its registration.

5. **Democratic management:**

Co-operative bank are managed on democratic lines. A group known as "board of directors "manages the bank. The members of the board of directors are the elected representative of the bank. Each member has a single vote, irrespective of the number of shares held.

6. **Service motive :**

Co operative are not formed to maximize profit like other forms of business organization. The main purpose of a co operative bank is to provide service to its members. For example, in a consumer co operative store, goods are sold to its members at a reasonable price by retaining a small margin of profit.

7. **Separate Legal Entity :**

A co operative bank is registered under the co operative bank Act. After registration, a society becomes a separate legal entity, with limited liability of its members. Death, insolvency or lunacy of a member does not affect the existence of a bank. It can purchase or sell properties in its own name.

8. **Distribution of surplus:**

The income of the co-operative banks is distributed among the members based on their capital contribution. According to co operative societies Act 1919 the rate of divided is limited to 9%.

9. **Self-help through co operative**:

Co operative bank thrive on the principle of mutual help. They are the organizations of financially weaker sections of bank Co operative bank convert the weakness of members into by adopting the principle of self-help through mutual co operation. It is only by working jointly on the principle of "Each for all and for each," the members can fight exploitation and secure a place in bank

.

ADVANTAGES OF CO OPERATIVE BANK:

A co operative form of business organization has the following advantages:

1. **Easy formation** :

Formation of a co operative bank is very easy compared to a joint stock company. Any ten adults can voluntarily from an association and get it registered with the registrar of co Operative bank.

2. **Open membership**:

Person having common interest can form a co operative bank .Any competent person can become a member at any time he/she likes and can leave the bank at will.

3. **Democratic Control**:

A co operative Bank is controlled in a democratic manner. The members cast their vote to elect their representatives to form a committee that looks after the day to day administration.

4. **Limited Liability**:

The liability of members of a co operative Bank is limited to the extent of capital contributed by them .Unlike sole proprietors and partners; the personal properties of members of the co-operative bank are free from any kind of risk because of business liabilities.

5. **Elimination of Middlemen's Profit:**

Through co operatives, the members or consumers control their own supplies and thus, intermediaries' profit is eliminated.

6. **State Assistance:**

Both central and state governments provide all kinds of help to the bank help may be provided in the form of capital contribution, loans at low rates of interest, exemption in tax, subsidies in repayment of loans, etc.

7. **Stable Life:**

A co operative bank has a stable life and it continues to exist for a Long Period. Its existence is not affected by the death, insolvency, lunacy, or Resignation of any of its members.

Limitation of co operative bank:

Besides the above advantages, the co operative from of business organization also suffers from various limitations. Let us learn these limitations.

1. **Limited capital:**

   The amount of capital that a co-operative bank can raise from its member is very limited because the membership is generally confined to a particular section of the banks. Again, due to low rate of return the members do not invest more capital. Government's assistance is often inadequate for most of the co operative bank.

2. **Problem in Management:**

   Generally, it is seen that co banks do not function efficiently due to lack of managerial talent. The members or their elected representatives are not experienced enough to manage the bank. Again, because of limited capital they are not able to get the benefits of professional management.

3. **Lack of Motivation:**

   In their best effort and manage the bank efficiently. Every co operative bank is formed to render service to its members Rather than to earn profit. This does not provide enough motivation to the members to put.

4. **Lack of co operation**:

   The co operative banks are formed with the idea of mutual co operation. However, it is often seen that is a lot of friction between the members because of Personality differences, ego clash, etc. The selfish attitude of members may sometimes end the bank.

5. **Dependence on own capital & members:**

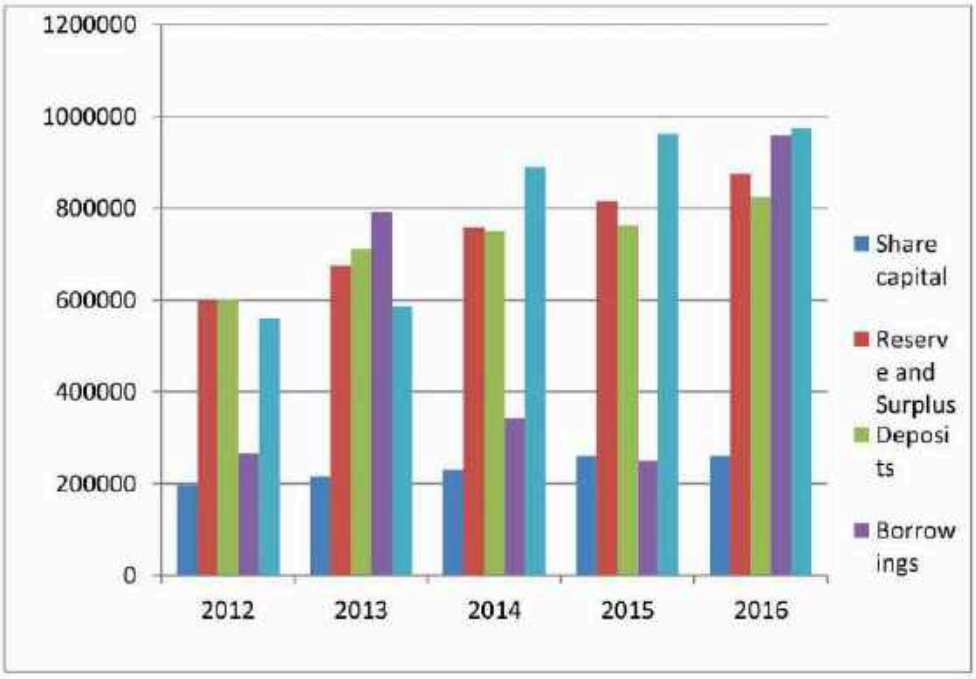
   The inadequacy of capital and various other limitations make co operative banks dependant on the government for support and patronage in terms of grants, Loans subsidies, etc. Due to this, the government sometimes directly interferes In the management of the bank and audits their annual accounts.

BANK PROFILE

JANATA CO OPERATIVE BANK PROGRESS REPORT: (AMOUNT IN 000)

	2012	2013	2014	2015	2016
Share capital	197963	216555	230395	246894	261448
Re & Sur	598904	674654	758554	815900	875383
Deposits	601332	711769	749386	764303	8255742
Borrowing	265236	790384	2491713	249171	960400
Net profit	559188	587034	890834	963084	974360

PROGRESS REPORT:



History:

The name of the bank is **JANATA CO-OPERATIVE BANK LTD., HARUGERI** Established in the year 15-10-1977. The bank is situated in HARUGERI. The bank Register NO.C/ARCD/6193/77-78 AND Reserve bank license number UBD/KAN/1499P.This bank has 3 branches:

1. **Raibag**
2. **Ugarkhurdu**
3. **Athani**

The **Janata co-operative Bank limited** is head quartered at **HARUGERI** is professionally managed bank started back, at a time when banking was less Known to the people. The bank grew in strength over the years. The Janata co-operative Bank three branches spread over in Belgaum. The Bank has ambitious plans for growth in branches total business and profits. The bank has achieved substantial sophistication In the various banking services provided.

REGISTERED OFFICE:

The address of the registered office of the bank shall be Janata co-operative Bank Ltd, Raibag. If a change in above address shall be intimated to the Reserve Bank of India and registrar of co-operative Bank within fourteen days from the date of occurrence of such a change. Such a change of address shall also be immediately published in local news paper and displayed on the bank notice board.

FOUNDER OF THE COMPANT:

Janata co-operative Bank initially started for helping rural people, who are suffering by Poverty. Moreover, founder of the bank **is MR.B.R.PATIL**

Address of the Bank:

Name of the bank	The Janata co-operative Bank Ltd .RAIBAG
year of Establishment	23/09/1977
Nature of business	Service Provide
Turnover	More than Rs.81.37 crore (Approx.)
Location	RAIBAG Tq: Raibag Dis: Belgaum Karnataka-591201 (India) Sub branches: Raibag Ugar Athani
Registered number of Bank	C/ARCD/6193/77-78
Telephone number	08331-257054-257747
Fax no	08331-257747
E-mail	Janata hrg @rediffimali.com
Working hours	10.30 am to 5.3o pm 10.30 am to 2.30 pm Saturday

BOARD OF DIRECTORS:

The Bank has members on the board. **Dr R.B.PATIL** is the chairman and President and managing Director of the Bank.

S.NO	NAME	DESIGNATION
1	**Mr.** Rajshekar B Patila	President
2	**Mr.** BaramuS Bandanikai	Vice president
3	**Mr.** Shreeshail I Palbhavi	Director
4	**Mr.** Satappa B Karnavadi	Director
5	**Mr.** Prakash D Kashetti	Director
6	**Mr.** Appasaheb B Aski	Director
7	**Mr.** Tamamappa S Teli	Director
8	**Mrs.** Rekha C Deshpande	Director
9	**Mr.** Annappa S Terdal	Director
10	**Mr.** C D Mungarwadi	Professional Director
11	**Mr.** A. A. Patila	Branch Manager
12	**Mr.** A. A. Gurav	Branch Manager

Types of Accounts:

DEPOSIT ACCOUNTS

DEPOSIT TERM	NEW INTEREST RATE
1.Savingdeposit	4%
2. Pigmy deposit	3%
46 days to 90 days	5.5%
91 days to 180 days	7.00%
181 days to less than 1 year	8.25%
For 1 year	10.00%
Above 1 year to 3 year	9.50%
Above 3 year	9.00%

LOAN ACCOUNTS:

NAME OF LOAN	RATE OF INTEREST
Cash credit loan	10.50%
House loan (per month)	12.50%
House loan	14.50%
Salary loan	13.50%
Vehicle loan (per month)	14.00%
Plant machinery loan	14.00%
Consumer/durable loan	14.00%
NSC loan	14.00%
Tractor loan	14.00%

Information Technology:

The bank is continuously focusing on improvement in IT related functions to have an edge over market players. The bank continues to leverage information technology as a strategic tool for its business operations, to gain competitive advantage by offering customer convenience and improved services as well as improving productivity and efficiency.

As a measure to reduce operational cost, increase the deposit base and enhance customer service, the bank in increasing the number of ATMs. The bank has introduced the intranet banking facility titled connect.

Staff:

This refers to organizations human resources. How organization human resource is development, trained, socialized, integrated, motivated and how their career development is managed.

Co operative:

Co operative encourage every member of the bank to practice the Indian principles of work: service with devotion sound management practices, professionalism of a high caliber, a cohesive group policy which charters of independence in individual operations are the strengths of the Co-operative, weaves together different operations at co operative, believe that people are the key resources especially in a high tech competitive environment. It is the people behind the work, behind the product and behind the service that make the difference. That is the reason we take exceptional care to hire the best both in terms of qualification and attitudes, and constantly train and upgrade.

SKILLS

Skill refers to distinctive capabilities of personnel or of the organization as a whole skill is that for which the staff to develop appropriate new skill, for which it requires a learning

environment. If the staff managers are to acquire the skills, then there needs to be an appropriate learning environment. One that

- Driven by desire to realize the vision.
- Has a sharing culture with mutual support.
- Provides space and time for learning Preferably closely linked to specific tasks and Objectives.
- Allows risk is
- Tolerates failure, provided it is part of the learning process.
- Has visible recognition for success that is built on new learning.

In short, skill refers to the fact that employees have the skill needed to carry out the company's strategy. Training and development ensuring people know how to do their jobs and stay up to date the latest techniques.

List of department and functions:

Department of the bank

- Credit department
- Operation department
- Marketing department
- Cash department
- Clearing department
- Customers relation

1. **Credit department**:

This department mainly concentrates on lending activities to its customers and client .for smoothing of its activities, it has further sub department. This department provides different loan like personal loan, housing loan, education Loan, agriculture loan, etc. while providing loan it evaluate the capability, Background of client and analyze the risk involved in recollecting the same.

Functions

- Examining the proposals.
- Documentations.
- Disbursement of loan.
- Recovering the loan.
- Credit appraisal.

2. **Operation department:**

It is department, which is taking care of daily banking activities for smooth for running of organization. The operation has been delegated average decision authority bin their routine work by management. It full co operation with other department and it is necessary for other department, for smooth running. The management with different criteria has apprised the department, like by customer satisfaction, by branch performance.

Functions:

- DD drafting.
- Out station cheque realization.
- Attending customer's queries.
- ATN office in charge.
- Handling day to day transactions.
- Cash and clearance.
- Handling govt. business
- RTGS (Real Time Gross Settlement System.)

3. Marketing Department:

It is the department, which will take care of organization by way of achieving targeted goals. Means in this department it mainly concentrate on selling security, acquiring more number of deposits, accounts etc. The marketing department has been given decision power 50-90% by the management to achieve their target and, make it success, for achieving.

Function:

- Achieving branch targets
- Coordinating
- Customer service
- Opening of new account(building of new relation)

4. Cash Department:

In this department it evaluates the daily requirements of gash, based on this it is going to maintain liquidity. If the bank having heavy cash liquidity this department will kept all cash in to higher authority bank. The department has been given 50 80% of decision power by management to their routine activities. It has given more contribution to other department in achieving their goals in terms of co operation.

Functions:

- Handling daily cash transaction,
- Balancing cash figure at the end of day.
- Maintaining cash level of the bank.
- Maintaining liquidity

5. Clearing Department:

It is department that is taking care of customer work regarding receiving out station cheques and odds. The department has given average decision power by the management. Regarding co operation, it had no any plans but it is other department as possible. As it is clearing department it has no plans but it is ready accept all positive changes towards improvement.

Function:

- Clearance of out stations cheque.
- Clearance of local cheques.
- CBSS (software name used for giving information to the current account holders)

Product and services:

Consumer banking

Co operative is providing in consumer banking the following products and services:-

- Savings account
- Salary power
- Power salute
- Priority banking
- Women account
- Fixed deposits
- Lockers

Services

- Corporate banking
- Cash management services
- Trade service
- Lending financing

Corporate banking

In corporate co operative is providing following services.

- Cash management services
- Lending financing
- Current account

- Fixed deposits
- Trade service

Cash management services

Through bank cash management service, bank bring to customers a wide array of Collection and payment services for improved liquidity through faster access to their funds and total on their fund movements through customized MIS reports. Banks cash management service solutions include collection service that offer local cheques collection (LCC) at more than 100 locations and upcountry cheques collection (UCC) for more than 800 locations

Lending /Financing:

- Working capital finance
- Cash credit/working capital demand loan
- Term lending
- Agricultural loan
- Asset securitization
- Channel finance
- Bank guarantees

Trade service:

- Bills discounting
- L/C backed bills discounting
- Drawer bills discounting
- Drawer bills discounting

Infrastructural facilities:

- Electricity
- Post and Telephone facilities
- Technical education
- Banking infrastructure
- Computerization

Future growth and prospects:

- To encourage thrift, self-help and co operation among the members, Associate members, nominal member's depositors of the bank.
- To mobilize or borrow funds.
- To prepare and finance projects to improve the economic condition of the members Particularly those belonging to weaker section of the Bank.
- To lend money to its members of hire purchase, Hypothecation of motor vehicles as defined in the motor vehicles act.
- To possess, acquire, alter, or construct site/building etc. for the used and convenience of business of the bank.
- To open branches, sub branches, pay offices within the area of operation of the bank with the prior permission of Reserve Bank of India and to frame rules for their business.
- To create funds for the promotion of co operative education.
- To issue, to accept, to sell or purchase promissory notes, drafts, warrants, share certificates and other negotiable instruments on behalf of its customer.
- To create funds for promotion of education of members children subject to the limits Prescribed by the board.
- To act as guarantor on behalf of the bank members and customers by issuing guarantee. to government semi government organizations.
- To extend financial and technical assistance to the un employed to start their owns

industry profession.

- To buy or sell foreign including foreign bank notes with the permission or Reserve Bank of India.

- To accept discounting of bill, to provide safe deposit lockers and other minor services.

Recommendation and Built-up proposal to Head office:

After completing field study Branch manager forwards to the head office. He has to give his own opinion about loan proposal and recommend on that proposal. His recommendation or opinion is very important to the head office to evaluate the loan proposal. The loan sanction wholly depends upon his recommendation of branch manager. Because he is nearer to the applicants ability to repayment of interest and principal .

He must examine consequence of the loan, sanction, and highlight risk factors. The branch manager will inform to the head office about applicant and his ability to repayment it .The applicant and what would be the income after loan sanction. The branch manager .

CONDUCT OF MEETINGS:

- Annual General meeting one in every year.
- Board of directors meeting every month
- Staff based meeting
- Cluster head meeting
- Department head meeting

THE FOLLOWING TYPES OF SHARES:

- Equity shares
- Preference shares

PRODUCT AND SERVICES PROFILE:

- Deposits
- Short term loans
- Long term loans

DEPOSITS:

- Fixed deposits
- Saving deposits
- Recurring deposits
- Current deposits
- Pigmy deposits

SHORT TERM LOANS:

- Personal loan
- Mortgage loan
- Vehicle loan

RECOUREMENT TO OPEN AN ACCOOUNT:

- Fill the form
- Affix a passport size photo
- Attached identity proof I e photo proof, address proof, etc ….

The McKinney 7smodel involves seven interdependent factors which are categorized as either "hard or soft" elements

Hard Elements:

- Strategy
- Structure
- Systems

Soft Elements:

- Shared values
- Skills
- Style
- Staff

The entire profile of the organization which has been presented in according with McKenzie's 7's model this 7'S model states that there are seven basic dimensions which execute us to influence complex and large organization.

I.STRATEGY:

A set of decision and action aimed at gaining a sustainable competitive advantage. It includes mission and vision of the bank. The term strategy is derived from the Greek world 'strategy' which means general. Strategy can be defined as the general programs of action and deployment of resource to attain comprehensive objectives. Strategy is the route that the organization has chosen for future growth, and plan an organization formulates to gain sustainable competitive advantage.

II.STRUCTURE:

The structure of organization is what follows from division of work, the tasks and Responsibilities, both horizontally and vertically. It is the total of various ways in which the work is divided into separate tasks and the way in which these tasks are operated. It also includes how the policies and procedures, govern the way in which the organization acts within itself and within its environment. Structure of any organization is the frame work in which the activities of the organization members are co ordinate.

III.STYLE:

Style refers to the employees shared and common way of thinking and behaving unwritten norms of behavior and thought. The managerial approach is more projects focused than process focused. The management is likely mixture of self management for customer facing activities and task management for organizational activities.

IV.SYSTEMS:

The system refers to the procedure, processes and routine that characterize how important works has to be done like financial system, hiring, promotion and performance appraisal systems, information systems. Systems require capabilities in both information technology and in organizational process methods and control. The capabilities are required in:

a) Information technology &information system.

b) Sales and service.

V.STAFF:

This refers to organization human resources. How organizations human resource is development, trained, socialized, motivated and how their career development is managed JANATA Bank encourages every member of the bank to practice the Indian principle of work service with devotion. Sound management practices, professionalism of a high caliber, a cohesive group policy which charters of independence in individual operations are strengths of Janata Bank Weaves together different operations into one single stand of its corporate value system.

VI.SKILLS:

Skills refer to distinctive capabilities of personnel or of the organization as a whole. Skill is that for which the staff to develop appropriate new. Skills for which it requires a learning environment. One that

- Is driven by desire to realize the vision.
- Has a sharing culture with mutual support.
- Allows risk.
- Has visible recognition for success that is built on new learning

VII. SHARED VALUES:

- Providing quality service effectively and efficiently.
- Smile, it enhances your face value is a service quality stressed on.
- Periodic customer services audits.
- Maximization of stakeholder value.

SWOT ANALYSIS OF CO OPERATIVE BANK:

STRENGTH:

- JANATA BANK has been in the banking industry since 1977. It has successfully. Completed SILVER JUBLI CEREMINY.
- The bank has a sound network i e. it providing mobile SMS service to their customer.
- The bank is having well experienced, trained, most, dedicated and committed staff it has a strong customer base.

OPPORTUNITIES:

- The bank can optimize the growth opportunities arising out of retail banking and small and medium enterprises.
- Future expansion of business network and possible arrangement of sharing network of other bank by issuing mutual funds and insurance.

THREAT:

- Bank is facing competition from its other private sector banks.
- Changing economic policies of government will have serious impact on interest rates And reserve maintained with RBI.

CHAPTER- 3

CONCEPTUAL FRAME WORK OF THE STUDY

MEANING OF BANK:-

It is very difficult to define the term "BANK" precisely on account of the numerous activities performed by a modern bank. Dr H L Hart defines a banker s one who in the ordinary course of business honors' cherubs drawn upon him by persons from and for whom the receive money on current account according to this definition, the essential characteristics of bank are.

a. Acceptance receiving of current deposits

b. Payment of cherubs drew against those deposits I.e. repayment of that deposit.

The banking regulation act 1949, defines the terms "banking company as any company which transacts the business of banking in India'' the term banking as accepting for The purpose of lending or investment of deposits of money from public repayable on demand or otherwise withdrawal by cherubs, draft order.

NON PERFORMING ASSETS

MEANIN OF NPA:

As asset is classified as Non per-forming asset (NPA) if dues in the. However with effect from March 2004, default status would be given to a borrower if dues are not paid for 90 days. If any advance or credit facilities granted by the bank to a borrower becomes non performing then the bank will have to treat all the advance/credit facilities granted to that borrower s non performing without having any regard to the fact that there may still exit certain advances/credit facilities having performing status.

Non-performing asset "Lease or loan where the lessee or borrower is not making timely payments, payments are no longer anticipated or maturity date has passed without fulfillment of the agreement. In such cases, the lessor or lender may allow some time (typically not exceeding 90 days) before asking for additional collateral, demanding the full payment of the balance, or taking repossession or foreclosure action.

A non performing asset (NPA) is a loans or advance for which the principal or interest payment remained overdue for a period of 90 days.

DEFINITION OF NON –PERFORMIHG ASSETS:

NPA [supervision of banking business directives (Directive no SSB/3212002)] Defines the term non-performing is, "loans or advances whose credit equality has deteriorated such that full collection of principle and or interest in accordance with the contractual repayment terms of the loan or advances in question". For purposes of this directive, loans or advances with per-established repayment are non-performing when principal and or interest is due uncollectible for 90 days or more beyond the scheduled payment date or maturity.

A "Non performing assets'' (NPA) was defined as a credit facility in respect of which the interest and installment of principle as remained 'past due' for a specified period of time. An amount due under any credit facility is treated as "past due" when it has not been paid within 90 from the due date. Due to the improvement in the payment and settlement systems, recovery climate, up gradation of technology in the banking system, etc, it was decided to dispense with 'past due' concept, with effect from March 31, 2004.Accordingly, as from that date, a non performing assets (NPA) shall be an advance where

90 DAYS OVERDUE NORM:

With a view to moving towards international best practices and to ensure greater transparency, it has been decided to adopt '90 days overdue norm' for identification of NPAs, from the year ending march 31,2004.Accordingly, with effect from march 31, 2004, a NPAs shall be a loan or an advance were;

- Interest and installment of principal remain overdue for a period for more than 90 days in respect of a term loan,
- The account remain 'out of order' period of more than 90 days, in respect of an Overdue/cash credit (OD/CC),
- Interest and installment of principal remains overdue for two harvest season but for a Period not exceeding two half year in the case of an advance grantee for agriculture Purpose.

- Any amount to be received remains overdue for a period of more than 90 days in respect of other account

As a facilitating measure for smooth transition to 90 days norms, bank has been Advised to more over to charging of interest at monthly rates, by April 1, 2002 however, the date of classification of an advance as NPA should not be changed on account of changing of interest at monthly rests. Bank should therefore, continued to classify an account as NPA only if the interest charged during any quarter is not serviced fully with 180 days from the end of the quarter is not service fully with 180 days from the end of the quarter with effect from Aril 1, 2002 and 90 days from the end of the quarter with effect from march,3 2004

"Out of order status"

As account should be treated as 'out of order' if the outstanding balance remains Continuously in excess of the sanctioned limit drawing power. In cases where the outstanding balance in the principal operating account in less than the sanctioned limit drawing power, but there are no credits continuously for to be reduced to 90 days, with effect from march 31, 2004. has on the date of balance sheet or credits are not enough to cover the interest debited the same period, this accounts should be treated as 'out of order'

'Overdue'

Any amount due to the bank under any credit facility is 'overdue' if it is not paid on the due date fixed by the bank.

ASSET TYPE	Percentage of provision
Sub standard	10%
Doubtful 1(up to 1 years)	20%
Doubtful 2 (up to 3 years)	30%
Doubtful 3 (above 3 years)	50%
Loss assets	100%

THE CONCEPT OF GROSS NPA:

Income recognition is not possible once an account becomes NPA. Interest accrued on non- performing loans account is debited to the respective accounts and credit to the interest suspense account instead of profit and loss account. Usually no debits are permitted in NPA expect unavoidable expenditure like litigation expenses, insurance, etc. hence the balance outstanding in an NPA account includes;

1. Balance as on date of becoming an NPA.
2. Interest accrued but not realized.

On balance sheet date banks make provisions for loans losses, this provision is calculated not on the balance outstanding but on the net balance, balance net of the amount kept in the interest suspense account this book balance of the net interest suspense account is known has gross NPA.

But in cases where guarantee claim is receive from credit guarantee corporations like ECGC, before making the provision for loan losses, such clime received is also netted from the gross NPA. The terminology net NPA indicates the balance in interest suspense account. For evaluation RBI and other rating agencies relay on purpose usually the net NPA balance. Thus gross NPA means, balance outstanding minus balance in interest suspense account. Net NPA means; gross NPS minus balance claim received amount and provisions outstanding in that account.

IMPACTION OF NPA

At the macro level NPAs have choked off the supply line of credit of the potential lender thereby having a deleterious effect on capital formation and arresting the economic activity in the country.

At the macro level, unsustainable level of NPs has eroded current profits of banks and Fly. They lead to reduction of interest income and increase in provisions and have restricted and recycling of funds leading to various assets liability mismatches. Besides this, it has led

to erosion in their capital base reduction in competitiveness. The problem of NPA is not a matter of concern to banks and Fly alone. It is the matter of grave concern to the country and any bottleneck in the smooth flow of credit is bound to create adverse repercussion in the economy. The mounting menace NPAs has raised the cost of credit, made Indian business man uncompetitive as compared to their counterparts in other countries.

It has made bank more advance to risk and squeezed genuine small and medium Enterprises (SMEs) from accessing competitive credit and throttled their enterprising spirits as well, to a great extent

Due to their crippling effect on the operation of the bank, Asser quality has been considered as one of the most important in the measurement of bank's performing under the CAMELS supervisory rating system of RBI.

REVERSAL OF INCOME

If any advance, including bills purchased and discounted, becomes NPS as at the close of any years, interest accrued and credit to income account in the corresponding previous year, should be revised or provided for if the same is not realized. This will apply to government guaranteed accounts also. If respect of NPAs, fees, communication and similar income that have accrued should cease to accrue in the current period and should be reversed for with respect to past records, if uncollected.

REASONS FOR NPAs:

In priority sectors advances;

- Directed and per-approved nature of loans sanctioned under sponsored programs.
- Miss- utilization of loans and subsides.
- Diversion of funds.
- Absence of security .
- Lack of effective follow –up (post sanction supervision and control)
- Absence of bankruptcy and fore –closure loans.
- Decrepit legal system .
- Cost in- effective legal recovery measures.
- Difficulty in execution of decrees obtained.

In Non – priority sector advances:

- Inadequate credit appraisal.
- Demand recession.
- Industrial sickness and labor problems.
- Slow legal system.
- Diversion of funds.
- Willful default.
- Technology obsolescence.
- Managerial inefficiency.
- Political compulsion and corrupt.

OVER ALL BANKING AND NPA

BANKING REFORMS IN INDIA:

The nationalization of major commercial bank in the year 1969 and 1980 hand brought radical changes in the banking system in India. It had brought about major shifts in the priorities in banking operations.

Most of the banks were under capitalize and some and of them even with negative worth. Thus there was a compelling need for a change and various policy corrections had to be taken with the view of strengthening the economy. Thus the government of India was forced it initiate a process of reforming the financial sector which banks constitute a dominate part. The reforms process includes:

- Introduction of prudential norms.
- Transparency in balance sheet.
- Deregulation of interest rates.
- Partial deviation from directed lending.
- Up gradation of technology.
- Entry of new private sector banks.

EMERGING BANKING TRENDS:

During the current financial year, the focus of non-going reforms in the banking sector was on soft interest rates regime, increasing operational efficiency of banks, strengthening regulatory mechanisms and on technological up gradation. As a set towards a softer rate regime, RBI in its annual policy statement had advise banks to introduced flexible interest rate system for new deposits, announce a maximum spread over PLR for all advances other than consumer credit and to review and to review the present maximum spread over PLR and reduce them wherever they are unreasonable high

A BRIEF HISTORY OF NAP:

The concept of assets quality on the books of public sector bank (PSBs) and financial institution came into being when RBI introduced prudential norms on the Recommendation of the Narasimha committee in the year 1992-1993. The committee recommended that an asset may be treated as NPA, If interest or installment of principal remains overdue for a period exceeding 180 days and that banks and FIs should not take into their income account, the interest accrued on such NPAs unless it is actually received or recovered. The committee also recommended that assets be classified into four categories:

1. **Standard**
2. **Sub standard**
3. **Doubtful and**
4. **Loss assets**

And that certain specified of the same be held as provision there against before the reform process, bank were booking income on an accrual basis and they balance sheet did not reflect their true specified health. Thus the profit, capital and reserves were overstated by them.

After 10 year of NPA terror in the banking industry, "now the banks have teeth' a new law lightens the burden of bad loan for Indian banks. The law that has been the catalyst for the bad loan cleans up passed India's parliament in November 2002.it allows lender to more easily foreclose on debtors assets or even demand or even demand a change in

management. Within weeks of the law's passage, banks saw a flood of loans once deemed unrecoverable being repaid in double time. The act is the securitization and reconstruction of financial assets and enforcement of security up of asset management companies for addressing the problems of NPAs of banks FIs

LENDING BEHAVIOUR OF BANKS:

Due to the excess liquidity in the banking system, banks are now giving credit to even non-priority in an aggressive manner. Now banking give credit more to unproductive purpose. Like car loans, housing loans consumer durable loans and personal loans. This reckless lending paves the way to payment irregularities and more of NPA in the banking system. But on the other side economy has become buoyant and the borrowings are now in position to repay the loans even if it is unproductive loans. Bank has improved their credit appraisal system. NPA percentage in city bank car loan portfolio is zero because of the sophisticated credit appraisal system followed by the bank. Bank now gives priority to 'businesses and lending schemes also follow the path.

CLASSIFICITION OF ASSETS:

CATEGORIES OF NPAs:

Bank are required to classify non-performing assets further into the following three categories based on the period for which the assets has remained non performing and reliability of the dues:

1. **Sub standard assets**

2. **Doubtful assets**

3. **Loss assets**

SUB-STANDERED ASSETS:

A sub- standard asset was one, which was classified as NPA for a period not exceeding two years. With effect from 31 march 2001, a sub-standard asset is one, which has remained NPA for a period less than or equal to 18 months. In such cases the current net worth of the borrowing guarantor or the current market value of the security charged is not enough recovery of the dues to the bank in other world, such an asset will defined credit weakness that jeopardize the liquidation of the debt and are characterized by the distinct possibility that banks will sustain some loss, if deficiencies are not corrected. With effect from 31 march 2005, a sub standard asset would be one, which has remained NPA for a period less than or equal to 12 months.

DOUBTFUL ASSETS:

With effect from March 31, 2005, an asset would be classified as doubtful if it has remained in the substandard category for a period of 12 months. A loan classified as doubtful has all the weaknesses inherent in assets that were classified as substandard, with the added characteristic that weaknesses make collection or liquidation in full, on the basis of currently known facts, conditions and values highly questionable and improbable.

LOSS ASSETS:

A loss asset is one where loss has been identified by the bank or internal or external auditors or the RBI inspection but the amount has not been written off wholly. In other words, such an asset is considered uncollectible and of such little value that its continuance as a bankable asset is not warranted although there may be some salvage or recovery value.

It should be noted that the above classification is only for the purpose of computing the amount of provision that should be made with respect to bank advances and certainly not for the presentation of advances in the bank balance sheet. The third schedule to the banking regulation act 1949 solely governs presentation of advance in the balance sheet. Bank have started issuing notice under the securitization act, 2002 directing the defaulter to either pay back the dues to the bank else give the possession of the secured asset mentioned

in the notice. However, there is a potential threat to recover if there is substantial erosion in the value of security given by the borrower has committed fraud.

TYPES OF NPA:

1. Gross NPA

2. Net NPA

Gross NPA:

Gross NPAs are the sum total of all loan assets that are classified as NPAs as per RBI guideline as on balance sheet date. Gross NPA reflects the real NPAS and the quality of the loans made by banks. It consists of all the nonstandard assets like as sub –standard, doubtful, and loss assets. It can be calculated with the help of following ratio:

Gross NPAs Ratio = Gross NPAs / Gross advances

Net NPA:

Net NPAs are those of NPAs in which the bank has deducted the provision regarding NPAs.Net NPA is obtained by reducing the provisions from Gross NPAs and shows the actual burden of banks.

Net NPAs = Gross NPAs – provisions on Gross Advances

CREDIT INFORMATION BUREAU (CIB):

It is in this context that facility of CIB become relevant. A CIB provides an institutional mechanism for sharing of credit information on borrowers and potential borrowers among bank and FIs. it acts as a facilitators for credit dispensation and helps mitigate the credit risk involved in lending.

HIGH COST OF FUNDS DUE TO NPA:

Quite often genuine borrowers face the difficulties in raising funds from banks due to mounting NPAs either the bank is reluctant in providing the requisite funds to the genuine borrowers or the funds or provided, they come at a very high cost to compensate the lender's losses caused due to high level of NPAS.

Therefore quite often corporate prefer to raise funds through commercial papers (CPs) where the interest rates on working capital charged by the bank is higher the main purpose of this notice is to inform the borrower that either the sum due to the bank or FLs be paid by the borrower or else the former will take action by way of taking over the management of company. Thus the bankers under the aforementioned act will have the much needed authority to sell the assets of the defaulting companies or change their management.

RISK MANAGEMENT:

Banking and risk are inseparable and risk management assumer significance as the banks have to take considerable risks. Analysis of risks also assumers importance as it determines the pricing for the products. As banking is subject to several types of risks like market risk, credit risk, liquidity risk, default risk, interest rate risk, investment risk, transaction risk, et., proper perception and evaluation of risk is extremely important and any short coming on this score can play havoc on the financial decision. It has been that in banks managing NPAs has been a reactive response rather than a proactive function. In a market driven environment, volatility and risk have increased considerably in any credit dispensation. Hence, a proper perception and evaluation of risk become essential along with market intelligence about the industry concerned.

CREDIT APPRAISA SYSTEM :

Provision of standard assets from migrating to non performing status is most important in NPA management. This depends on the style of credit management mechanism available in banks. The quality of credit appraisal and the effectiveness of post credit appraisal and effectiveness of post credit follow up influences the asset quality of the banks in big way.

At pre-credit stage:

- Extensive enquiry about the character and the credit worthiness of the borrower.

- Viability of the project to be financed is meticulously studied.
- Adequate coverage of collateral is ensured to the extent possible.
- Financial statement of the borrower are obtained and poor analysis of their financial strength is done.
- Parts from the published financial statement independent enquiries are enquiries are made with previous bankers.
- Per- credit inspection of the assets to financial is made.

At post- credit stage:

- Operations in the account are the closely monitored.
- Unit visit is done at irregular intervals.
- Asset verification is done on a regular basis.
- Borrower submits control returns regular.
- Accounts are periodically to evaluate the financial health of the unit.
- Early warning singles are properly attended to.
- Close contract with the borrower is maintained.
- Potential NPAs are kept under special watch list.
- Potential viable unit are restructured.

THE NPA PROBLEM:

The origin of the problem of growing NPAs line in the quality of managing credit risk by the bank which are concerned. What is needed is having adequate preventive an effective post-disbursement supervision.

Bank concerned should continuously monitor loans to identify account that have potential to become non-performing. The performance in terms of profitability is a benchmark for any business including the banking industry. However, increasing NPAs have a credit impact on banks profitability as legally banks are not allowed to books income on such account and at the same time bank are forced to make provision on such assets as per the RB I guidelines. Also, with increasing deposit made by the public in the banking System, the payment capacity of banks. Further, RBI successful creates liquidity in the system the system through various rate cuts and banks fail to utilize this benefit to its advance due to the fear of burgeoning non-performing assets.

SUB-STANDARD ASSETS

The segment is more effort elastic in terms of recovery and hence the bank's recovery Police is not to tuned up for maximizing the recoveries from the sub standard efforts.

NPA RECOVERY ACTION PLAN:

- Send simple remainder letter in installment/ interests debited are not service on due dates

- If no result are forthcoming form the remainders, meet the borrower in person and Persuade them to settle the accounts persons.

- Officials from the assets recovery cell at the regional office to compulsorily meet by Borrower With RS.500000 and evaluation the reasons for the non performing accounts and suggest evolve methods to improve the quality.

- In cases of sick but viable industries unites prospects for rehabilitation are too look in to a nursing program to be evolved.

DOUBTFUL ASSETS:

Slippage of assets from sub standard category to doubtful necessities higher provisions requirements. Depending on the age of asset, 20% to 5o% provision has to be made on such assets on the secured portion and 100% provision is required on the unsecured provision. Recovery of the doubtful assets in the normal course is difficult; the following strategies can be adopted in handing doubtful assets:

- Borrower is to be met in person to get the accounts settle through persuasion.
- Ensure that the securities charged to the bank are intact and intact and are not alienated. Securities are to be inspected at

- A periodic intervals and correct value properly recorded.
- Legal remedy is the last resort.
- Most of the accounts coming under this category are either suit filed or Initiated case of suit field accounts, cases are be closely followed up with the advocated to ensure that decree is obtained within a reasonable time.

LOSS ASSETS:

CHANCES OF RECOVERY IN MOST OF THEASE CASES ARE VERY REMOTE:

1. It recovery in the normal course is difficult, they may have to legal remedies against the borrowers, guarantor, and efforts shall be made to bring them to a compromise table for the settlement of accounts.

2. In case of account coming under priority sector, recovery through the RR route to be resorted too.

3. As per loss assets are concerned they have made 100% provision for loan losses. Hence there will not be any further impact on bottom line. Such national write off will help in cleansing the balance sheet .

4. Even after write off the branches can continue the recovery efforts thus made and improve the bottom line of the bank.

5. Recovery through legal action is time consuming.

GENERAL REASONS FOR ASSETS BECOMING NPAs:

A multiplicity of factor is responsible forever increasing size of NPAs in banks. A few prominent reasons for assets becoming NPAs are as under.

- ❖ Poor credit appraisal system.
- ❖ Lack of proper monitoring.

- Reckless advances to achieve the budgetary targets.
- There is not or lack of corporate culture in the bank. In adequate legal provision on foreclosure and bankruptcy.
- Change in economic policies/ environments.
- No transparent accounting policy and poor auditing practices.
- Lack of consideration between banks.
- Directed lending to certain sectors.
- Failure on the part of the promoters to bring their portion equality from their own source or public Issue due to market turning lukewarm.

REASONS FOR NON RERFORMANCE IN LOAN ASSETS:

- Antiquated legal system in the country and the defaulter taking shelter under this.
- Even DRT cases are not getting setting the way it was envisaged when tribunals were set up.
- In agriculture sector poor recovery has been due to various factors recovery and RPAS advances have been affected by the sharp fall in rubber prices. Throughout the country aqua culture miserably failed due to reasons beyond the control of the borrowing we are not an exception.
- Poor recovery in schematic loans is mainly due to willful default by the borrowers.
- Default in share loans has been due to setback in securities market and sharp decline in the values of equities.

MEASURES FOR NPA CONTAINMENT:

MEASURES TO TACKLE NPAs:

Seeing the gravity of the situation, RBI has taken several constructive steps for arresting the incidence of NPAs. It has also created a regulatory environment to facility the recovery of existing NPAs of banks.

1) **Loch Adalats:** lock adalats have been setup for recovery of dues in accounts falling in the doubtful and loss category with outstanding balance up to Rs 500000, by way of compromise settlements. This mechanism has proved to be a quite effective for speedy justice and recovery of small loans.

2) **Debt recovery tribunals:** DRTs which have been set up by the government to facilitate the speedy recovery by banks / DFIs have not been able to make much impact on loan recovery due to a variety of reasons like inadequate number, lock infrastructure, under

3) **Corporate debt restructuring:** corporate debt restructuring (CRD) mechanism is an additional viable unity. Corporate debt restructure system was set up, in accordance with the guidelines of RBI evolved in consolation with government of India the objective of the corporate debt restructuring system is to ensure a timely and transparent mechanism for restructuring of corporate debts for viable entities and to minimize the losses to the creditors and other stakeholders through an orderly and co ordinate restructuring program. With corporate debt restructuring banks can arrest fresh slippage of performing into the magnitude of the assets. Under the system standard, sub-standard doubtful assets can be restructured the corporate debt restructuring mechanism is based upon effective co ordinate among banks.

4) **Assets reconstruction companies (ARCs):** one of the most effective ways of removing NPAs from the books of banks/DFIs would be to move these out to a separate agency which buy the assets and make its own efforts for recovery. On this front, the SRES act has provided a frame work for setting up to ARCs in India a pilot company called assets reconstruction company (India) limited (ARCIL) has been set up under the sponsorship of IDBI, ICICI bank, SBI and other.

5) **Reduction in NPAs:** the problem of the existing NPAs is currently being tacked in several ways. Efforts are made through negotiations and discussions with the borrowers to bring them around to settle the dues such settlement in the form of one time settlement (OTS) and negotiated settlement (NS) are now being increasingly used by banks to reduce the level of NPAs under these schemes banks focus on maximum payment.

6) **Legal reforms:** the legal framework sets standards of behavior for market participants details the rights and responsibilities of transacting parties assures that completed transactions are legally binding and also provides the regulators with the necessary teat to ensure complains and adherence to law. Banking as the problem of NPAs ins closely linked with the issue of legal reforms the government has taken up initiatives to align the legal set up with the requirements of the banking.

7) **Securitization:** securitization enables risk sharing and trading of loans where the bas assets of banks can securitize and sold at a discount. The lending institution's NPAs are hence removed from their balance sheet and instead funded by investors through negotiable financial instruments.

CHAPTER-4

DATA ANALYSIS AND INTEPREATION

NO. 4.1:

TOTAL NPA ACCOUNTS

YEAR	NO. OF NPA A/C
2011-2012	10
2012-2013	8
2013-2014	15
2014-2015	12
2015-2016	18

(Source: Annual Reports from 2011-12 to 2015-16)

GRAPH NO. 4.1:

TOTAL NPA ACCOUNTS

INTERPRETAION:

Table 4.1 indicates total NPA accounts for the study period in 2011-2012 they 10 are NPA accounts in 2012-2013 number of NPA accounts is decrease to 8 only.

But in 2013-2014 number of NPA accounts where increased to 15, from the above data it can be interpreted that there is fluctuations in study period.

TABLE NO. 4. 2:

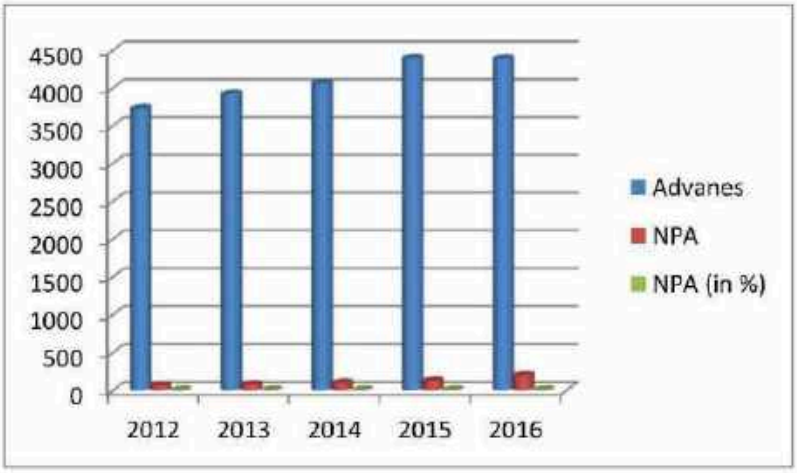
ADVANCES, TOTAL NPA AND % OF NPA

YEAR	ADVANCE (LAKH)	NPA (LAKH)	NPA (IN %)
2012	3730	64.53	1.73
2013	3921	80.79	2.06
2014	4069	102.48	2.51
2015	4394	126.12	2.87
2016	4388	199.68	4.55

(Source: Annual Reports from 2012 to 2016)

GRAPH NO. 4. 2:

ADVANCES, TOTAL NPA AND % OF NPA



INTERPRETAION: Data in Table 4.2 indicates total advance, total NPA and %of NPA for study period for the year 2012 total NPA amount is 64.33(lakh), it is lowest for the study period. In the year 2016 it is increased to 199.68 lakh it is

highest in the in study period. They is increasing trend in NPA amount, which is not good sign for bankers.

Table No.4:3

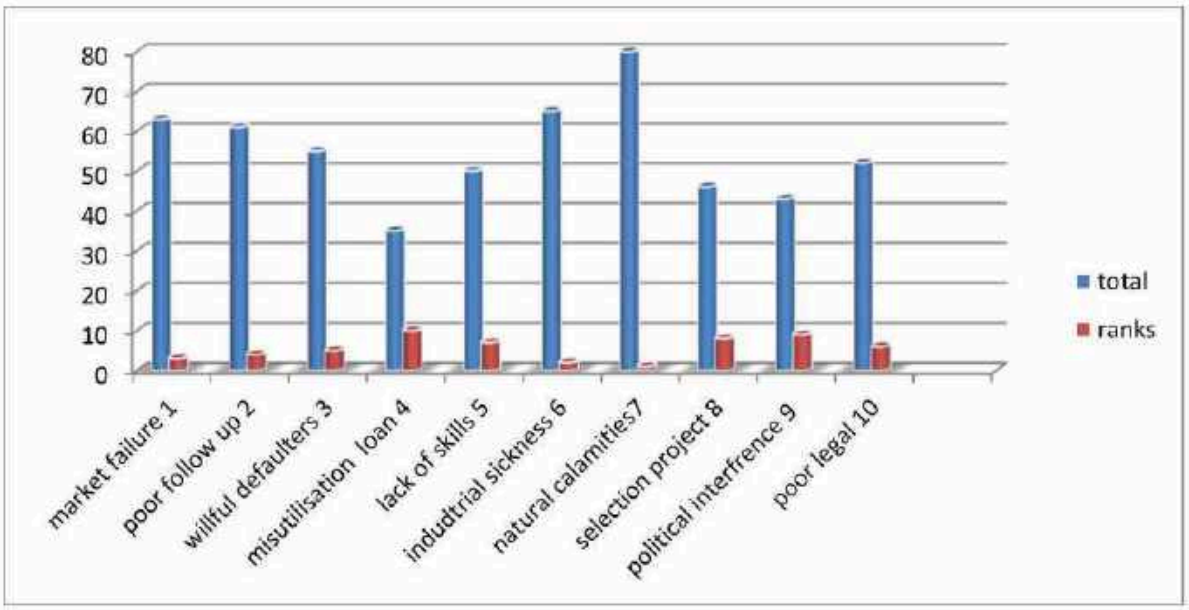
Main cause of NPAs from Borrowers point of view.

Sl N0	Causes	Weights.										Total Wtd Pts.	Ranks
		I 10 pts	II 9 Pts	III 8 pts	IV 7 pts	V 6 pts	VI 5 pts	VII 4 pts	VIII 3 pts	IX 2 pts	X 1 pts		
1	Market failure.	2 (20)	2 (18)	0 (0)	1 (7)	0 (0)	1 (5)	2 (8)	1 (3)	1 (2)	0 (0)	63	3
2	Poor follow up & Supervision.	1 (10)	1 (9)	1 (8)	2 (14)	2 (12)	1 (5)	0 (0)	0 (0)	1 (2)	1 (1)	61	4
3	Willful defaulters.	0 (0)	1 (9)	1 (8)	2 (14)	1 (6)	1 (5)	2 (8)	1 (3)	1 (2)	0 (0)	55	5
4	Misutilisation of loan amount.	0 (0)	0 (0)	1 (8)	0 (0)	1 (6)	1 (5)	1 (4)	2 (6)	2 (4)	2 (2)	35	10
5	Lack of entrepreneurial skills.	1 (10)	1 (9)	1 (8)	1 (7)	1 (6)	0 (0)	0 (0)	2 (6)	1 2)	2 (2)	50	7
6	Industrial sickness.	1 (10)	2 (18)	3 (24)	1 (7)	0 (0)	0 (0)	0 (0)	1 (3)	1 (2)	1 (1)	65	2
7	Natural calamities.	4 (40)	2 (18)	0 (0)	2 (14)	0 (0)	1 (5)	0 (0)	1 (3)	0 (0)	0 (0)	80	1
8	Selection of Unviable project.	1 (10)	0 (0)	2 (16)	0 (0)	1 (6)	1 (5)	1 (4)	0 (0)	1 (2)	3 (3)	46	8
9	Political interference.	0 (0)	0 (0)	1 (8)	1 (7)	1 (6)	1 (5)	2 (8)	2 (6)	1 (2)	1 (1)	43	9
10	Poor legal framework.	0 (0)	1 (9)	0 (0)	0 (0)	3 (18)	3 (15)	2 (8)	0 (0)	1 (2)	0 (0)	52	6

(Source – Field Survey)

GRAPH NO: 4.3

MAIN CAUSES OF NPAs FROM BORROWERS POINT OF VIEW



INTERPRETATION:

Data in table no 4.3 indicates main causes of NPAs from borrowers point of view. Data reveals that among others "Natural calamities (Total 80 wet. Pts.)" is the main cause of NPAs. The second main cause for NPAs is "Industrial sickness (Total 65 wtd.pts.)" the third main cause for loans becomes NPA is "market failure (Total 63 wet. Pts.)" followed by "poor follow up and supervision (Total 61 wtd.pts)" and "willful defaulters (Total 55 wet. Pts.)" Borrowers' point of view the least important reason for NPA is "misutilisation of loan amount (Total 35 wtd.pts).

Table No.4:4

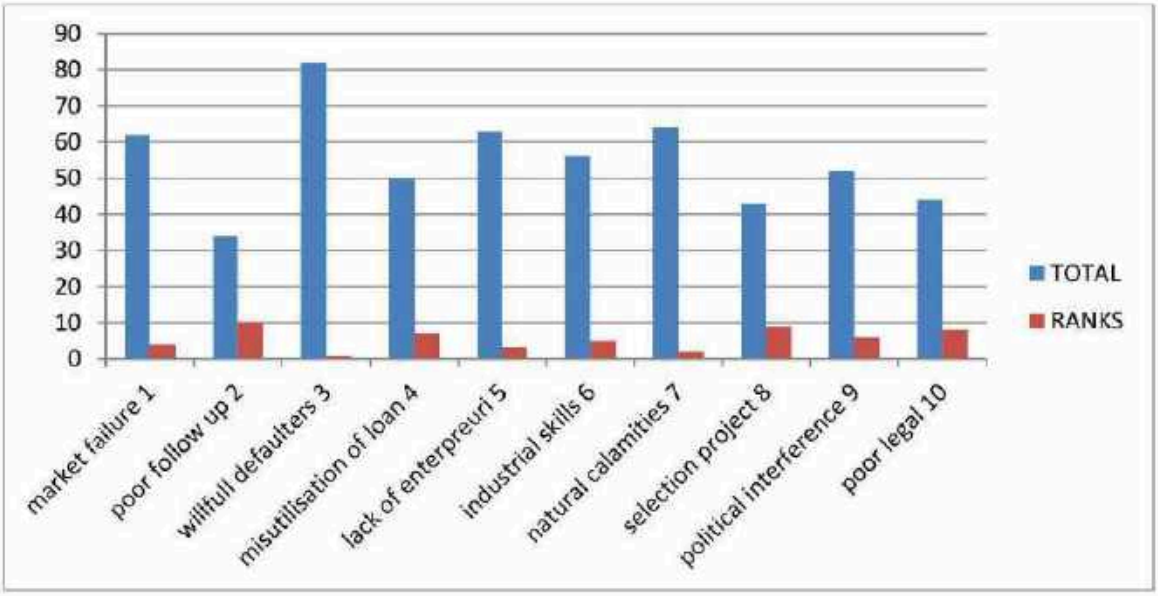
Main cause of NPAs from Banker's point of view.

Sl N0	Cause	Weights.										Total Wtd Pts.	Ranks
		I 10 pts	II 9 Pts	III 8 pts	IV 7 pts	V 6 pts	VI 5 pts	VII 4 pts	VIII 3 pts	IX 2 pts	X 1 Pts		
1	Market failure.	1 (10)	1 (9)	2 (16)	1 (7)	2 (12)	1 (5)	0 (0)	0 (0)	1 (2)	1 (1)	62	4
2	Poor follow up & Supervision.	0 (0)	0 (0)	0 (0)	1 (7)	1 (6)	1 (5)	1 (4)	2 (6)	2 (4)	2 (2)	34	10
3	Willful defaulters.	4 (40)	2 (18)	2 (16)	0 (0)	0 (0)	1 (5)	0 (0)	1 (3)	0 (0)	0 (0)	82	1
4	Misutilisation of loan amount.	1 (10)	1 (9)	1 (8)	1 (7)	1 (6)	0 (0)	0 (0)	2 (6)	1 (2)	2 (2)	50	7
5	Lack of entrepreneurial skills.	1 (10)	2 (18)	1 (8)	3 (21)	0 (0)	0 (0)	0 (0)	1 (3)	1 (2)	1 (1)	63	3
6	Industrial sickness.	0 (0)	1 (9)	2 (16)	1 (7)	1 (6)	1 (5)	2 (8)	1 (3)	1 (2)	0 (0)	56	5
7	Natural calamities.	2 (20)	2 (18)	1 (8)	0 (0)	0 (0)	1 (5)	2 (8)	1 (3)	1 (2)	0 (0)	64	2
8	Selection of Unviable project.	0 (0)	0 (0)	1 (8)	1 (7)	1 (6)	1 (5)	2 (8)	2 (6)	1 (2)	1 (1)	43	9
9	Political interference.	0 (0)	1 (9)	0 (0)	0 (0)	3 (18)	3 (15)	2 (8)	0 (0)	1 (2)	0 (0)	52	6
10	Poor legal framework.	1 (10)	0 (0)	0 (0)	2 (14)	1 (6)	1 (5)	1 (4)	0 (0)	1 (2)	3 (3)	44	8

(Source – Field Survey)

GRAPH NO 4.4

MAIN CAUSES OF NPAs FROM BANKERS POINT OF VIEW



INTERPRETATION:

Data in Table No .4.4 reveals main causes of NPAs from banker's point of view. Data indicates that among others "willful defaulters (Total 82 wet. Pts.)" Is the main cause of NPA. The second main reason for NPA is "Natural calamities (Total 64 wtd.pts.)"The respondents' opinion that "lack of entrepreneurial skills (Total 63 wtd.pts.)" is the third main cause for NPA followed by market failure (Total 62 wtd.pts.)".Respondent's opinion that "poor follow up and supervision (Total 34 wet. Pts.)"is the least important cause for NPAs.

Table No.4:5

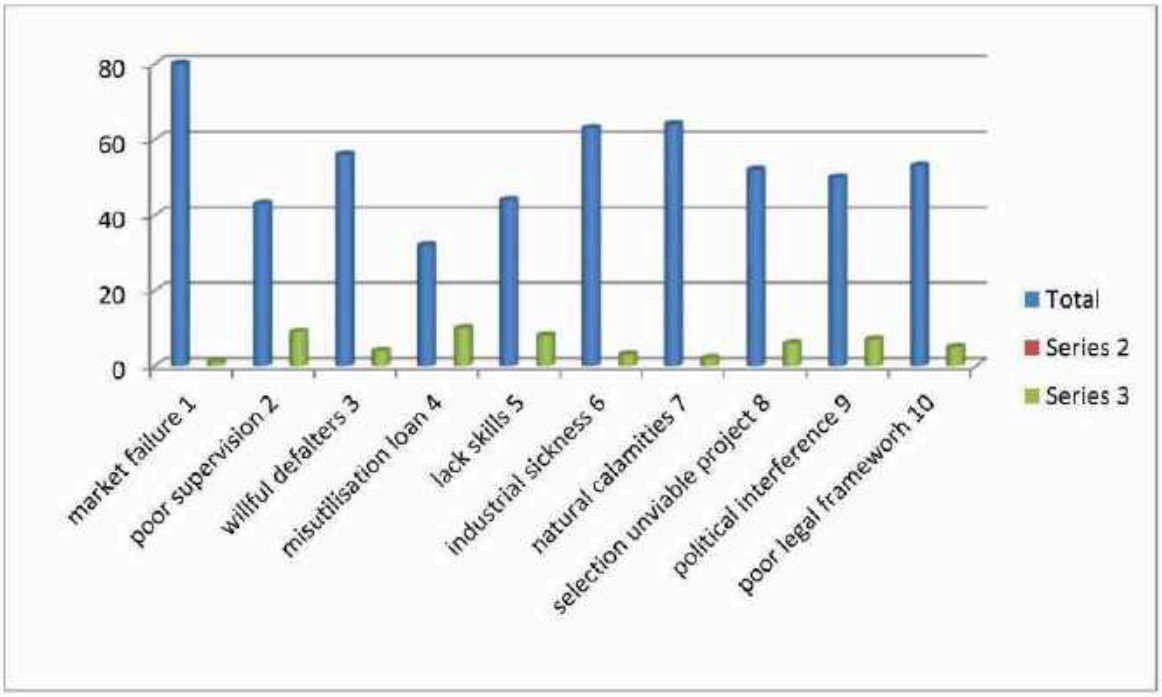
Main causes of NPAs from Academicians point of view.

Sl N0	Cause	Weights.										Total Wtd Pts.	Ranks
		I 10 pts	II 9 Pts	III 8 pts	IV 7 pts	V 6 pts	VI 5 pts	VII 4 pts	VIII 3 pts	IX 2 pts	X 1 Pts		
1	Market failure.	2 (20)	4 (36)	2 (16)	0 (0)	0 (0)	1 (5)	0 (0)	1 (3)	0 (0)	0 (0)	80	1
2	Poor follow up & Supervision.	0 (0)	0 (0)	1 (8)	1 (7)	1 (6)	1 (5)	2 (8)	2 (6)	1 (2)	1 (1)	43	9
3	Willful defaulters.	0 (0)	1 (9)	2 (16)	1 (7)	1 (6)	1 (5)	2 (8)	1 (3)	1 (2)	0 (0)	56	4
4	Misutilisation of loan amount.	0 (0)	0 (0)	0 (0)	1 (7)	1 (6)	1 (5)	1 (4)	2 (6)	1 (2)	2 (2)	32	7
5	Lack of entrepreneurial skills.	1 (10)	0 (0)	0 (0)	2 (14)	1 (6)	1 (5)	1 (4)	0 (0)	1 (2)	3 (3)	44	8
6	Industrial sickness.	2 (20)	2 (18)	1 (8)	0 (0)	0 (0)	1 (5)	2 (8)	1 (3)	1 (2)	0 (0)	63	3
7	Natural calamities.	2 (20)	1 (9)	1 (8)	3 (21)	0 (0)	0 (0)	0 (0)	1 (3)	1 (2)	0 (0)	64	2
8	Selection of Unviable project.	1 (10)	1 (9)	2 (16)	1 (7)	2 (12)	1 (5)	0 (0)	0 (0)	1 (2)	1 (1)	52	6
9	Political interference.	1 (10)	1 (9)	1 (8)	1 (7)	1 (6)	0 (0)	0 (0)	2 (6)	1 (2)	2 (2)	50	7
10	Poor legal framework.	1 (10)	0 (0)	0 (0)	0 (0)	3 (18)	3 (15)	2 (8)	0 (0)	1 (2)	0 (0)	53	5

(Source – Field Survey)

GRAPH NO.4:5

MAIN CAUSE OF NPAs FROM ACADEMICIANS POINT OF VIEW



INTERPRETATION:

Data in table no. 4.5 depicts the main causes of NPA from Academicians point of view. Respondents opinion that among others "market failure (total 80 wtd. Pts.)" is the main cause of NPA. The second main cause for NPA is "Natural calamities (Total 64 wtd.pts.)".The third main cause for NPA is "Industrial sickness (Total 63 wtd.pts.)" and "poor legal framework (Total 53 wtd.pts.)".Respondents' opinion that "misutilisation of loan amount (Total 32 wtd.pts.)" is the least important cause for NPAs.

CHAPTER-5

FINDINGS, SUGGESTIONS AND CONCLUSION

FINDINGS

- Form borrowers point of view the main cause of NPA is natural calamities (Total 80wtd.pts.) followed by industrial sickness (Total 65wtd.pts.) and market failure (Total 63 wtd.pts.)

- From bankers point of view the main cause of NPA is willful defaulters (Total 82wtd.pts.). The second important cause is natural calamities (Total 64wtd.pts.).

- From academician point of view the main cause of NPA is market failure (Total 80wtd.pts.) followed by natural calamities (Total 64wtd.pts.) and industrial sickness (Total 63wtd.pts.)

- The janata co operative bank has taken steps to implement an integral Risk management system covering credit operational and market risk.

- The share capital trend is static and constant.

- The account of NPA shown that the no. of NPA account are fluctuated.

- The advances have been increased over the year.

- There are a large number of small loans scattered apart thus making recoveries Very difficult.

- The banks do not have proper database about the defaulter of the past. first of all there is no way of rejecting a loan proposal on the basis of earlier default. In fact there is no systematic method of interbank sharing of information but there is a also lack of communication between branches of the same bank.

- The existing system is a tool for pricing a loan and is not appropriate for evaluating the risk involved. The system incorporates many control factors which do not reflect the credit risk.

- The financial parameters used are static figures as on balance sheet date. Historical trend of number of previous year are no taken into account hence the figures do not give a complete picture of the financial position of the company.

- Inadequate staff for recovery.

- There is large number of scattered accounts

- Easy and personalized banking.

- Janata co operative bank has good image.

SUGGESTIONS

- Banks should continuously monitor loans to identify accounts that have potential to become non performing.

- By observing data I would like to suggest maintaining the stability of share capital.

- By observing data I would like to suggest the no. of NPA accounts bank should reduce the NPA account.

- By observing data I would like to suggest keeping the increasing trend in the advances.

- Janata co operative bank should offer rescheduling of loans of those borrowers who were struggling with high interest rates in a falling interest rate environment.

- Janata co-operative bank should concentrate more on credit appraisal monitoring credit risk management and recoveries.

- Finding out real reason behind irregular repayments or defaults and if it is Willful then offer good debt management advices the borrower.

- Nameplate indicating hypothecation of assets in favor of the financing bank may be affixed to assets lie carts vehicles' rickshaws etc. This will prevent to some extent the assets changing hands.

- Approaching borrowers before due date the for payment of the loan should coincide with the borrowers cash flows. Bank should intimate borrowers regularly regarding

the due dates of payments that are approaching. Harvesting regarding season should be used effectively to recovery of due

- Branch wise analysis of overdue –branch wise analysis of overdue may be don and in those branches where overdue as a percentage of advances exceed a specified limit a special recovery department may set up. These cells can take up not only monitoring of bad loans but existing loans as well. Senior official man visit branches to regular intervals

- Insist PAN card while operating the bank accounts.

- Bank should adopt the modern methods like internet banking credit cards, ATM etc.

CONCLUSION

NPA act is fine comprehensive and an extra-ordinary price of legislation. it is also a assuring sing of governments commitment to reforms. The act empowers bank to change or take over the management or even take possession of secured assets of the borrowers and sell or lease out assets. This is for the first time the banks can take over the immovable assets of the defaulting borrowers without the intervention of the court. They can claim future receivables and supersede the board of directors of the defaulting corporate. No court other than debt recovery tribunal can entertain any appeal against the action taken by banks and financial institutions under this act

The problem bad loans could be due to bad intention or bad financial management or otherwise and also due to several external reasons. The main concern is the prevention of further slippage of performing accounts into the non performing category in the first instance.

Preventing fresh flow of NPAs is as important as the recovery of the existing heavy stock of NPAs. There cannot be any quick fix or one short solution to solve the NPA problem once recovery reforms are carried out market for stressed assets are developed this securitization act will surely help banks in reduction of NPAs to a great extent. Passing of law cannot be considered to be synonymous with addressing the underlying problem our legal system has to far failed to enforce contractual obligations and strictly enforced in true letter and spirit. Banks should also be empowered to proceed against the personal assets of the directors of the defaulting units /companies /group etc. to enable the act be more effective and proactive as well.

Exchange of credit information among banks would be of immense help avoid possible NPAs. The banking system ought to be so grader that a default at one place is recognized as a defaulter by the system. The system will have to provide a mechanism to ensure that the unscrupulous borrowers are unable to pay one bank against the other.

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Five years Annual report

CAUSES OF NPAs FROM BORROWERS POINT OF VIEW

Sl No.	Causes	Ranks
01	Market failure	
02	Poor follow up and supervision.	
03	Willful defaulters.	
04	Misutilisation of loan amount.	
05	Lack of entrepreneurial skills.	
06	Industrial sickness.	
07	Natural calamities.	
08	Selection of unviable project.	
09	Political interference.	
10	Poor legal framework.	

CAUSES OF NPAs FROM OFFICIALS POINT OF VIEW

Sl No.	Causes	Ranks
01	Market failure	
02	Poor follow up and supervision.	
03	Willful defaulters.	
04	Misutilisation of loan amount.	
05	Lack of entrepreneurial skills.	
06	Industrial sickness.	
07	Natural calamities.	
08	Selection of unviable project.	
09	Political interference.	
10	Poor legal framework.	

CAUSES OF NPAs FROM ACADEMICIANS POINT OF VIEW

Sl No.	Causes	Ranks
01	Market failure	
02	Poor follow up and supervision.	
03	Willful defaulters.	
04	Misutilisation of loan amount.	
05	Lack of entrepreneurial skills.	
06	Industrial sickness.	
07	Natural calamities.	
08	Selection of unviable project.	
09	Political interference.	
10	Poor legal framework.	

KLE Society's

BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE, CHIKODI

(Accredited at 'A' with 3.26 CGPA in 3rd Cycle of A & A)

DEPARTMENT OF CHEMISTRY

REPORT

ON

INDUSTRIAL VISIT

TO

SHREE DOODHAGANGA KRISHNA SAHAKARI SAKKARE KARKHANE NIYAMIT

Chikodi, Examba Nanadi road, Nanadiwadi, Karnatak State , India

ON

24/03/2018

Arranged for B.Sc final year students

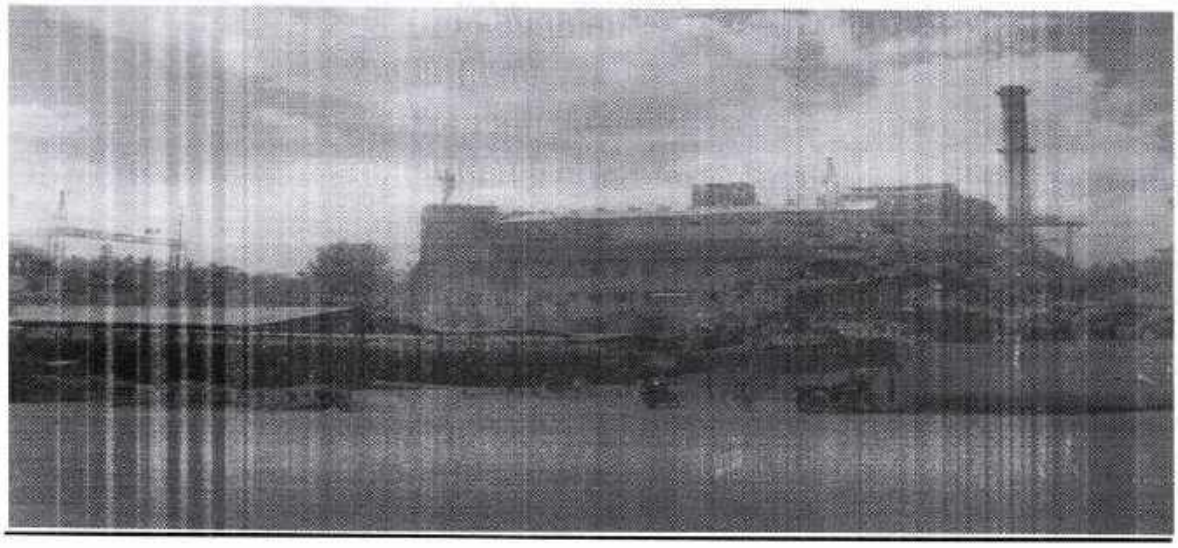
INDUSTRIAL VISIT REPORT

One Day Educational Industrial Visit To Shree Doodhaganga Krishna Sahakari Sakkare Karkhane Niyamit Chikodi, Examba Nanadi road ,Nanadiwadi, Belagavi-591247,Karnatak State , India.

Our college arranged one day Educational visit to **Shree Doodhaganga Krishna Sahakari Sakkare Karkhane Niyamit Chikodi,Examba Nanadi road ,Nanadiwadi**, on 24thMarch 2018 for B.Sc final year (VI sem) students of Chemistry Department . This industrial tour was helpful to inculcate the processes of manufacture of sugar from sugarcane juice amongst the students and the faculty members.

Name of company	Shree Doodhaganga Krishna Sahakari Sakkare Karkhane Niyamit Chikodi.
Address of company	Post: chikodi, Examba Nanadi road, Nanadiwadi, Belagavi-591247, Karnatak State , India
Chairman of company	Shri. Amit P. kore
Established year	1974
Nature of business	Producing sugar, Power , Spirits(Ethanol).
Capacity	5500 TCD TO 10000, 30 KLPD Ethanol & Cogeneration Power Plant 20.5 MWhr to 50 MWhr.
Date of visit	24thMarch 2018
Branch involved	Department of chemistry (B.Sc. PCM And CBZ VI sem)
Concerned subject	B.Sc.VIth sem Chemistry Paper –II Prctical Curriculum
Total students	151
Transport facility	College bus

Faculty coordinators	1. S.B.Banakar 2.Raju 3.M.B.Dandin 4. .P.M.Palankar 5. S.D.Kotabagi 6 S.S.Latte 7. P.B.Dubale
Objectives	1. To understand the operations that are used in the sugar industry. 2. To impart the knowledge of waste production of useful chemicals(Ethanol) out of waste during manufacture. 3. To inculcate knowledge of applied chemistry in manufacturing.



Outcome	Students have experienced the actual operations which are being taught in the classroom e.g. evaporation, crystallization etc.

HOD
Head of the Department of Chemistry
B. K. College, CHIKODI - 591 201

PRINCIPAL
PRINCIPAL
B.K.Arts, Science & Commerce College
CHIKODI - 591201.

K.L.E. SOCIETY'S
BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE, CHIKODI – 591 201.

(Accredited at 'A' Grade by NAAC with CGPA Of 3.26 In 3rd Cycle)

Date:18/03/2018

Department of Chemistry

Notice

As every year department of chemistry is organizing an Industrial visit to Shree Doodhaganga Krishna Shakari Sakkare Karkhane Niyamit Chikodi (DKSSK Chikodi), On 24 March, 2018 for B.Sc final year students.

Objectives of Industrial visit:
1. To create awareness about manufacturing process of industry.
2.To give industrial exposure.

Departure Time: 8:30 A.M on 24th March, 2018

Arrival Time:6:00 P.M. on 24th March, 2018

Name of Industry: Shree Doodhaganga Krishna Shakari Sakkare Karkhane Niyamit Chikodi (DKSSK Chikodi), *Examba Nanadi Rd, Nanadiwadi, Karnataka State , India*

All B.Sc. Final year students are required to register their names along with 100/- Rs. In department of chemistry on or before **20th March, 2018** without fail.

Note: Industrial visit is compulsory for all B.Sc. final year students.

HOD
Department of Chemistry
B K College, CHIKODI - 591 201

KLE Society's
BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE, CHIKODI
(Accredited at 'A' with 3.26 CGPA in 3rd Cycle of A & A)

Date:14/03/2018

To,
The Managing Director,
Shree Doodhaganga Krishna Shakari Sakkare Karkhane
Niyamit Chikodi (DKSSK Chikodi),
Examba Nanadi Rd, Nanadiwadi, Karnataka State , India

Sir,

Sub: Seeking Permission for Industrial Visit to your esteemed organization.

As part of the Rani Channamma University Belagavi, curriculum of B.Sc. final year students have industrial visit. To facilitate the onsite working procedure of a esteemed organization such as yours and the curriculum demand, we request you for the industrial visit. Kindly permit us to visit your esteemed organization for a team of 45 students 3 groups (Including staff member) on 24March 2018..

Kindly grant us permission for the industrial visit and make the necessary arrangement for the same. We look forward to a positive reply from your side.

Thanking You,

Yours Sincerely,

Prof. S .B. Vanjire,
Head of the Department of chemistry,
KLE'S B.K.College , Chikodi-591201, Dist: Belagavi
Contact: 7349747434

Website: www.klesbkcollegechikodi.edu.in

14 MAR 2018
Shree Doodhaganga Krishna
akari Sakkare Karkhane
amit,Chikodi-591247

REG. NO: S1715738 ROLL.NO: 156

K.L.E SOCIETY'S

BASAVAPRABHU KORE ARTS, SCIENCE & COMMERCE COLLEGE, CHIKODI

Reaccredited At 'A' Level by NAAC

DEPARTMENT OF ZOOLOGY

B.sc – 2nd SEMESTER

2017 – 2018

CERTIFICATE

Date: 17/4/18

This is to certify that Shri/miss Sachin Kore *Examination registration No: of* 2nd *semester zoology has satisfactorily completed study tour for studying "Biodiversity" as prescribed in the syllabus by the Rani channamma University, Belagavi during the year 2017-2018.*

Staff member SR Patades

Incharge of the batch

Head of the department

HEAD
DEPARTMENT OF ZOOLOGY

Examiners 1)

2)

List of the students who have participated in study tour

Sl No.	Roll No.	Name of the Student
1	145	AKSHATA AJIT UPADHYE
2	146	AKSHATA ANIL MIRJE
3	147	ANIKET KALLAPPA BEKKERI
4	148	APURVA PRAKASH PATIL
5	149	JASMIN RASHID TAMBOLI
6	150	JAYASHREE APPASAHEB MALI
7	151	LAXMI MALLAPPA METRI
8	152	PALLAVI ASHOK THORUSHE
9	153	POOJA RAJSHEKHAR PUJARI
10	154	PRACHI BASAVARAJ PATIL
11	155	PRAJAKTA ARUN LATAWADE
12	156	SACHIN RAMU KORE
13	157	SAMAREEN JAHANGIR JAMADAR
14	158	SHIVANI MALLAPPA METRI
15	159	SHUBHAM RAMACHANDRA JAKATE
16	160	SOUMYA SAGAR SHEDBALE
17	161	TANUJA APPASAHEB SHINDHE
18	162	AKSHATA ANAND WALAKE
19	163	AROODH MALLIKARJUN MALLAPURE
20	164	BHAVANA CHANDRAKANT SARAPURE
21	165	CHAITRA APPAYYA MATHAPATI
22	166	CHAITRA GOPAL MUKKANNAVAR
23	173	PRATIK SHASHIDHAR KATTIMANI
24	174	PREETAM ASHOK PAWAR

ACKNOWLEDGEMENT

We are indebted to our beloved Principal Dr. M. T. Kurani for his all kind of help in this regard.

With deep sense of gratitude let us express our indebtedness to Prof. Y.H.Yalavigi, H.O D, Prof. M.S.Yadawade, and Miss. Shweta Potadar, Department of Zoology for their support to undertake this field visit on *Study of Biodiversity of lizards in Belgaum district.*

And also thankful to V.S.Devarushi and our friends who helped in completing this project.

Introduction

We planned a field visit which is compulsory as mentioned in 2nd semester syllabus of RCU. Studying in class rooms is not enough to understand the concept of subject in case of some portion of syllabus. Class room study may not expose us to a reality so, observation in-vivo is inevitable. The subject we wanted to study in field was Biodiversity.It was one day visit So, we confined our visit to surrounding area of Kanakumbi which is hilly area. This we undertook on 03/02/2018.

Lizards observed during study tour

1.Chameleon

2.Wall lizard

3.Calotes

4.Varanus

5.Skink

Chameleon

SCIENTIFIC CLASSIFICATION

Kingdom ; Animalia

Phylum ; Chordata

Class ; Repttilia

Order ; Squamata

Suborder ; Iguania

Clade ; Acrodonta

HABITAT ; Chameleon live in a variety of habitat, from rain forests and lowlands to desert, semi-deserts, scrub savannas, and even mountains.

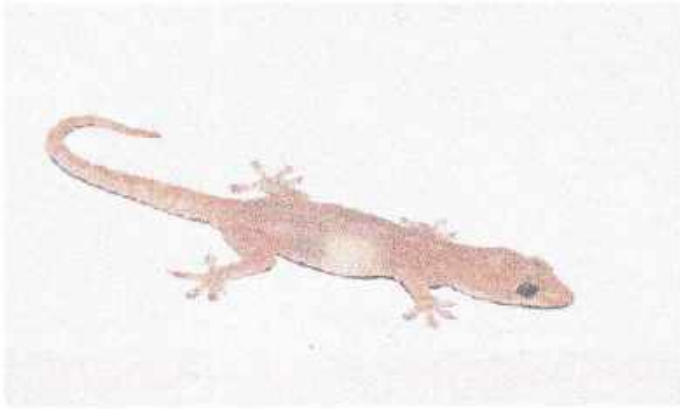
many inhabitat trees, but some live in grass or on small bushes, fallen leaves, or dry branches

FOOD ; A well balanced veiled chameleon diet consists of :

-A variety of insects, including gut-loaded(recently fed) crickets, roaches, mealworm, and waxworm

-* dark, leafy green vegetables such as collard greens; pothos and ficus leaves

Wall lizards



- SCIENTIFIC CLASSIFICATION
- Kingdom ; Animalia
- Phylum ; Chordata
- Class ; Reptilia
- Order ; Squamata
- Family ; Lacertidae
- Genus ; *podarcis*
- Species ; P.muralis

- HABITAT ; In dry areas, the species is largely found in humid or semi-humid habitats. It the more northern parts of its range it is mostly found in the driest areas , it can be occur in rocky and scree areas , scrubland , deciduous , and coniferous woodland , orchards , vineyard, fields , stonewall , and on buildings

- FOOD ; Wall lizards eat flying and ground insects such as files and beetles along with many types of spiders. They are fast predators and have been seen jumping off the ground to catch the flying insects

Calotes

- SCIENTIFIC CLASSIFICATION
- Kingdom : Animalia
- Phylum ; Chordata
- Class ; Reptilia
- Order ; Squamata
- Suborder ; Iguania
- Family ; Agamidae
- Subfamily ; Draconinae
- Genus ; Calotes

- HABITAT ; Terrestrial and arboreal; diurnal; , found in many types of forested land. Prefers dense and bushy hill forest . A skilful and an adept climber, it moves over trees and bushes rather swiftly . It is active durning day time

- FOOD ; A majority lizards eat insects , while most snakes eat smaller vertebrates , including birds , rodents, fish, amphibians, and other reptiles can go for a day, even months without food , and the food that they do eat is used in making more reptiles

Varanus

- SCIENTIFIC CLASSIFICATION
- Kingdom ; Animalia
- Phylum ; Chordata
- Class ; Reptilia
- Order ; Squamata
- Family ; Varanidae
- Genus ; varanus
- Subgenus ; Papusaurus
- Species ; V.salvadorii

- HABITAT ; Most monitor species are terrestrial , but aboreal and semiaquatic montiors are also known

- FOOD ; While most monitor lizards are carnivorous , eating eggs , smaller reptiles , fish , bird , and small mammals , some also eat fruits and vegetation , depending on where they live

Conclusion

Every one of we all worked great in our groups and we studied lot about Biodiversity have visited and observed.It is really wonderful experience to the above all organism because in class room we only imagine but here we know the reality and it increase our thinking capacity.In one day study of biodiversity is tough possible.

We are inspired very much looking at the forest covery and hilly topography of the area. So, we personally visit this area for complete understanding of biodiversity here,

K.L.E. Society's
Basavaprabhu Kore Arts, Science and Commerce
College, CHIKODI -591 201

DEPARTMENT OF ZOOLOGY

B.Sc Fourth Semester

(2017-18)

CERTIFICATE

This is to certify that Mr/Miss ....Akshata Anil More.....**of fourth semester has satisfactorily completed the study tour as prescribed in the practical syllabus by the Rani Chennamma University Belagavi, during the academic year 2017-2018.**

Staff-member in-charge

Head of the Department

HEAD
DEPARTMENT OF ZOOLOGY

Examiners

(1)

(2)

List of the students who have participated in study tour

Roll No.	Sl No.	Name of the Student
72	1	POOJA NAGENDRA KUMBAR
153	2	ABHISHEK MUDAKAPPA MADIWAL
154	3	ALIYAKOUSAR GOUSLAJAM SAYYAD
155	4	ALTAF SHAMAN NADAF
156	5	APARNA PANDURANG BHAGAT
157	6	ARATI SHRIPATI TORASE
158	7	HEMAJEET BAPUSAHEB SHINDE
159	8	NAMRATA DATTA MEDH
162	9	VEENA IRAPPA KENCHANNAVAR
163	10	VIPUL VILAS HERWADE
164	11	AKSHATA ANIL MONE
165	12	AMOL SHANKAR MAGADUM
167	13	AYISHA SIKANDAR BAGAWALE
169	14	DHANASHRI DHANYAKUMAR KANTE
170	15	GAJANAN BASAPPA MANGI
171	16	GIRISH LAXMAN DUNDAGI
172	17	HANAMANT BHIMAPPA HUKKERI
173	18	JYOTI MAHADEVGOUDA PATIL
174	19	JYOTI SHANKAR KAMATE
175	20	JYOTI SHRAVAN KAMBLE
176	21	MANJUNATH SHIVARAI KONGANOLI
177	22	NAMRATA PRABHURAJ CHOUGALE
178	23	NINGAPPA MUTYEPPA DONI
179	24	POOJA BABURAV KURADE
180	25	POOJA SHIVALING MADIVAL
183	26	RAKESH MALAKARI LATTE
182	27	RAJU BHIMU PUNDIPALLE
184	28	RANI GULAB PANARI
187	29	SHANTINATH MANIK KUDACHE
189	30	SHWETA TIPPANNA NERLIGE
190	31	SPOORTI PRABHULING HALEJOL
191	32	SUDHA SUKUMAR UPPAR
192	33	VIJAYLAXMI BHAUSAB PATIL
193	34	VINAYAK PARAPPA DANDIN
194	35	VISHAL APPASAHEB NAIK
195	36	SATISH SHAMARAV HERAWADE
196	37	TIPUSULTAN MUSA AFRAJ
197	38	ALIFIYA ALTAFHUSAIN UMARKHAN
218	39	SHUKRATA RAMESH ZUNJARAWADE

Introduction

We planned a field visit which is compulsory as mentioned in IV semester syllabus of RCU. Studying in class rooms is not enough to understand the concept of subject in case of some portion of syllabus. Class room study may not expose us to a reality so, observation in-vivo is inevitable. The subject we wanted to study in field was mimicry habitats and community of organisms and is available in surrounding area of chikkodi. So, we confined our visit to surrounding area of chikkodi which is hilly area. This one day visit was undertook on 20/01/2018.

ACKNOWLEDGEMENT

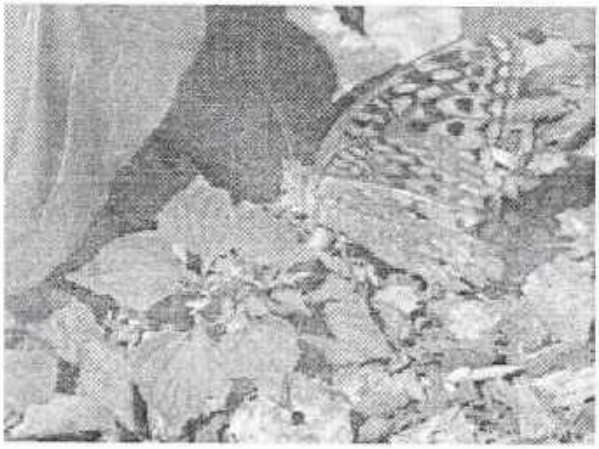
We are indebted to our beloved Principal Dr. M. T. Kurani for his all kind of help in this regard.

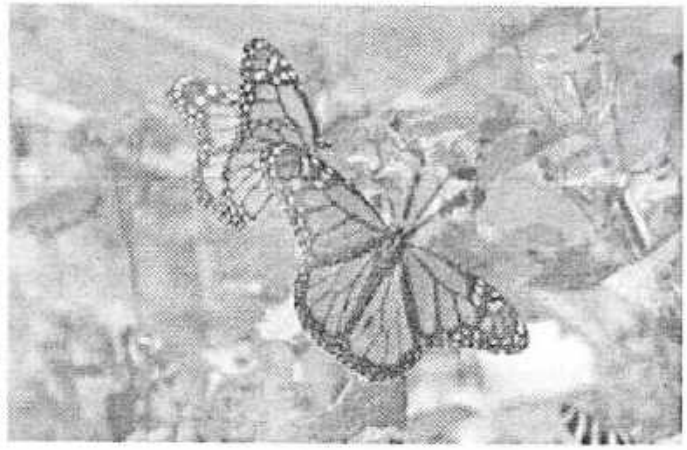
With deep sense of gratitude let us express our indebtedness to Shri. Y.H.Yalavigi, H.O.D., Shri. M. S. Yadwade and Miss. Shweta Potadar, Department of Zoology for his support to undertake this field visit on *Study ofmimicry habitats and community.*

And also thankful to V.S.Devarushi and our friends who helped in completing this project.

Students of IV semester

Butterfly mimicry

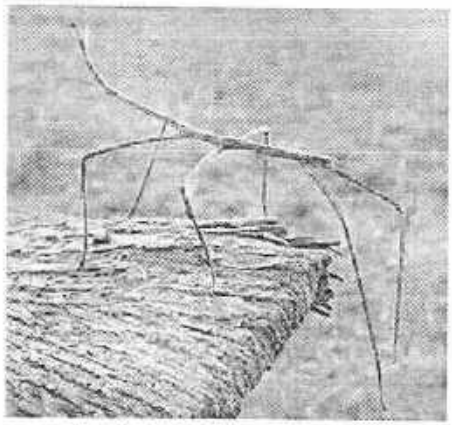




Butterfly behaviour in the garden puddling, petroling and perching. The three p's in butterfly behaviour are puddling, petroling and perching. We have seen all three of these actions when we have observed butterflys but we most likely had no idea what these beauty of creature were doing.

Flower are the main source of food of butterfly. There is not a lot of nutrients in flower nectar.

Stick Insect

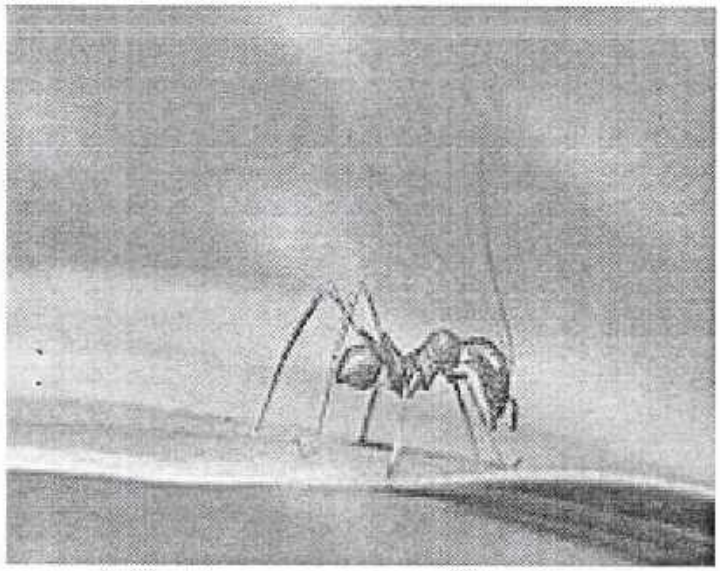


The model is usually another species, except in automimicry, where members of the species mimic other members, or other parts of their own bodies, and in inter-sexual mimicry, where members of one sex mimic members of the other. It is often thought that models must be more abundant than mimics, but it has been shown that this is not necessarily a requirement.

Though visual mimicry through animal coloration is most obvious to humans, other senses such as olfaction (smell) or hearing may be involved, and more than one type of signal may be employed. Mimicry may involve morphology, behaviour, and other properties. In any case, the mimetic signal always functions because it resembles that of another organism. In evolutionary terms, this phenomenon is a form of co-evolution. It can involve an evolutionary arms race if mimicry negatively affects the model, and the model can evolve a different appearance from the mimic. Mimicry should not be confused with other forms of convergent evolution, which occurs when species come to resemble each other by adapting to similar lifestyles that have nothing to do with a common signal receiver.

Mimics may have different models for different life cycle stages, or they may be polymorphic, with different individuals imitating different models. Models themselves may have more than one mimic, though frequency dependent selection favours mimicry where models outnumber mimics.

Ants



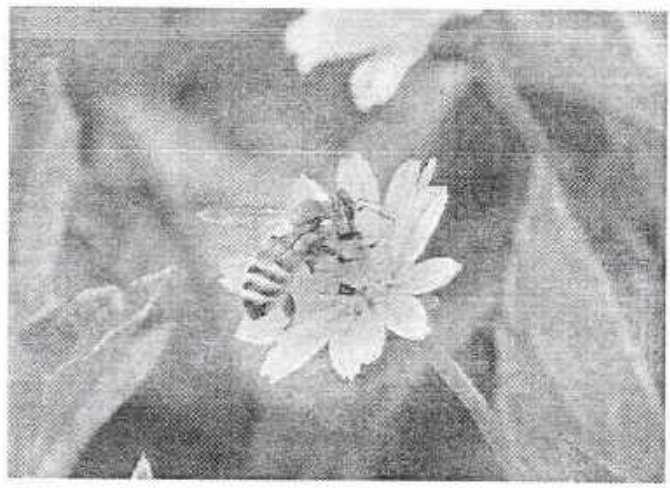
Defensive or protective mimicry takes place when organisms are able to avoid harmful encounters by deceiving enemies into treating them as something else.

The first three such cases discussed here entail mimicry of animals protected by warning coloration:

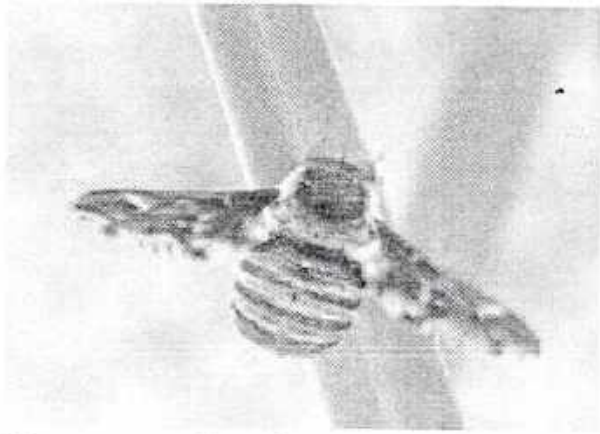
- **Batesian mimicry, where a harmless mimic poses as harmful.**
- **Müllerian mimicry, where two or more harmful species mutually advertise themselves as harmful.**
- **Mertensian mimicry, where a deadly mimic resembles a less harmful but lesson-teaching model.**

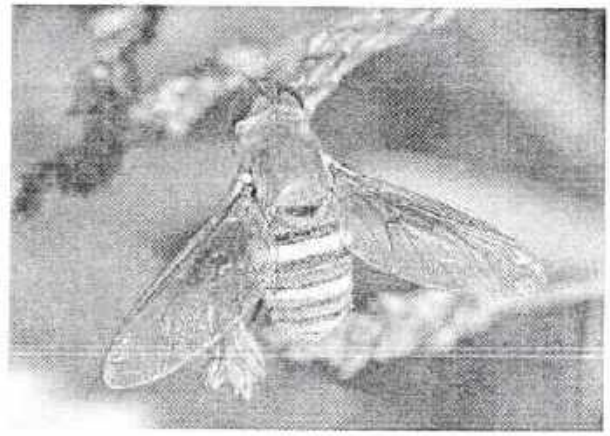
The fourth case, Vavilovian mimicry, where weeds resemble crops, involves humans as the agent of selection.

Bees Mimicry



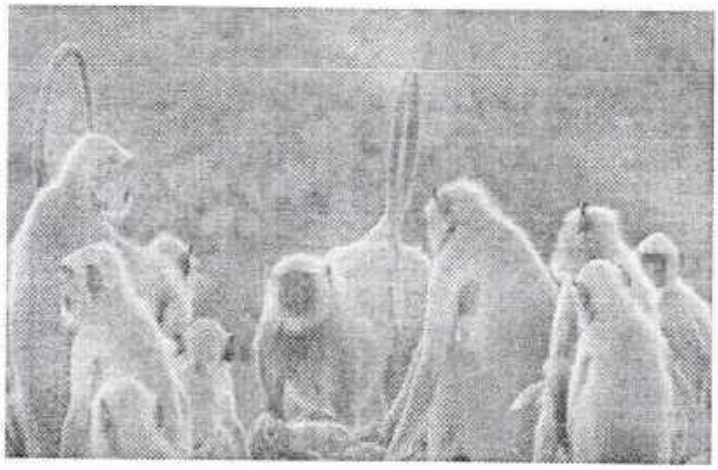
Bees feed on flowers. Bees have powerful defense mechanisms such as painful sting and group defense. Most predators will avoid bees. Bees are the ideal model for other insects which also feed on flowers. Most bees mimics feed on nectar and are the pollinators of plants as well.

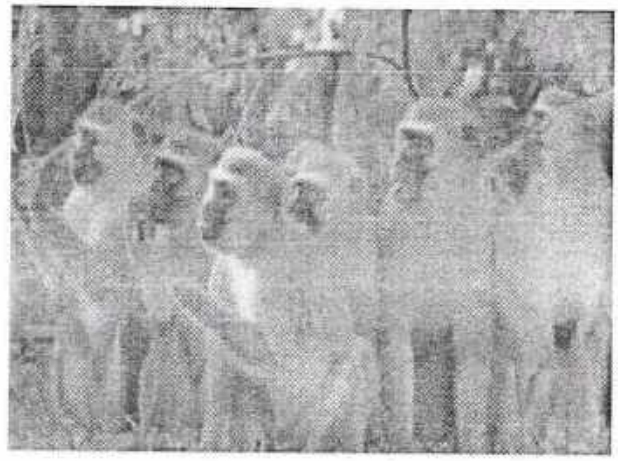




However, they have stout bodies and do not have narrowed waist. Their wings are easily recognized with distinctive vein pattern, usually dark in colour, some with patterns or spots. When at rest, their wings are flat in outspread position.

Monkey

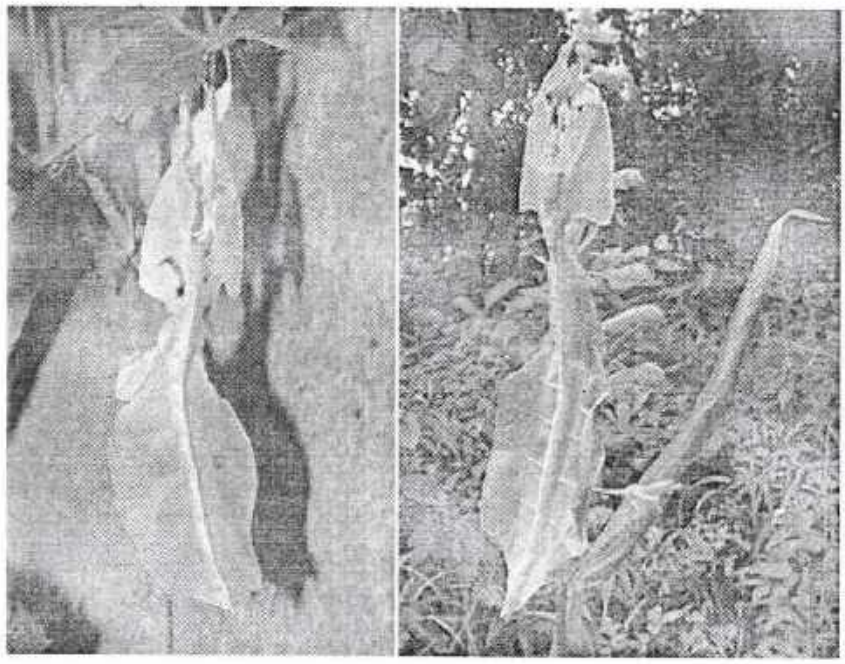




The monkey social structure is very interesting to observe. They are very intelligent animals and need socialization for them to be able to thrive in their natural environment. The overall structure can very based on the species of monkey. There social feelings can also change based on stress from their environment just like it can for humans. they enjoy having fun too and bring amazing games and spontaneous event their lives.

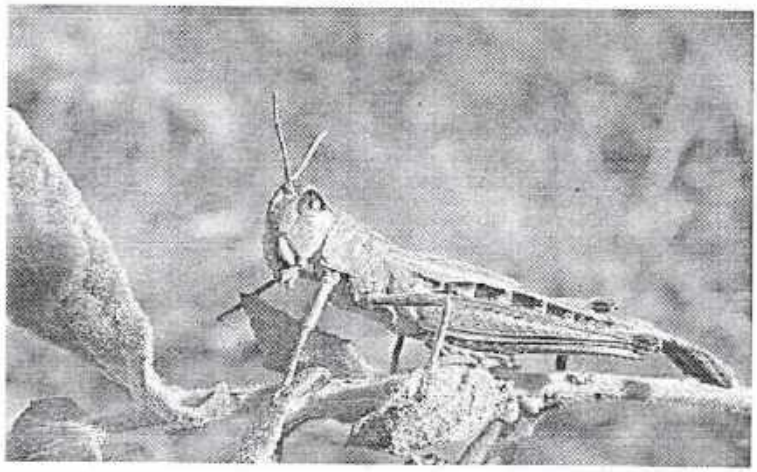
Vocalization is the most common method of socialization for the monkey. They have a verity of sounds that they use. This can be low chatter, clicking, and even high pitch yelling that can be heard for a long distances. these sounds to allow them to be able to create strong bonds, to take care of their young, and even to warn other groups of monkeys to stay away.they will warn each other of potential risks and predators when they can too.

Leaf Insect



Leaf insects are camouflaged (using mimicry) to take on the appearance of leaves. They do this so accurately that predators often are not able to distinguish them from real leaves. In some species the edge of the leaf insect's body even has the appearance of bite marks. To further confuse predators, when the leaf insect walks, it rocks back and forth, to mimic a real leaf being blown by the wind.

Grass hopper



Aggressive mimicry is found in predators (or parasites) that share the same characteristics as a harmless species, allowing them to avoid detection by their prey (or host). The mimic may resemble the prey or host itself, or another organism that is either neutral or beneficial to the signal receiver. In this class of mimicry, the model may be affected negatively, positively or not at all. Just as parasites can be treated as a form of predator, host-parasite mimicry is treated here as a subclass of aggressive mimicry.

Conclusion

Every one of we all worked great in our groups and we studied lot about mimicry and community in habituations it is real wonderful experience to observe the above all organism. because in class room we only imagine but here we know the reality and it increase our thinking capacity.

K.L.E. SOCIETY'S

BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE,CHIKODI-591201

PG DEPARTMENT OF COMMERCE AND MANAGEMENT

CERTIFICATE

This is to certify that **Mr. Abhinandan G Hanje** has satisfactorily completed the project work entitled **"A STUDY OF PERFORMANCE OF LOANS AND ADVANCES" UNDERTAKEN AT JANATA CO-OPERATIVE BANK HARUGERI BRANCH RAIBAG.** for the partial fulfillment of DEGREE IN MASTER OF COMMERCE in **RANI CHANNAMMA UNIVERSITY, BELAGAVI** during the academic year 2017-2018.

Shri. S. M. BHOSAGE	Prof. B. S. MALI	Dr. M. T. KURANI
PROJECT GUIDE	**CO-ORDINATOR**	**PRINCIPAL**

K.L.E. S's BASAVAPRABHU KORE COLLEGE NAAC-A CHIKODI

ಜನತಾ ಸಹಕಾರ ಬ್ಯಾಂಕ ನಿಯಮಿತ,

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JANATA CO-OPERATIVE BANK LTD; HARUGERI-591220.

STD. 1977
R.B.I. LICENCE
NO. : U.B.D. KAN-1499P

Tq. Raibag) ☎ : (08331) 257054, 257747 E-mail : janata_hrg@rediffmail.com (Dist. Belgaum

Ref. No. 77/18-19

Date: 07 JUN 2018

CERTIFICATE

This is to certify that **Mr. Abhinandan G. Hanje** M.Com 4th semester student of K.L.E. Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi has done his project work entitled as **"Performance of Loans and Advances of Janata Co-Operative Bank Ltd.; Harugeri Branch: Raibag".**

During his 4th semester period i.e., from April 2018 to May 2018, during this period his conduct was good. We wish all the best in his future career, we wish all the success in his future and all the best.

Janata Co-op. Bank Ltd. Harugeri Br. Raibag

For, Janata Co-op. Bank Ltd.
Harugeri (HO) Br. Raibag

Br. Manager

CHAPTER-1

INTRODUCTION TO RESEARCH DESIGN

1.1 Introduction :

Finance has been called the life blood of business because it deals with the money and it requires funds for its day to day activities.

A co-operative or credit is an autonomous association of person who voluntarily co-operate for their mutual social, economic, and cultural benefit. In India Co-operative Banks engaged in banking barriers are regulated with the RBI and governed Co-operative Banks Act, 1965.

Co-operative Banking Systems are also usually more integrated than credit union systems. Local branches of Co-operative Banks select their own boards of directors and manage their own operations, but most strategic decisions require approval from a central office.

The Co-operative Banks and societies were established to curb the activities of money lenders and unorganized money market agencies.

As co-operative bank is retail and commercial banking organized on a co-operative basis. Co-operative banking institutions take deposits and lend money in most parts of the world. The Banking Industry was once a simple and reliable business that took deposits from investors and lent it to borrowers at a higher rate.

In India, Co-operative Banks are working for nearly hundred years. Co-operative Banks are considered as one of the important financial institutions in the country. The major contributions of these banks are mostly in rural areas where they play the most vital role in rural financing and micro financing. The major strength of co-operative banks are their easy local reach, transparent interaction with the customers and their efficient services to common people.

1.2 Review of Literature

Singh and Singh (2010), in their study titled, "Technical and Scale Efficiency in District Central Co-operative Banks of Punjab –A Non- Parametric Analysis" had attempted to investigate the extent of technical efficiency across 20 DCCBs of Punjab with the help of Data Envelopment Analysis. They brought out that size of DCCBs and profits had been

affecting the measures of technical efficiency significantly. The study further revealed that DCCBs of Punjab were suffering from the problems of managerial irregularities and improper production scale. Appropriate policy interventions by state government, RBI and NABARD have been suggested by the authors.

Dhanappa (2009) in his study titled, "Performance Evaluation of UCBs: A Case Study of Kallappanna Awade Ichalkaranji Janata Sahakari Bank Ltd. Ichalkaranji" made an attempt to examine the working and financial performance of UCBs. The objective of the study was to examine and analyze the trend, progress and problems of this bank, and to offer some important suggestions for improving the competency and efficiency of the bank. The related data had been collected for the period from 1995-96 to 2007-08. He used various statistical tools such as ratios, percentages, averages, and chi-square test to analyze the data, to know the performance of the UCBs in respect of share capital, deposits, reserve funds, loans and advances, investment, profit, and NPAs. He observed that the bank had maintained NPAs under control at the best stipulated level of RBI norms. There was immense instability in net profit.

The bank should focus on non- interest income sources (commission based services) to increase the profit level and reduce the NPAs. CD ratio of the bank was declining continuously which was not a good signal. The economic health of the bank was sound and the Bank was able to compete with other banks. He further suggested that loans should be provided (at least to regular borrowers) on competitive rates of interest.

The European Association of Co-operative Banks (2009), in its article titled, "European Co-operative Banks in Financial and Economic Turmoil" was of the view that despite extensive interest rate cuts, liquidity injections and support measures the financial markets were not stable. Figures showed that global economy will experience a deep recession in 2009 and perhaps also 2010. But as has been demonstrated, most co-operative bank groups had fortunately been able to weather the financial crisis relatively well so far without any state support. This was due to the fact that they generally had limited exposure to toxic assets, a predominant focus on domestic retail banking with stable results, strong capital buffers and principally conservative risk management. The co-operative banks that did report losses due to the subprime crisis were affected primarily at the level of subsidiaries and at the level of APEX institutions. The local banks were not hitted directly by the financial crisis.

Moreover, they continue to lend money to SMEs and retail customers. Co-operative banks were consequently solid and robust at the local level and accordingly demonstrated stability of the retail banking industry in Europe.

Jayaraman and Srinivasan (2009) in their study titled, "Relative Efficiency of Scheduled Commercial Banks in India (2001-08): A DEA Approach" attempted to measure the scale efficiency of scheduled commercial banks in India using Data Envelopment Analysis. The study listed out the number of efficient banks on the basis of relative performances using efficiency scores. It was found that the general performance of scheduled commercial banks under study was relatively high during the study period 2001-08 and the average efficiency score was ranging between 0.919 and 1. More than 60 per cent of the scheduled commercial banks under study were above the average efficiency score for each study period except for the year 2006, where it was around 53 per cent. The results show that ICICI Bank, IndusInd Bank, ABN Amro Bank, Calyon Bank and Citibank were efficient for all years during study period. In addition to above banks, efficiency scores of State Bank of Travancore, Vijaya Bank, Bank of Maharashtra, and Oriental Bank of Commerce, Axis Bank, Federal Bank and Yes Bank were above the average efficiency scores for all the years.

Rajamohan and Pasupathy (2009) in their study titled, "Performance Evaluation of TAICO (Tamil Nadu Industrial Co-operative Bank Ltd.) – An Application of Structural and Growth Analysis" stated that there were several factors that determined the operating efficiency and profitability of the bank. In this context, the general performance of a bank can be analyzed more meaningfully and objectively for a given period of time through structural and growth analysis. Through structural analysis the figures reported in the profit and loss account and balance- sheet are converted into percentages for each period to ensure uniformity for the purpose of comparison with those of other periods. Macro mean had been used to exhibit the strength and weakness of each factor considered. The results were summarized in capsule form. Macro mean in respect of interest received constituted 96.8% of the total income; it was 81.2 % for interest paid, 18.8% for operating expenses, 91% in the case of spread and 83% for burden. It was found that the net profit recorded a negative growth of 27.8%. Growth rate of operating expenses was at 44%, spread at 15%, burden at 29% and advances at 49%. Therefore, it was recommended that the burden rate should be

reduced by effecting cost control measures, and the spread rate be increased so that the profitability may be at a higher rate.

Kumar (2008), in her thesis, worked on "Management of Non-Performing Advances – A Study of District Central Co-operative Banks of Punjab". A sample of ten DCCBs, i.e., five with high level of NPAs and five with low level of NPAs, was taken for the study. It was found that despite the best efforts, Central Co-operative banks had not succeeded in diversifying their business. The NPAs in crop loan were found to be the lowest, while these were the highest in non-farm sector loan. On the basis of step-wise multiple regressions, it was found that caste, education, amount and adequacy of loan were the main factors affecting repayment performance of the borrowers. She suggested that these banks should form a special cell to monitor NPAs and should take services of recovery agents.

Murthy (2008), in his paper titled, "Rural Finance: A Remedial Measure for Rural Poor" focused on the role of financial services as key to enhancing economic development and reducing poverty in rural areas. Rural finance has often led the way in addressing social, gender and ethnic equity issues which hold families in poverty.

He, however, observed that the access was limited for poor households and for micro, small and medium enterprises. Despite rapid economic development in India the number of people living below the poverty line has decreased only slightly. While there was a numerically strong infrastructure of formal financial institutions in rural India, they often lacked the capacity to provide adequate demand-oriented services.

He recommended that the major constraint of such important rural finance agencies, i.e., lack of resources should be removed, by facilitating them to mobilize resources from capital market and other newer sources.

Rutamu and Ganesan (2008), in their research article titled, "Profit and Profitability of Co-operative banks: The Case of Banques Populaires (Peoples' Bank) of Rwanda" stated that financial institutions in general and banking sector in particular play a strategic role in the financing stage of capital formation. In the banking sector, cooperative banks undertake the responsibility of mobilising the scarce savings of the community and channelising these savings for productive investment in the economy.

They discussed the performance of Banques Populaires and the determinants of its Profit and Profitability. It had been noted that the net profit was not distinguished from Gross Profit in

the years 1994-2004. The empirical results from the six models mof Profit and Profitability showed that total assets per branch, other earnings and total deposits per branch were the determinants of profit in Banques Populaires, while total assets per branch, and the number of branches were the determining variables of profitability of Banques Populaires. The low return from investment of Banques

Populaires indicated a lack of cost control and unsatisfactory sources of income other nthan interest from advances. It was, therefore, crucial that Banques Populaires should make further effort for the improvement of its efficiency in operations so that the low profitability might be uplifted.

Heiko and Martin (2007) of IMF conducted a study on co-operative banks and their financial stability. The study was based on individual bank data drawn from the Bank Scope Database for 29 major advanced economies and emerging markets that were members of the Organization for Economic Co-operation and Development (OCED).

They found that co-operative banks in advanced economies and emerging markets had higher scores than commercial banks, suggesting that co-operative banks were more stable. These findings, perhaps somewhat surprising at first, were due to much lower volatility of co-operative banks' returns, which offsets their relatively lower profitability and capitalization.

Shah (2007) conducted a case study of Single and Bandana District Central Cooperative Banks regarding the financial health of credit co-operatives in Maharashtra and found NPAs or overdoes as the main factors for deterioration in health of these banks. The study revealed that both these banks showed a decline in their financial health and economic viability during the late nineties as against the early nineties period

Bagchi (2006), in his study titled "Agriculture and Rural Development are

Synonymous in Reality: Suggested Role of CAs in Accelerating Process" analyzed the performance of Primary Agriculture Credit Societies, and observed that PACS could not match up to the increasing requirements of growth dimensions in the Agriculture /Rural development in the Post-independence period, although till the late 50s, they were the only available source of institutional rural finance.

Singh and Singh (2006) in their study titled, "Funds Management in Central Cooperative

Banks–Analysis of Financial Margin" attempted to estimate the impact of identified variables on the financial margin of the central co-operative banks in Punjab with the help of correlation and multiple step-wise regression approach. The ratio of own funds to working funds and the

ratio of recovery to demand were observed to be having positive significant influence on financial margin, whereas over dues to total loans were found to be negatively associated with the concerned parameter. A high percentage of own funds and timely recovery of previous loans outstanding, as a source of funding new loans by the bank, increased the financial margin in these banks

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Carlos et al. (2005) studied productivity changes in European co- operative banks and concluded that an effective use of technology between 1996 and 2003 had increased productivity for majority of the European co-operative banks under study.

An appropriate policy recommendation by the researchers was for larger or centralized co-operative banks to develop and franchise technology to smaller cooperatives.

NABARD (2005) conducted a study "Development in Co-operative Banking", to evaluate the financial performance of 1872 urban co-operative banks and 1, 06,919 rural co-operative credit institutions. The findings of the study revealed that in all financial institutions in the rural sector (SCBs, DCCBs, SCARDBS, and PCARDBS), percentage of NPAs in the substandard category declined, while it had increased in doubtful category. NABARD was worried about deterioration in asset quality of these banks. However, all the institutions were able to meet the necessary provisioning requirements. It further highlighted that NPAs ratio in DCCBs varied significantly across the states from 5% to 68% at the end March 2004. Only in four states (Haryana, Himachal Pradesh, Punjab and Uttranchal), the NPA ratio was less than 10%. NABARD suggested that co-operative banks should implement One Time Settlement system (OTS) and refer small value advances to Lok Adalats and high value advances to Debt Recovery Tribunals (DRTS). Further, State Governments were requested to help co-operative banks in reducing NPAs by taking special recovery derives.

Prasad (2005), in his research paper titled, "Co-operative Banking in a Competitive Business Environment" stated that the technology had made tremendous impact on entire banking sector, which had thrown new challenges, due to which co-operative banks were constantly exposed to competition and risk management. Therefore, they needed a combination of new technologies and better processes of credit and risk appraisal, treasury management, product diversification, internal control and external regulation along with infusion of professionalism. In the present business environment, the co-operative banks should be backed by democratization, depoliticisation & decentralization so as to make them competitive. He felt an urgent need for transformation in the mindset, identity, business operations, governance and

systems & procedures, which will definitely boost the morale of co-operative banks to face environmental challenges

Suryan and Veluraj (2005), in their study titled, "Profitability Analysis of the Pondicherry State Co-operative Bank", analyzed the performance of the bank from 1998-99 to 2002-03. Various ratios, such as cost of management (total expenses) to working capital ratio, profit to working capital ratio, non-interest income to total income ratio, etc. were used to assess the general performance of the bank. Spread and burden positions of the bank were also analyzed. They concluded that the profitability performance of the bank was impressive and bank was able to meet its obligations and norms. The cost of management and establishment expenses got reduced during the period of study which further strengthened the profitability position of the bank.

Raul and Ahmed (2005) conducted an empirical analysis of different aspects of bank's performance in the Barak Valley, southern part of Assam in the context of national level performance of PSBs in particular during two distinct time periods, pre- (1981-91) and post-(1992-2001) reform regimes, in their study titled, "Public Sectors Banks in India–Impact of Financial Sector Reforms". They concluded that profitability of banks had come under reverse pressure and PSBs had witnessed a low percentage of profits to total assets during the post-reform years due to lower interest spread and greater priority sector landing. They suggested that corporate governance should be implemented in these banks to encourage and pursue market discipline through transparency, consistency and accountability. They stressed greater autonomy for banks to lay down internal guidance and procedures for transparency, disclosures and risk management.

Nair (2004) in his paper titled, "Village Co-operatives – A Century of Service to the Nation" observed that by 2004, the formal institutionalized co-operative sector completed a century of its service to the nation. Analyzing the progress of Primary Agricultural Co-operative Societies, he observed that during the half century spread over 1951-2001, the PACs made rapid strides in membership, owned funds, deposits, and channelising production credit for farmers. They were versatile in the sense; they can take up any type of rural financing and rural service activity at short notice and at **lowest transaction cost. But besides excelling on all fronts, the co-**

operatives are feeling handicapped due to mounting NPAs. The overdue loans of PACs increased to

`95,899.60 million in 2000-01 as compared to `63.79 million indicated in 1950-51, thereby subjecting them to a sustained and systematic process of reviews,

reorganisation and restructuring.

Krishana et al. (2003), in their research paper, "Performance of Regiona Rural Banks I Karnataka An Application of Principal Components and Discriminant

Function Analysis" tried to identify the important discriminating characteristics of the two identified groups of Regional Rural Banks in the state of Karnataka. They used the discriminate function approach and sought to obtain linear discriminate coefficient, such that the squared difference between the mean Z-score for the one group and the mean Z-score for the other group was as large as possible in relation to the variation of Z-scores within the groups. They concluded that the number of employees per branch had maximum discriminating power to the extent of 55%, followed by amount of borrowings (18%), credit deposit ratio (14%) and income to expenditure ratio (13%).

Lodha (2002), in his study titled "Social Lending – Its Relevance in Deregulated Economy" studied how far the two extremities, viz. profit maximization and social lending will co-exist in the deregulated market, particularly in a developing economylike India. He concluded that

(1) Social lending should continue despite reforms;

(2) Economic reforms should continue;

(3) Target lending should be abolished;

(4) Social lending should be confined to weaker sections only;

(5) Time bound lending with least formalities should be ensured;

(6) Lending decision should be based on cost benefit analysis;

(7) Subsidy in social lending should be scrapped;

(8) Loss making rural branches should be converted into satellite offices;

. search paper titled, "Prime Discriminants of Profitability in the Indian Commercial Banks" tried to develop a discriminant function for bank profitability using the most significant ratios/parameters. The validity of the model was assessed by calculating the analysis sample (78 banks). The hit ratio for analysis sample was 49/78 = 62.82 per cent. The efficiency was

judged on four major parameters: Liquidity of the bank, Return performance, Expense parameters, and Operational efficiency. As per step-wise discriminant analysis, out of various measures, i.e., smallest F- Ratio, Mahalnobis Distance, and Wilk Lambda, the study employs Wilk Lambda with minimum value required for entry as 3.84 and maximum value for removal of the independent variable as 2.71. At each step the variable that minimizes the overall Wilk Lambda is entered. The computation ends when any further entry of variables fails to minimize the Wilk Lambda.

Das (2001) in his study titled, "A Study on the Repayment Behaviour of Sample Borrowers of Arunachal Pradesh State Co-operative Apex Bank Limited", examined the repayment behaviour of loanees, covering a period of 1994-95 to 1998-99. On the basis of primary data collected, researchers concluded that incidence of default was highest among borrowers for agriculture allied activities loans. Agriculture loanees, horticulture loanees, small business loanees and service sector loanees were ranked 2nd, 3rd, 4th and 5th in a descending order on the basis of percentage defaulters. Study further revealed that the number of defaulter loanees was highest in government sponsored schemes.

Viswanath (2001) in his study titled, "An Analysis of Performance of Agricultural Credit Co-operatives and their Overdues Problems in India" concluded that during the period 1950-51 to 1995-96, the total loans advanced by PACs increased from `24crore to `14,201 crore i.e. 587 times, but unfortunately this increase was followed by a corresponding increase in overdues. The results of Development Index in PACs of 16 states indicated that the performance of only 5 states, i.e., Karnataka, Gujarat, Tripura, Orissa, and Maharashtra was above the National average, while that of the remaining 11 states including Punjab were below the average. Using correlation technique, the extent of relationship between overdues and four variables, i.e., number of societies, total membership, working capital and total amount of loans advanced was studied. He concluded that there was a direct and positive link between overdues and membership on one hand, and overdues and working capital, amount of loans advanced on the other

.**Verma and Reddy (2000),** conducted a study analyzing the causes Overdues in Cooperatives under SWOOD, to assess recovery and NPAs position in these banks. Policy distortions in liberalized economy and inefficient management were identified

as main reasons for poor recovery. Misutilisation of credit, political interference at every level, successive crop failures, non-remunerative prices of agriculture produce, inadequate income and natural calamities, were some other factors, which affect the working culture of co-

operative banks considerably. To improve the working of these banks, the study suggested that available credit size should be need based and production-oriented. Effective supervision of loans to minimize misutilisation and close social relations with loanee members were two other suggestions to improve the profitability and productivity of these banks.

.1.3 Need for the studty

Loans and advances are the most important aspect of any banking organization. Loan is a type of debt. Like all debt instruments, a loan entails the redistribution of financial assets over time. The borrower initially receives an amount of money from the lender, which they repay later. This service is generally provided at a cost, referred to as interest on the debt, a sum of borrowed money (principal) is generally repaid with interest which in turn helps the organizations gain profits and also use these profits for the welfare of the organization as well as to pay interest on deposits.

This study is mainly concentrated on the lending practices pattern and influence in the organization performance. It also helps to know the objectives and goals as well as it help to ascertain people's response on bank lending. The study is taken on **"Performance of Loans and Advances"** in **"OF THE JANATA CO-OPERATIVE BANK LTD.RAIBAG".** The Co-operative credit banks are playing an essential role in the rural development. This study shows us the procedure that are taken place for purpose of providing loans to customers/borrowers and also with respect to the study of the whole organization and the process followed in that organization.

1.4 Statement of problem:

There is no project report found on the Performance of loans and advances of Janata Co-operative Bank Limited Raibag. The title of the project work is "Performance of Loans and Advances" with reference to **THE JANATA CO-OPERATIVE BANK LIMITED RAIBAG".**

This topic was selected to analyze the **Performance of loans and advances** in **"JANATA CO-OPERATIVE BANK LIMITED RAIBAG".** That has shown good profit and turnover in the recent years. The study is conducted to represents the concept of loans and advances and critically analyse them. Finally provides conclusion relating to Performance of loans and advances of Janata Co-operative Bank Limited Raibag.

1.5 Scope of the Study:

The present case study on **"OF JANATA CO-OPERATIVE BANK LIMITED RAIBAG"** covers a study on "Performance of Loans and Advances". The study also makes a micro focus in all the major functional areas of the Bank. The various types of loans are studied by analyzing the financial statement of the Bank.

1.6 Objectives of the Study:

1) To study the concept of loans and advances.
2) To study different types of loans given by the bank.
3) To know the period of repayment for varies provided by The Janata Co-operative Bank Ltd .
4) To know the overall performance of Loans and Advances.
5) To suggest measures for better performance.

1.7 Research Methodology:

The present study mainly based on the primary and secondary data i.e., annual reports of the bank for the respective years is from 2012 to 2016. The necessary primary data is collected through informal discussion with the secretary, founder and also with the members of the bank.

- **Tools for data collection:**

The tools for data collection are divided into two parts i.e.

1. Primary Data:

This data is being collected by the help and guidance of **Shri A A GURAV** who is the manager of **THE JANATA CO-OPERATIVE BANK LTD. RAIBAG".** The conversation helped to have a idea about the Bank, its functions and other aspects of the Bank.

- **Source of Primary data**:
  - Observation
  - Discussion

2. Secondary Data:

Secondary Data which includes the annual reports of the Bank for the past years helped to study the financial aspects of the Banks. This data shows about gain/loss in the financial statement of the bank. It is the data, which gives relevant information in the different fields of **"THE JANATA CO-OPERATIVE BANK LIMITED RAIBAG".**

The secondary data also includes the data collected from other sources mentioned below:

1) Annual Reports and magazines of the Janata Co-operative Bank.
2) The part of required data has also been collected through browsing.
3) Books
4) Reference materials.

1.8 Limitations of Study:

1. Due to strict confidential policy of the bank the accounts departments provided only screened information.
2. Accuracy of the data provided cannot be guaranteed which does not give a clear idea about the actual functioning of the Bank
3. Due to busy schedule of secretary, the company's financial statements obtain secondary data.
4. Time of constraint
5. The present study is confined only for a period of five years from 2012-13 to 2016-17.

1.9 Chapter schema

Unit I; INTRODUCTION TO RESEARCH DESIGN;

The first chapter gives detail introduction of ratio analysis, review of literature, Statement of problem, need for the study, objective of study scope, and research methodology and limitations.

Unit II-CONCEPTUAL FRAMEWORK

It gives the profit of the bank where the project is conducted It also explains about future plan of the bank.

Unit III-BANK PROFILE:

It gives the profile of the bank where the project is conducted. It also explain about future plan of the society.

Unit-IV : DATA ANALYSIS AND INTERPRETATION

This chapter gives detail regarding the analysis and interpretation of data. It also consists of the table, graphs and its interpretation.

Unit-V : FINDINGS, SUGGESTIONS AND CONCLUSION

This chapter concluded the project report it comprises of the findings, conclusion draw from above analysis bases on the data collected and also included suggestions.

CHAPTER- 2

CONCEPTUAL FRAME WORK

INTRODUCTION OF LOANS AND ADVANCES

Loans and advances are the most important aspects of any banking organizations. Loan is a type of debt, Like all debt instruments, a loan entails the redistribution of financial assets over time.

Meaning:

The term **'loan'** refers to the amount borrowed by one person from another. The amount is in the nature of loan and refers to the sum paid to the borrower. Thus, from the view point of borrower, it is **'borrowing'** and from the view point of bank, it is **'lending'**. Loan may be regarded as **'credit'** granted where the money is disbursed and its recovery is made on a later date. It is a debt for the borrower. While granting loans, credit is given for a definite purpose and for a predetermined period. Interest is charged on the loan at agreed rate and intervals of payment. A loan is financial arrangement under which an advance is granted by the bank to a borrower on a separate account called the "loan account" when a loan is sanctioned, it is paid to the borrower in one lump sum either in cash or by transferring the amount of loan to the credit of borrower's account.

'Advance' on the other hand, is a **'credit facility'** granted by the bank. Banks grant advances largely for short-term purposes, such as purchase of goods traded in and meeting other short-term trading liabilities. There is a sense of debt in loan, whereas an advance is a facility being availed of by the borrower. However, like loans, advances are also to be repaid. Thus a credit facility- repayable in installments over a period is termed as loan while a credit facility repayable within one year may be known as advances. However, loans and advances granted by commercial banks are highly beneficial to individuals, firms, companies and industrial concerns. The growth and diversification of business activities effected to a large extent through bank financing. Loans and advances granted by banks helps in meeting short and long term financial needs of business enterprises.

Advance is a term that described a secured loan made to a member. Advances are offered at fixed or floating rates with specific maturities or with embedded options for early redemption. There are different types of loans offered by a bank. Different loans fetch a different rate of interest and have different securities against them.

We can discuss the role played by the bank in the business world by way of loans and advances as follows;

a) Loans and advances can be arranged from banks in keeping with the flexibility in business operations. Traders may borrow money for day today financial needs availing of facility of cash credit, bank overdraft and discounting of bills. The amount raised as loan may be repaid within a short period suit the convenience of the borrower. The business may be run efficiently with borrowed funds from banks for financing its working capital requirements.

b) Loans and advances are utilized for making payments of current liabilities, wages and salaries of employees, and also the tax liability of the business.

c) Loans and advances from banks are found to be economical for traders and businessman; banks charge a reasonable rate of interest on such loans or advances. For loans from money lenders, the rate of interest charged is very high. The interest charged by commercial banks is regulated by the RBI of India.

d) Banks generally do not interfere with the use, management and control of the borrowed money. But it takes care to ensure that the money lent is used for business purpose.

e) Banks loans and advances are found to be convenient as far as its repayment is concerned. This facilitates planning for future and timely repayment loans. Otherwise business activities would have come to a halt.

f) Loans and advances by banks generally carry element of secrecy with it. Banks are duty – bond to maintain secrecy of their transactions with customers. This enhances people faith in the banking system.

TYPES OF LOANS:

The loans can be broadly classified as follows;

1. Short term loan as demand loan.
2. Long term loan

1. Short Term Loan means it is granted for a short period of a year or less than one year.
2. Long Term loan: Term Loan is of two types
   a. Medium term loan being repayable in 1 to 3 years.
   b. Long-term loan is being repayable in above 3 to 5 years.

A Loan is granted either against collateral securities, or against the personal security of the barrowers. In the case of a loan, interest is charged on the whole amount of the borrower at different intervals, but the rate of interest charged on a loan is slightly lower than that charged on overdraft, cash credit. Generally a banker prefers to make an advance in the form of a loan for two reasons.

1) He can collect interest on the entire amount of the loan sanctioned.
2) A loan involves very little accounting work as the granting & the repayment of the loan are generally done in the lump-sum. But the borrower does not prefer that type of advances, as he is required to pay interest on the full amount of the loan sanctioned to him irrespective of the amount of the loan sanctioned to him irrespective of the amount actually withdrawn by him.

Further Loans and advances are classified into two main categories as mentioned below:

1. **Secured Loan or Advance:-**

Secured loan or advance means a "Loan or Advance made on the security of assets. The market value of which is not at any time less than the amount of such loan or advance."

These are the loans granted by the bankers/society by obtaining security equal or more than the loan amount. In other words, a secured loan is the one in which specific property is pledged to secure payment of the loan. The security may be in the form of shares, debentures, LIC policies, goods, Fixed Deposit receipts, etc.

Advantages of Secured Loans:

- Take possession of security,
- Validity of title,
- Marketability,
- Stability of price,
- Durability,
- Easy ascertainment of value,
- Easy transfer of title,
- Margin,
- Approved securities,
- Lower cost of storage and supervision.

2. **Unsecured Loan or Advance: -**

An unsecured loan or advances means a "Loan or advance not so secured. A partly covered loan or advance is partly covered by the security of assets, the market value of such securities being less than the amount that has been lend or outstanding at any time."

These are the loans granted without any security or on personal security of the borrower. Unsecured loans are often more expensive and less flexible than secured loans, but suitable if you want a short-term loan (one to five years).

Advantages of Unsecured Loans:

- Unsecured loans can be obtained without collateral.
- This loan is involved time factor.
- This loan is suits the various financial needs of its borrowers.
- In unsecured loans cannot create any legal charges.
- In unsecured loan personal liability come first

Principles of lending

When a banker is approached for a loan he has to keep his eyes and earns wide open. Apart from appraisal of individual loan proposal, there are some general principles, which should guide him determine whether a proposed loan is desirable, irrespective of whether or not securities is offered. It has been stressed throughout that a banker does not lend only because the advance will be secured many other consideration influence his decision. Following are some of the principles of the loans and advances.

1. Safety:

For a banker, the celebrated principle in holding asset is "safety first" nothing is more important to him than the preservation of the principle some advanced. In fact by safety is meant the ability of the borrower to repay the principle and the interest their own according to term and conditions provided in the loan agreement.

2. Liquidity:

The next principle of the bank lending is that the advances should be liquid. The assets should be readily into cash without much loss of the value, which temporary advances granted to finance some purchased of stock, raw materials etc.

3. Diversification of risk:

It is another important principle of the sound lending is that they should hold loan assets of diversified character. So as to reduce the degree of credit risk. It should be one of the banker's ax Ions to advance relatively moderate sums to many customers rather than large sums to few customers. Loans are also tied to be diversified with respect to maturity, security and type of the borrower.

4. Profitability:

A significant matter for consideration is the remunerative of the advance i.e., the yield which the particulars advance is going to give to the banker. The rate of interest to be charged has to be commensurate with the risk involved in loan. The object of the profitability has to be moderate by safety and liquidity of funds and than by national policies as lay down by the government and the central bank.

5. Purpose oriented:

Normally the bank should not finance unproductive, consumption loans, else extend short- term credit for movement of goods and other productive purposes. The banks are generally expected to make available ways and means of accommodation working capital advantage and not to finance fixed assets formation just as the disbursement of the repayment of the loan is made in one lump sum.

Benefits to the Lender

- The lender of the loan gets the desired rate of interest on the amount he/she have borrowed.
- The lender can plan his investment and can earn good return on the investment to be utilized in the future and can build a good reputation in the market.

Benefits to the Borrower

- The Advantage with loans is that you can design your repayment period as well as monthly installments according to your financial capacity. A secured business loan comes at lower interest rates when compared with other business loans. As these loans are taken against collateral, any default in repayment can put the commercial property at risk.
- Interest rates offered on secured business loan is variable and easily affordable. Such opportunities are provided entrepreneurs to encourage them and ultimately enhance the economy of the region. By promising business or industries, local government can even eradicate unemployment and improve overall standard of living.

Drawbacks of Loan: -

1. **Inflexibility: -**

   Every time a loan is required, it is to be negotiated with the banker. To avoid it, borrower may borrow in excess of their exact requirement to provide for any contingency.

2. **Abuse of funds: -**

   Banks have no control over the use of funds borrowed by the customers. However, banks insist on hypothecation of the assets purchased with loan amount.

3. **Indistinct period: -**

   Though the loans are for fixed period but in practice roll over, i.e. they are renewed frequently.

4. **Complexity for document: -**

   Loan documentation is more comprehensive as compared to each credit system.

Procedure for Granting Loans:

Duties and Responsibilities of Guarantors

- The guarantor is equally responsible for the loan to which he becomes guarantor.
- Before signing as the guarantor, member should ensure payment capacity and credit worthiness of the loanee.
- If the loan becomes overdue then along with the loanee even the guarantor is equally liable for legal action. As far loan repayment is concerned the guarantor should monitor and watch the status of the loan. Cooperation in this regard helps the bank to provide better service.

Members Should Know:

- Any member without the prior permission of sahakari remains absent for 3 consecutive AGM's are liable for disqualification of the membership and may lose their membership.
- Every member should have minimum transactions with SBSCS.

- Members who do not receive the dividend within 3 years, the amount will be transferred to reserve fund and any query in this regard will not be entertained.
- In case of any changes in the address, members should intimate in writing to the office for the proper payment of dividend. Any problem arising due to the impress address SBSCS will not be responsible.
- Nomination facility is provided to all the services. All members should are to avail this facility to avoid the legal complications.
- As per KCS & KSS Act the member of one Cooperative bank cannot become the member of another Cooperative bank engaged in same trade of business.

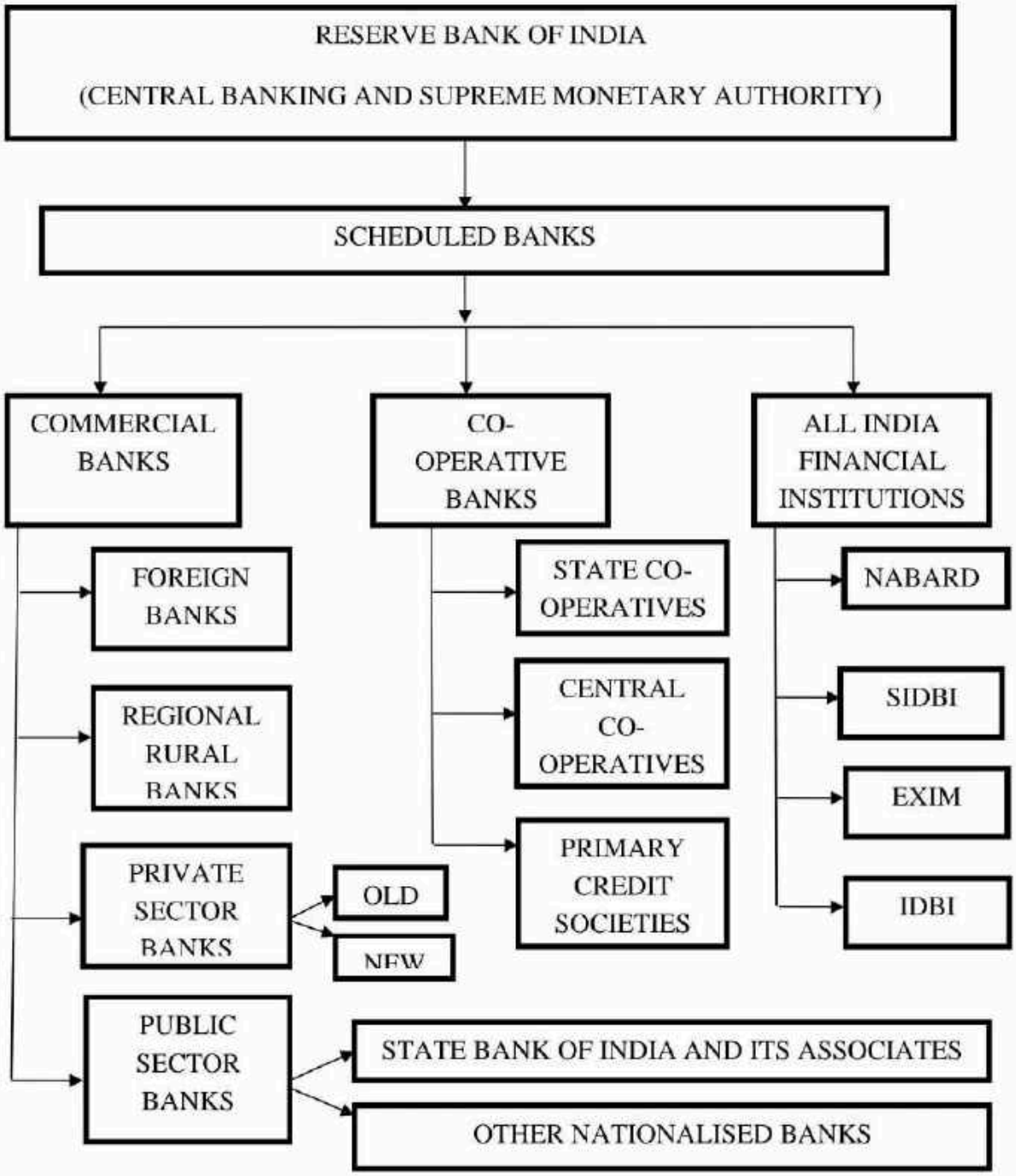
The following are the various types of loans given by the Bank:

1) Mortgage Loan
2) Salary secured Loan
3) Surety Loan
4) Cash credit Loan
5) Fixed deposit Loan
6) Vehicle Loan
7) Housing Loan
8) Motor Cycle Loan
9) Plant and Machinery Loan
10) Medium term Loan
11) BLCC Loan
12) Pigmy Deposit Loan
13) NSC Loan
14) Recurring Deposit Loan

CHAPTER-3
ORGANIZATION PROFILE

BANK PROFILE

INDIAN BANKING STRUCTURE:-



CO-OPERATIVE BANKS OVERVIEW:

The Co-operative Banks has a history of more than100 years. The Co-operative Banks are an important part in the Indian financial systems. The Co-operative movement originated in the West but the importance that such banks assumed in India is rarely paralleled anywhere else in the world. Their role in rural financing continues even today and their business in urban areas also has increased phenomenally in recent years mainly due to sharp increase in the number of primary Co-operative Banks.

While the Co-operative Banks in rural areas mainly finance agriculture based activities including farming, personal finance, Hatchery along with some Small Scale Industries and Self-employment driven activities. The Co-operative Banks in urban area mainly finance various categories of people for self - employment Industries, Small Scale Units, Home finance, Consumer finance, Personal finance etc. Co-operative movement is quite established in India. The first legislation on Co-operation was passed in 1904.In the beginning of the 20th Century availability of Credit in India more particularly in rural areas was almost absent. The rural folk have to depend on the money lenders, who lent often at various rate of interest.

Co-operative Banks are organized and managed on the principal of Co-operation, self help and mutual help. They function with the rule of "One Member, One Vote" Co-operative Banks perform all the main banking functions of deposits, supply of Credit and provision of remittance facilities. Co-operative Banks provide limited banking products and are functionally specialist in agriculture related products. Co-operative Banks now provide Housing loans, Vehicle loans, Industrial loans, Hypothecation loans etc.

A co-operative bank promotes economic activity and provides banking facilities and service to the rural people. The significant role of co-operative banks in the agricultural economy impacts a lesson to commercial banks and dispels from their minds the age old inertia and the gloom of conservatism by shifting emphasis from credit worthiness of the purpose and from tangible security to the character of the business.

HISTORY OF CO-OPERATIVE BANKS IN INDIA

The beginning of co-operative banking in India dates back to 1904. The Institutional source of credit for agriculture and related activities was very inadequate at that time. The money lenders would provide some credit at very high rates of interest. The co-

operative banks were expected to substitute such unorganized money market agencies and provide short and long term credit at reasonable rates of interest. It was expected that they would co-ordinate the activities of unorganized and organized segments of Indian money market. Subsequent to the adoption of economic planning in 1951, co-operative banks were expected to play a crucial role in achieving agricultural and rural development. Before the nationalization of commercial banks the cooperative banks were the only substitute for money lenders and other informal sector lenders. But after nationalization and creation of Regional Rural Banks and NABARD their relative share declined.

Co-operative Banks in India, (with their network; spread over remote rural areas and a large number of smaller towns), have historically played a major role in mobilization of domestic savings for economic development of the country. They have provided the farmers and non-farm entrepreneurs with the needed credit support. These institutions have also contributed significantly to private capital formation in agriculture and accelerated the pace of distribution of farm inputs NABARD 2002).

Co-operative banks are promoted to meet the banking requirements of consumers. They are established not only in the urban areas but also in the rural areas. In rural areas these banks supply finance to agriculture, while in the urban areas they are started to provide finance to buy consumer goods. They provided short and medium term loans. They provide loans at a lower rate comparatively. They are formed on the co-operative Bank principles and as such are more service oriented than profit oriented.

Meaning and Definition of Bank:

A bank is a financial institution licensed to receive deposits and make loans. Banks may also provide financial services, such as wealth management, currency exchange and safe deposit boxes. There are two types of banks commercial/retail banks and investment banks.

A bank is financial institution that accepts deposits from the public and creates credit. Lending activities can be performed either directly or indirectly through capital markets.

Banking business in India is largely governed by the Banking Regulation Act, 1949. According to Section 5(b) of this Act, banking means "the acceptance for the purpose of lending or investment of deposits of money from the public repayable on demand, order or otherwise and withdraw able by cheque, draft, order or otherwise.

Definition and meaning of co-operative banks:

In the words of HENRY WOLFF "co-operative banking is an agency which is in a position to deal with the small means on his own terms accepting the security he has and without drawing ion the protection of the rich.

DEVINE defines "a mutual Bank formed composed and governed by working people themselves for encouraging regular saving and generating miniature loans on easy terms of interest and repayments".

On the analysis of above definitions, one can say that co-operative banks is a co-operative organization where persons Voluntarily associate together as human being on the basis of equality for the Promotion of economic interest of themselves engaged in the banking functions of acceptance of deposits and lending the credit. In short, co-operative bank is an institution, which performs the banking functions of accepting deposits and borrowing of funds and lending of credit.

Features of Co-operative Bank:

1. They are organized and managed on the principle of co-operation self help and mutual help. They function with the rule of "one member one vote".

2. Co-operative banks perform all the main banking function of deposit mobilization, supply of credit and provision for remittance facilities.

3. Co-operative banks are perhaps the first government supported agency in India.

4. Co-operative banks belong to the money market as well as the capital markets.

5. Co-operative banks accept current saving, fixed and other types of time deposits from individuals and institutions including banks.

6. Co-operative banks do banking business mainly in the agricultural and rural sector.

7. Some co-operative banks are schedule co-operative banks while others are non-schedule co-operative banks.

8. Co-operative banks also required to comply with requirement of statutory liquidity ratio (SLR) and cash reserve ratio (CRR) liquidity requirements as other scheduled and non-scheduled banks.

The co-operative banking is federal in character with three tie linkages between state, district and village level institutions. At the state level, we have development banks (SLDBs) at the

district level, the central co-operative banks(CCBs) or the District Central co-operative banks (CLDBs), then at the village level, the primary agricultural credit societies (PACs), and the primary land development banks (PLDB's and the branches of SLDBs).

The lower ties are members and the shareholders of the immediate higher ties. Besides, there are urban co-operative banks (UCBs) or the primary co-operative banks (PCBs) which are outside this federal structure. Though federal in its nature the system is integrated vertically on the basis of functional responsibilities of various components of the system. The SCBs, CCBs, & PACs from the short term and medium term credit structure and it is the same in all states. The LDBs at various levels make the long term credit structure which is not uniform in all states.

The state level co-operative banks are said to be the apex institution in their federal structure. However, the apex institutions from the point of view of promotion, supply of resources and supervision are controlled by the government. NABARD and National co-operative bank of India, SCBs and SLDBs are in the immediate position between the institution just mentioned on the one hand and co-operative banks on the other.

The SCBs co-ordinate and regulate the working of CCBs. They act as custodians of surplus funds of the CCBs and supplement them by attracting deposits and by obtaining loans from the RBI. The CCBs mobilize resources in districts to finance their members and they also channelized funds from the SCB to primary credit societies.

The primary co-operative banks at the village level from the base of the co-operative banking. Although they are expected to be multipurpose societies, they mostly deal in credit unlike the short and medium term credit structure.

The PACs at the village level form the base of the co-operative banking. Although they are expected to be multipurpose societies, they mostly deal in credit. Unlike the short and medium term credit structure, the arrangements for the provision of long term are not uniform in all the states however a majority states have a federal set up for this purpose also. These states have SLDBs at the states level affiliated to primary land development banks at the district and taluk levels. In other states the operational units below the SLBDs are branches of SLDBs. The SLDBs obtain funds by issuing ordinary debentures and special development debentures.

Introduction of Credit Bank:

Non- profit financial institution that owned that and operated entirely by its members. Credit Bank provide financial services for its members including saving and lending. Large organizations and companies may organized credit Bank for their members and employees respectively. To join a credit union a person must ordinarily belong to a participations organization such as a college academic associations or labour union. When a person deposits money in a credit Bank he or she becomes a member of the union because the deposit is considered partial ownership in the credit Bank.

The Principles of Co-operative or Credit Bank

The followings are some of the principles on which a Co-operative organization stands.

1. Voluntary association

The membership of a Co-operative organization is voluntary and open to all adult persons having common interest. Any person can become a member of the organization irrespective of caste, creed, colour, sex and religion.

2. Autonomy

A Co-operative Bank is a self-governing institution. It enjoys the status of autonomy because it is self-sufficient, self-renewing and self-controlling organization. It has a continuous existence because it is not affected on the death of any member of the Bank.

3. Capital

The capital of a Co-operative organization is raised from its members in the form of share capital. As the share capital is not sufficient to meet its operational cost, it borrows loan from the government or apex Co-operative organization.

4. Service motive:

It is organized to render service to its members and not to make profit. It main principle is to serve the members of the Bank.

5. Democratic management

The management of a Co-operative Bank is done on democratic line. The management is vested in the bands of a managing committee elected by the members. The general body of the members determines rules and regulations for the management, the

managing committee functions within the framework of the principles framed by the general body.

6. Government control

The Co-operative organization is subject to the rules and regulations of the government because it is registered under the Co-operative Banks Act, 1919.

7. Status of the members

In Co-operative Bank, each member is given one vote irrespective of number of shares held by him. In this organization nobody can control the Bank on the basis of his share capital.

8. Distribution of surplus

The income of the Co-operative Banks is distributed among the members on the basis of their capital contribution. According to Co-operative Banks Act, 1919 the rate of divided is limited to 9 percent.

9. Cash trading

The trading operation of the Co-operative Bank is done on the basis of cash. It never allows the principles of credit in its trade practice.

10. Mutual help:

It always aims at developing the spirit of Co-operation among the members. Every member of the Bank is required to act for the maximum benefit to other members. It is based on the principle "all for each and each for all".

Characteristics of Co-operative Bank

A Co-operative Bank is a special type of business organisation different from other forms of organisation you have learnt earlier. Let us discuss its characteristics.

i. Open membership

The membership of a Co-operative Bank is open to all those who have a common interest. A minimum of ten members are required to form a co-operative Bank. The Co–

operative Bank Act does not specify the maximum number of members for any Co-operative Bank. However, after the formation of the Bank, the member may specify the maximum number of members.

ii. Voluntary Association

Members join the Co-operative Bank voluntarily, that is, by choice. A member can join the Bank as and when he likes, continue for as long as he likes, and leave the Bank at will.

iii. State control

To protect the interest of members, Co-operative Banks are placed under state control through registration. While getting registered, a Bank has to submit details about the members and the business it is to undertake. It has to maintain books of accounts, which are to be audited by government auditors.

iv. Sources of Finance

In a Co-operative Bank capital is contributed by all the members. However, it can easily raise loans and secure grants from government after its registration.

v. Democratic Management

Co-operative Banks are managed on democratic lines. The Bank is managed by a group known as "Board of Directors". The members of the board of directors are the elected representatives of the Bank. Each member has a single vote, irrespective of the number of shares held. For example, in a village credit Bank the small farmer having one share has equal voting right as that of a landlord having 20 shares.

iv. Service motive

Co-operatives are not formed to maximize profit like other forms of business organization. The main purpose of a Co-operative Bank is to provide service to its members. For example, in a Consumer Co-operative Store, goods are sold to its members at a reasonable price by retaining a small margin of profit.

v. Separate Legal Entity

A Co-operative Bank is registered under the Co-operative Banks Act. After registration a Bank becomes a separate legal entity, with limited liability of its members. Death, insolvency or lunacy of a member does not affect the existence of a Bank. It can enter into agreements with others and can purchase or sell properties in its own name.

vi. Distribution of Surplus

The income of the Co-operative Banks is distributed among the members on the basis of their capital contribution. According to Co-operative Banks Act, 1919 the rate of divided is limited to 9 percent.

vii. Self-help through mutual cooperation

Co-operative Banks thrive on the principle of mutual help. They are the organisations of financially weaker sections of Bank. Co-operative Banks convert the weakness of members into strength by adopting the principle of self-help through mutual Co-operation. It is only by working jointly on the principle of "Each for all and all for each", the members can fight exploitation and secure a place in Bank.

Advantages of Co-operative Bank

A Co-operative form of business organisation has the following advantages:

i. Easy Formation

Formation of a Co-operative Bank is very easy compared to a joint stock company. Any ten adults can voluntarily form an association and get it registered with the Registrar of Co-operative Banks.

ii. Open Membership

Persons having common interest can form a Co-operative Bank. Any competent person can become a member at any time he/she likes and can leave the Bank at will.

iii. Democratic Control

A Co-operative Bank is controlled in a democratic manner. The members cast their vote to elect their representatives to form a committee that looks after the day-to-day administration. This committee is accountable to all the members of the Bank.

iv. Limited Liability

The liability of members of a Co-operative Bank is limited to the extent of capital contributed by them. Unlike sole proprietors and partners the personal properties of members of the Co-operative Banks are free from any kind of risk because of business liabilities.

v. Elimination of Middlemen's Profit

Through Co-operatives the members or consumers control their own supplies and thus, middlemen's profit is eliminated.

vi. State Assistance

Both Central and State governments provide all kinds of help to the Banks. Such help may be provided in the form of capital contribution, loans at low rates of interest, exemption in tax, subsidies in repayment of loans, etc.

vii. Stable Life

A Co-operative Bank has a fairly stable life and it continues to exist for a long period of time. Its existence is not affected by the death, insolvency, lunacy or resignation of any of its members.

Limitations of Co–operative Bank

Besides the above advantages, the Co-operative form of business organisation also suffers from various limitations. Let us learn these limitations.

i. Limited Capital

The amount of capital that a cooperative Bank can raise from its member is very limited because the membership is generally confined to a particular section of the Bank. Again due to

low rate of return the members do not invest more capital. Government's assistance is often inadequate for most of the Co-operative Banks.

ii. Problems in Management

Generally it is seen that Co-operative Banks do not function efficiently due to lack of managerial talent. The members or their elected representatives are not experienced enough to manage the Bank. Again, because of limited capital they are not able to get the benefits of professional management.

iii. Lack of Motivation

Every Co-operative Bank is formed to render service to its members rather than to earn profit. This does not provide enough motivation to the members to put in their best effort and manage the Bank efficiently.

iv. Lack of Co-operation

The Co-operative Banks are formed with the idea of mutual Cooperation. But it is often seen that there is a lot of friction between the members because of personality differences, ego clash, etc. The selfish attitude of members may sometimes bring an end to the Bank.

v. Dependence on own Capital & Members

The inadequacy of capital and various other limitations make cooperative Banks dependant on the government for support and patronage in terms of grants, loans subsidies, etc. Due to this, the government sometimes directly interferes in the management of the Bank and also audits their annual accounts.

Types of Co-operative Banks

1. Producer's Co-operative Banks

The producer's Co-operative Banks are established by the small producers. The members of the Bank produced goods in their houses or a common place. The raw material, tools money etc. is provided to them by the Bank. The output is collected by the Bank and sold in the market at the wholesale rate. The profit is distributed among the member in proportion to the goods supplied by each member.

2. Consumer's Co-operative Banks

Consumer's Co-operative Banks are established to remove middleman from the field of trade. These Banks purchase goods at him wholesale prices and sell these goods to the members at cheaper rates than the market price. However, the goods are sold to the non members at the market rates. The profit, if any, is distributed among the members in the shape of bonus according to their purchases ratio.

3. Marketing Co-operative Banks

The marketing Co-operative Banks are formed by the mall produces for the promotion of trade. The two main objectives of these Banks are, to sell the good at reasonable prices by eliminating middlemen and to make the ready for the product of the member. These types of Banks are formed by the small agriculturalist and artisans. These Banks collect the product of its members and make its grading and keep them in warehouses and sell them in the market at whole sale rate when the market is ready for this product. The profit is distributed among the member according to the ratio of goods supplied by them.

4. Farming Co-operative Banks

These solicits are formed by the small agriculturalist to get then benefits of large scale forming. These Banks provide help to the farmer for the improve method of cultivations by providing large scale forming tools such as tractors, threshers and harvesters etc.

5. Housing Co-operative Banks

These Banks are formed for the procurement of land for the construction of houses on homogeneous basis. These Banks are formed by those members who are intended to construct their own home. These Banks provides loan to the members for the construction of houses. These also purchase construction material in bulk and provide this material to its member at cheaper rates.

6. Insurance Co-operative Banks

These Banks make contract with insurance companies for the purchase of different insurance policies for its member at lower premium. This Bank may take a group insurance policy for its members. The main object of the Bank is to minimize the risk of its member.

7. Transport Co-operative Banks

These Banks are formed to provide the services of its members at lower rates welfare bus scheme is an example of this type of Banks. A pass handed over to the member for travelling on approved routes.

8. Storage Co-operative Banks

These Banks are formed for the provision of storage facilities to its member for perishable and non perishable goods at lower rates. These Banks also provide grading and distribution services to its members.

9. Labour Co-operative Banks

These Banks are formed by unskilled labour for selling their services at reasonable wage rate. This type of Bank makes a contract with different firm for the provision of labour to them.

10. Miscellaneous Banks

Some other important Banks, in addition to the major form of Banks discussed above are, Processing Co-operative Banks, Fisheries Co-operative Banks, Forestry Co-operative Banks and Poultry Forming etc

11. Credit Co-operative Banks

These Co-operative Banks are formed for the financial help of the members. These Banks provide loans to the members at low rate of interests. In rural area these provides loans to the farmers for the purchase of seeds, fertilizers and cattle. In urban area these Banks provide loan to its members for the purchase of raw material and tool.

These are the various types of Co-operative Banks which are formed to achieve economic objectives of the members. Hence the further study is related to **"Loans & Advances"** of "**Co-operative Credit Bank.**

BANK PROFILE

The name of the bank is Janata Co-operative Bank Limited RAIBAG. Established in the year 15-10-1977.The bank is situated in RAIBAG, the bank register NO. C/ARCD/6193/77-78 AND Reserve bank license number. UBD/KAN/1499P.

The Janata Co-operative Bank Limited is head quartered at RAIBAG is professionally managed bank. Started 3 decades back, at a time when banking was less known to the people. The bank grew in strength over the years. The Janata Co-operative bank three branches spread over in Belgaum. The bank has ambitious plans for growth in branches total business and profits. The bank has achieved substantial sophistication in the various banking services provided.

The bank is managed by a group of professionals' administrators and businessman. From the starting the bank has been going in 'A' as an audit classification. And also it is giving 14% as dividend to the share holders. On 26-9-1996 the bank opened its first branch in Ugar Khurdha and Raibag and Athani.

REGISTERED OFFICE:

The address of the registered office of the bank shall be Janata co-operative bank ltd., Harugeri. If any change in above address shall be intimated to the Reserve Bank of India and registrar of co-operative societies within fourteen days from the date of occurrence of such a

change. Such a change of address shall also be immediately published in a local news papers and displayed on the banks notice board.

VISION AND MISSION:

VISSION:-

- Understanding the needs of customers & offering them superior product and services.
- Leveraging technology to service customers quickly and conveniently

Mission:-

- Customer Service and Product Innovation tuned to diverse needs of individual and corporate clientele.
- Continuous technology up gradation while maintaining human values
- Efficiency and effectiveness built on ethical practices

THE ADRESS OF THE BANK

Name of the bank	The Janata Co-operative Bank Ltd., Harugeri.
Year of Establishment	23-09-1977
Nature of Business	Service Provider
Location	RIABAG Tq: Raibag Dist: Belgaum Karnataka 591201(India) Sub branches: Raibag Ugar Khurda Athani
Turnover	More than 96 crores (approximately)
Registered number of bank	C/ARCD/6193/77-78
Telephone number	08331-257054-257747
Fax no	08331-257747
E-mail	Janata_hrg@rediffmail.com
Working hours	10.30 am to 4.30 pm

PROGRESS OF THE BANK:-

(In lakhs)

Sl No	Particulars	2012-13	2013-14	2014-15	2015-16	2016-17
1	No of members	2971	3167	3148	3116	3085
2	Share Capital	216.39	230.39	246.89	261.45	289.85
3	Reserve and Surplus	674.65	758.55	815.90	875.38	934.19
4	Deposits	7117.69	7493.86	7643.03	8255.74	9170.98
5	Loans and Advances	3926.52	4081.73	4389.74	4386.56	5284.50
6	Woking Capital	8137.78	8684.33	8975.66	9677.53	10765.56
7	Investment	3568.51	3428.21	3360.16	4007.98	4351.65
8	Net Profit	58.70	89.08	96.31	97.44	101.10
9	Dividend	12%	13%	14%	14%	14%

BOARD OF DIRECTORS:-

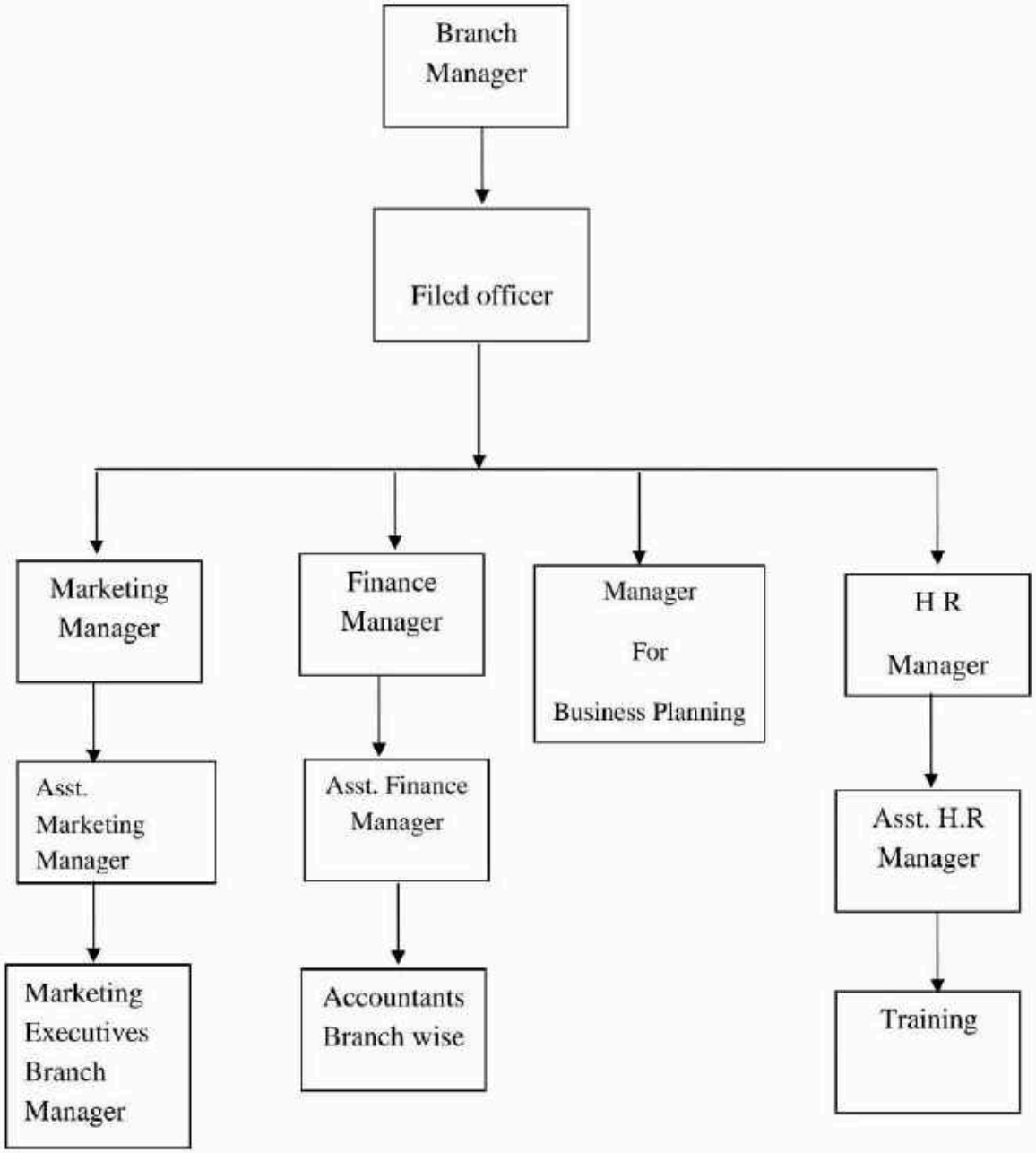
The Bank has **13** members on the Board. **Dr. R.B.PATIL** is the **chairman AND President and Managing Director of the Bank.**

SL.NO	NAME	DESIGNATION
1	MR. Rajashekar Basagouda Patil	President
2	Mr. Bharamu Siddappa Badamikai	vice president
3	Mr. Shreeshail Irappa Palbhavi	Director
4	Mr. Satappa Bimappa Karnavadi	Director
5	Mr. Appasaheb Bimgouda Aski	Director
6	Mr. Maleppa Y Mang	Director
7	Mr. S. D. Mungarwadi	Director
8	Mr.Deshbhooshan S Teli	Director
9	Mr. Prakash Dundappa Kashetti	Director
10	Mr. Tamanappa Sivlingappa Teli	Director
11	Mr. Hanamant.C.Madiwal	Director
12	Smt. Rekha C Deshpande	Director
13	Smt. Yashoda V Patil	Director

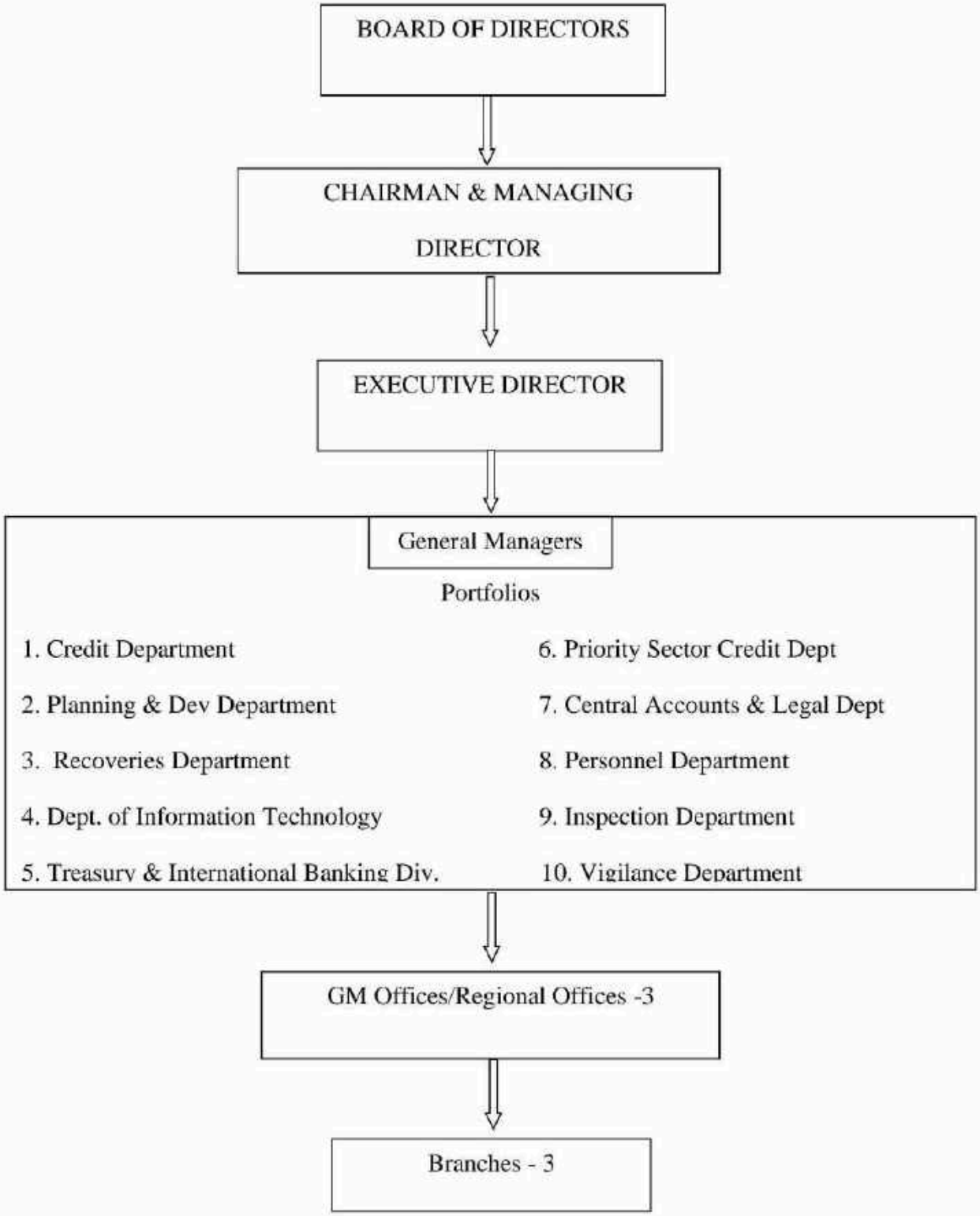
STAFF

SL.NO	NAME	DESIGNATION
1	Mr. A A Gurav	Branch Manager
2	Satyappa K Kumbar	Junior Assistant
3	Jayapal B Karnawadi	Cashier
4	Uday M Madival	Pigmy Agent
5	Madhav k Deshpande	Pigmy Agent
6	Gajanan T Badiger	Peon

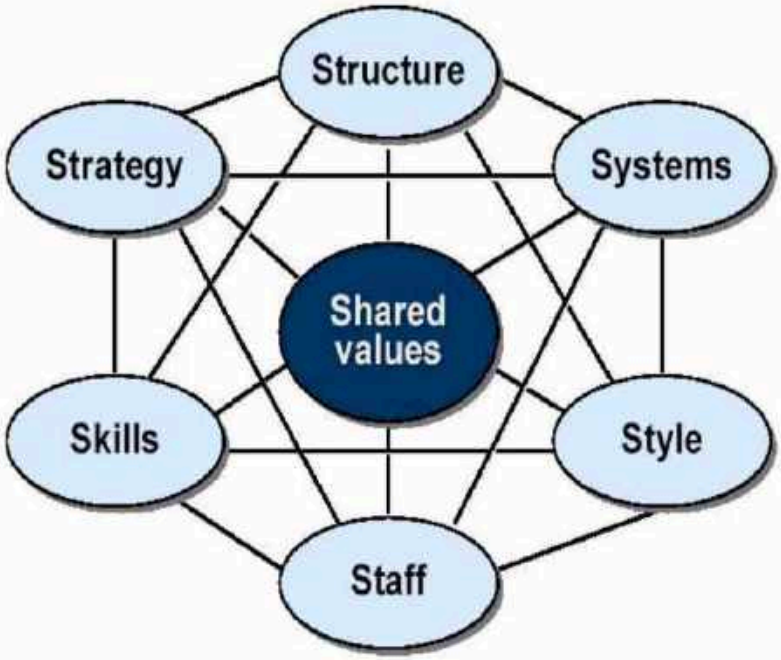
Organizational Structure of Janata Co-operative Bank at Raibag Branch



JANATA CO-OPERATIVE BANK ORGANISATIONAL STRUCTURE



MCKENSY'S 7S FRAMEWORK WITH RESPECT TO JANATA CO-OPERATIVE BANK LIMITED HARUGERI, RAIBAG BRANCH



STRATEGY:

A set of decision and action aimed at gaining a sustainable competitive advantage. It includes mission and vision of the Bank.

The term strategy is derived from the Greek word 'strategies' which means general. Strategy can be defined as the general programs of action and deployment of resource to attain comprehensive objectives. Strategy is the route that the organization has chosen for its future growth, and plan an organization formulates to gain a sustainable competitive advantage.

STRUCTURE:

The structure of an organization is what follows from division of work, the tasks and responsibilities, both horizontally and vertically. It is the total of various ways in which the work is divided into separate tasks and the way in which these tasks are co-ordinated. It also includes how the policies and procedures, govern the way in which the organization acts within itself and within its environment. Structure of any organization is the frame work in which the activities of the organizations members are co-ordinated.

STYLE:

Style refers to the employees shared and common way of thinking and behaving -unwritten norms of behaviour and thought. The managerial approach is more projects focused than process focused. The management is likely mixture of self-management for customer facing activities and task management for organizational activities.

For ex: if the staff is to treat customers as individuals, then they themselves will need to be managed as individuals, this suggests a self-management style.

Models for leadership:

Sharing leadership is key to the white stag philosophy of leadership because overtly promotes the distribution of the function of the leader among the group. Competitive styles of leadership are less and less responsive to complex Bank today. Participative of cooperative styles of interaction are the keys to our future. An individual's style in interacting with others is an outward sign of the substance within. With experience, we can really tell a lot about people's capabilities by looking at them, but it is better to watch them in action. How does a good leader behave when the group is confronted with the need for decision.

Leadership Styles in Janata Bank:

It has been observed in **Janata Bank** that the behaviour of superior towards the subordinates is pleasant. They motivate fresher who are working under them. The superior tells the subordinates what he has to do. The objective of the work is clearly defined to them. Otherwise the superior talks to the subordinate, ask the difficulties that the subordinate is facing, and tries to solve his problems.

It is also been observed that in the organization that while speaking to their subordinates, superiors will be very friendly and affectionate to the subordinates. The superior in the **Janata Bank** gives equal importance to objectives of the company as well as relationship with the subordinates (executive style). Superiors who act as leaders conduct meeting, discussions, presentations etc on regular basis and take the suggestions and ideas given by subordinates, the leaders take the final decisions only. This style of leadership is called participative style of leadership.

Systems:

The systems refers to the procedure, processes and routine that characterize how important works has to be done like financial systems, hiring, promotion and performance appraisal systems, information .Systems require capabilities in both information technology and in organizational process methods and controls. The capabilities are required in:

1. Information Technology & Information System:

It is used for Designing a user interface, analysis and design techniques, Development of prototype, new product development, database, System delivery like distribution to multiple users, locations, media type and combinations and operation of wide area network management, security management.

2. Sales and service:

Design, development and delivery of new responsive processes to support intimate customer relationships. And operation sales, services, claims, 24/7 day support.

3. Legal:

For like personalization and customization of products/services. The decision-making system within the organization can range from management institution, to structured computer system to complex expert system an artificial intelligence. It includes

· Computer system

· Operational System

· Human Resource System

· Marketing

· Finance

Staff:

This refers to organizations human resources. How organizations human resource is developed, trained, socialized, integrated, motivated and how their career development is managed.

Janata Bank encourages every member of the Bank to practice the Indian principles of work: service with devotion. Sound management practices, professionalism of a high calibre, a cohesive group policy which charters of independence in individual operations are the strengths of the Janata Bank.

At **Janata Bank**, believe that people are the key resources - especially in a high tech competitive environment. It is the people behind the work, behind the product and behind the service that make the difference. That is the reason we take exceptional care to hire the best - both in terms of qualification and attitudes, and constantly train and upgrade their skills.

The company has employed able people, trained them well and assigned them to the right jobs. Selection, training, reward and recognition, retention, motivation and assignment to appropriate work are all key issues.

Skills:

Skills refer to distinctive capabilities of personnel or of the organization as a whole. Skills are that for which the staff to develop appropriate new skills, for which it requires a learning environment. If the staff managers are to acquire the skills, then there needs to be an appropriate learning environment. One that:

- Is driven by desire to realize the vision.
- Has a sharing culture with mutual support.
- Provides space and time for learning. Preferably closely linked to specific tasks and objectives (just in time learning).
- Allows risk
- Tolerates failure, provided it is part of the learning process.
- Has visible recognition for success that is built on new learning.

Where skills and experience cannot be resourced or developed internally within the required timescales then external companies will need to be retained.

In short skills refer to the fact that employees have the skills needed to carry out the company's strategy. Training and development ensuring people know how to do their jobs and stay up to date the latest techniques.

Shared Values: - Customer Satisfaction through

- Providing quality service effectively and efficiently
- Smile, it enhances your face value" is a service quality stressed on
- Periodic Customer Service Audits
- Maximization of Stakeholder value

SWOT Analysis:

Strengths

- JANATA Bank has been in the banking industry since 1994. It has successfully completed SILVER JUBLI CEREMONY.
- The bank has a sound network i.e. it providing mobile SMS service to their customer.
- The bank is having well experienced, trained, most dedicated and committed staff.
- In has a strong customer base.

Weakness

- Tedious procedures have to be followed before advancing loans causing inconvenience to customers.
- Bank has less resource as compare to nationalized bank.
- No internet banking, mobile ATM banking.

Opportunities

- The bank can optimize the growth opportunities arising out of retail banking and small and medium enterprises (SMEs).
- Further expansion of business networks and possible arrangements of sharing networks of other banks by issuing mutual funds and insurance

Threats

- Bank is facing competition from its other Private Sector Banks
- Changing economic policies of Government will have serious impact on interest rates and reserve ratio maintained with RBI.

List of Department and Functions:

Department of the Bank

- Credit department
- Operation department
- Marketing department
- Cash department
- Clearing department
- Customers Relation
- Cash Management service

1. Credit Department:

This department mainly concentrates on lending activities to its customers and client. For smoothing of its activities it has further sub department. This department provides different loan like personal loan, housing loan, education loan, agriculture loan etc. While providing loan it evaluate the capability, back ground of client and analyze the risk involved in recollecting the same. To operate its activity it has given maximum decision power by management which will help to run organization successfully. As it is credit department it involves more risk and uncertainty towards its client and customers, so that the contribution to other department for achieving targets usually less. And it has also its future plans for achieving its goals.

Functions:

- Examining the proposals.
- Documentations.
- Disbursements of loans.
- Recovering the loan.
- Credit appraisal.

2. Operation Department:

It is department which is taking care of daily banking activities for smooth running of organization. The operation has been delegated average decision authority bin their routine work by management. It full co-operation with other department and also it is necessary for other department for smooth running. The department has been apprised by the management with different criteria, like by customer satisfaction, by branch performance. As it is an operation department, so it will contribute to all departments in achieving their planned targets.

Functions:

- DD Drafting.
- Out-station cheque realization.
- Attending customer's queries.
- ATN office in charge.
- Handling day to day transactions.
- Cash and clearance.
- Handling govt. business.
- RTGS (Real Time Gross Settlement System).

3. Marketing Department:

It is the department, which will take care of organization expansion by way of achieving targeted goals. Means in this department it mainly concentrate on selling security, acquiring more number of deposits, accounts etc. The marketing department has been given decision power 50-90% by the management to achieve their target and, make it success. For achieving of this success department has supporting and go operate with this department. Hence the marketing department performance has appraised with technique like, by customer satisfaction,

by branch performance, by self appraisal, by giving targets. Therefore to achieve this target marketing department has its own plan and strategies like,

-By obtaining new customers.
-By generating new business through existed customers.

Functions:

- Achieving branch targets.
- Coordinating with sales executives.
- Customer service.
- Opening of new account (building of new relation).

4. Cash Department:

In this department it evaluates the daily requirements of cash, based on this it is going to maintain liquidity. If the bank having heavy cash liquidity, this department will keep all cash in to higher authority bank. The department has been given 50-80% of decision power by management to their routine activities. It has given more contribution to other departments in achieving their goals in terms of co-operation. As it is cash department there are no any future plans. But as per present scenario market it is going to act.

Functions:

- Handling daily cash transaction.
- Balancing cash figure at the end of day.
- Maintaining cash level of the bank.
- Maintaining liquidity.

5. Clearing Department:

It is department which is taking care of customer work regarding receiving out station cheques and Odds. The department has given average decision power by the management. Regarding go-operation it has contributing to other department as much as possible. As it is clearing department it had no any future plans but it is ready accept all positive changes towards improvement.

Functions:

- Clearance of out stations cheque.
- Clearance of locals cheque
- CBSS (software name used for giving information to the current Account holders).

Information Technology:

The bank is continuously focusing on improvement in IT related functions to have an edge over other market players. The bank continues to leverage information technology as a strategic tool for its business operations, to gain competitive advantage by offering customer convenience and improved services as well as improving productivity and efficiency. UTI Bank technology strategy emphasis enhanced level of customer services through multi channel banking and straight through processing, and cost efficiency through wider and focus market reach and opportunities for cross selling.

As a measure to reduce operational cost, increase the deposit base and enhance customer service, the bank in increasing the number of ATMs. The bank has introduced the Intranet banking facility-titled **connect.**

Product and Services

Consumer banking

Janata Bank is providing in consumer banking the following products and services:-

- Savings Account
- Salary Power
- Power Salute
- Priority Banking
- Women Account
- Senior Privilege
- Fixed Deposits
- lockers

Services

- Corporate banking
- Cash Management Services
- Trade Service
- Lending/Financing

Corporate banking

In corporate banking Janata Bank is providing following services.

- Cash Management Services
- Lending/Financing
- Trade Service
- Current Account
- Fixed Deposits

Cash Management Services

Through bank cash management service, bank brings to customers a wide array of collection and payment services for improved liquidity through faster access to their funds and total control on their fund movements through customized MIS reports. Banks cash management service solutions include

- Collection services that offer local cheques collection (LCC) at more than 100 locations and upcountry cheques collection (UCC) for more than 800 locations.

Lending/Financing

- Working capital finance
- Cash credit / working capital demand loan
- Term lending
- Agricultural loan
- Channel finance
- Asset securitization
- Bank guarantees

Trade Service/Trade Finance

- Bills Discounting
- L/C Backed bill discounting
- Drawee Bill Discounting
- Drawer Bill Discounting

CHAPTER-4

DATA ANALYSIS AND INTERPRETATION

Data Analysis and Interpretation

Analysis and Interpretation:

Meaning of Analysis

The term Analysis means methodical classification of the data given in the financial statements. In simple words analysis classifies and simplifies the data .e.g. bringing together all fixed assets one side, current assets one side and so on.

Meaning of Interpretation

An interpretation is an assignment of meaning to the symbols of a formal language. Many formal languages used in mathematics, logic, and theoretical computer science are defined in solely syntactic terms, and as such do not have any meaning until they are given some interpretation. The general study of interpretations of formal languages is called formal semantics.

Table No. 4.1

MORTGAGE LOAN

Years	Loan Amounts	Total Loans	Amount in Percentage
2012-2013	51,36,091.00	6,35,10,515.61	8.08
2013-2014	1,13,12,207.00	6,85,04,118.00	16.51
2014-2015	1,00,65,962.00	7,02,92,709.20	14.32
2015-2016	1,33,09,476.00	8,19,97,399.21	16.23
2016-2017	88,07,667.00	8,25,63,619.21	10.67

Source: Annual Reports of the Bank from the year 2012-13to 2016-17

Graph 4.1

Data Interpretation:

Given graph shows that the Mortgage Loan has increased from 8.08% to 16.51% in the year 2013-2014 as compared to the year 2012-2013. And it has decreased to 14.32% in the year 2014-2015And it has increased to 16.23% in the year 2015-2016 and it has decreased 10.67% in the year 2016-2017 as compared to the previous year.

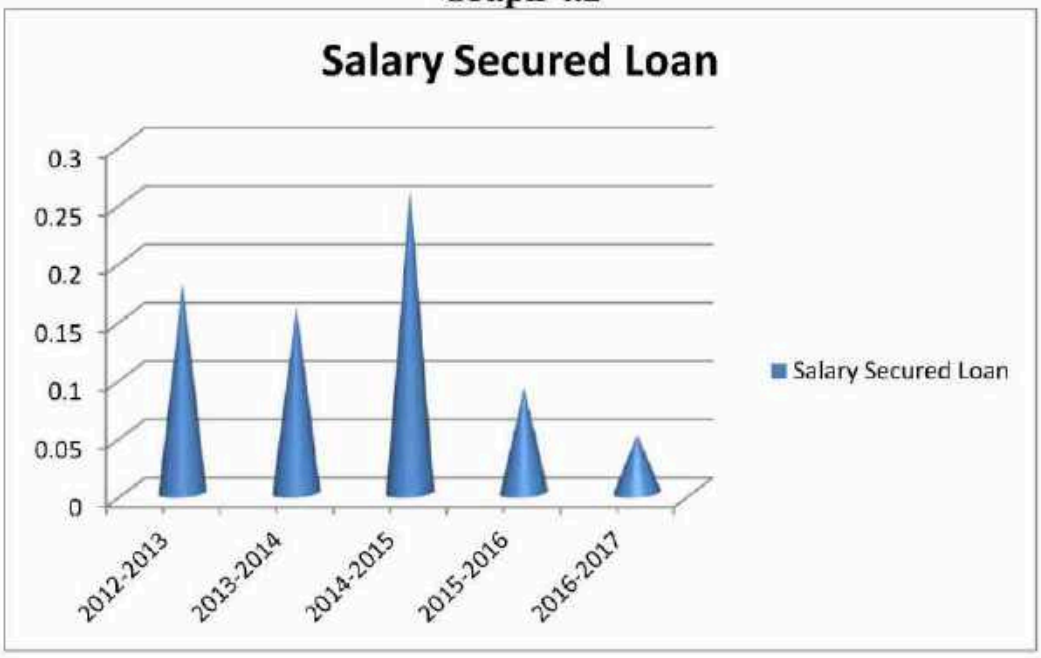
Table No. 4.2

SALARY SECURED LOAN

Years	Loan Amounts	Total Loans	Amount in Percentage
2012-2013	1,17,482.00	6,35,10,515.61	0.18
2013-2014	1,09,191.00	6,85,04,118.00	0.16
2014-2015	1,86,048.00	7,02,92,709.20	0.26
2015-2016	74,895.00	8,19,97,399.21	0.09
2016-2017	49,531.00	8,25,63,619.21	0.05

Source: Annual Reports of the Bank from the year 2012-13 to 2016-17

Graph 4.2



Data Interpretation:

Above graph shows the salary based loan has decreased from 0.18% to 0.16% in the year 2013-2014 as compared to the year 2012-2013. And it was highest in the year 2014-2015, 0.26% and again it decreased to 0.09% in the year 2015-2016 and 0.05% in the year 2016-2017.

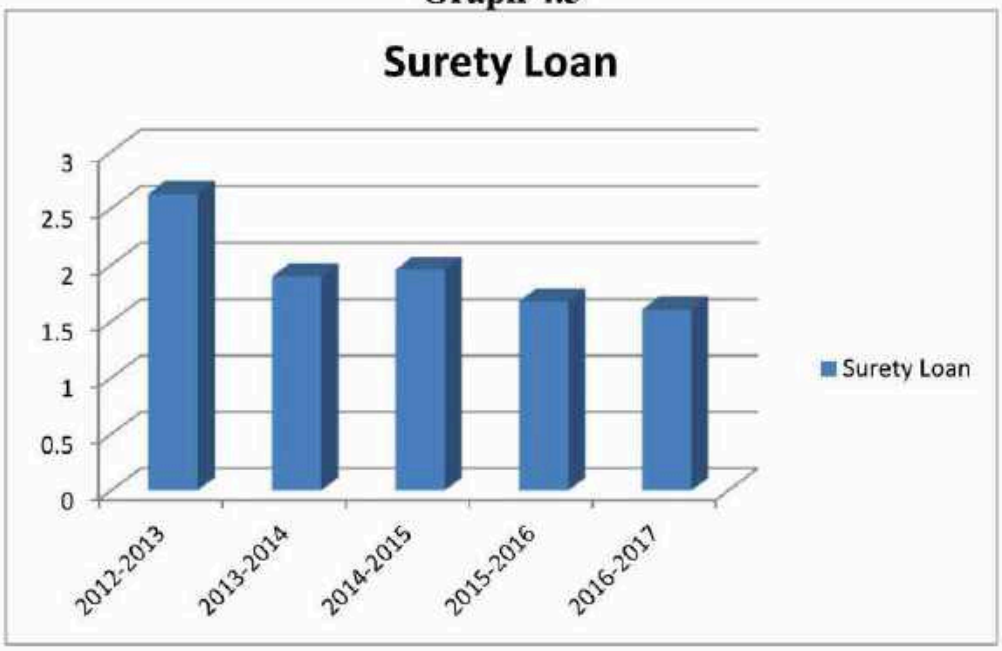
Table No.4.3

SURETY LOAN

Years	Loan Amount	Total Loans	Amount in percentage
2012-2013	16,69,182.00	6,35,10,515.61	2.63
2013-2014	13,06,868.00	6,85,04,118.00	1.90
2014-2015	13,81,921.00	7,02,92,709.20	1.96
2015-2016	13,80,558.00	8,19,97,399.21	1.68
2016-2017	13,29,541.00	8,25,63,619.21	1.61

Source: Annual Reports of the Bank from the year 2012-13 to 2016-17

Graph 4.3



Data Interpretation:

Given graph shows that the surety loan has decreased from 2.63% to 1.90% in the year 2013-2014 as compared to the previous year 2012-2013. And it has gradually increased 1.96% in the year 2014-2015. And it has decreased 1.61% in the year 2016-2017.

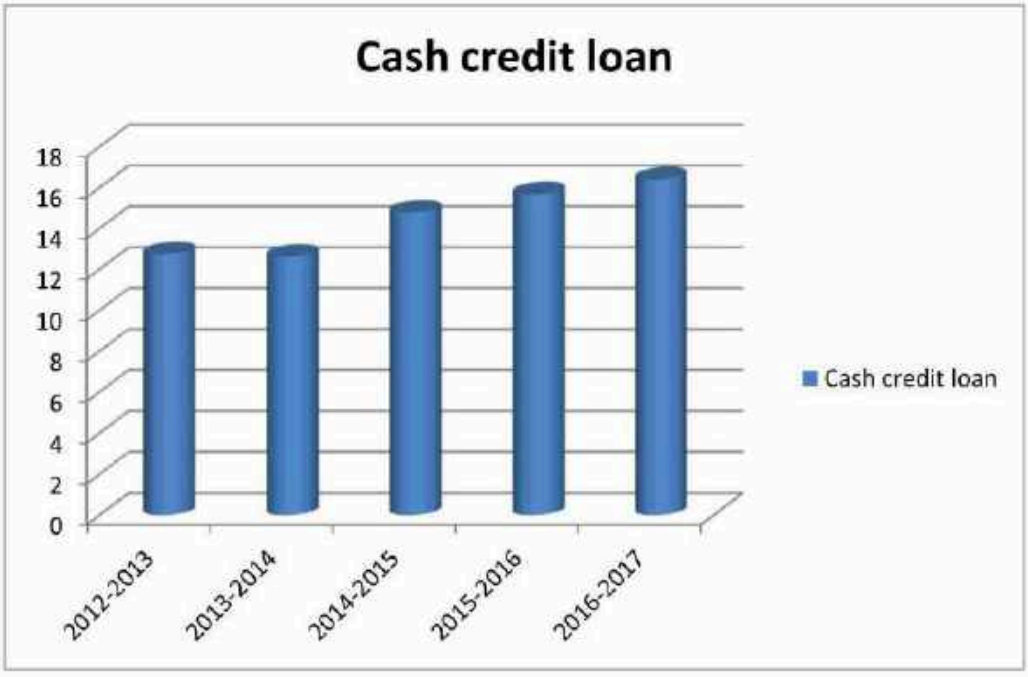
Table No. 4.4

CASH CREDIT LOAN

Years	Loan Amount	Total Loans	Percentage
2012-2013	80,96,070.61	6,35,10,515.61	12.75
2013-2014	86,46,392.00	6,85,04,118.00	12.62
2014-2015	1,03,97,537.20	7,02,92,709.20	14.79
2015-2016	1,28,58,029.80	8,19,97,399.21	15.68
2016-2017	1,35,49,787.80	8,25,63,619.21	16.41

Source: Annual Repots of the Bank from the year 2012-13 to 2016-17

Graph 4.4



Data Interpretation:

The above graph shows us the cash credit loan was 12.75% in the year 2012-2013. And it has gradually decreased 12.62% in the year 2013-2014.But it has continuously increased from 14.79% to 16.41% in the year 2016-2017 as compared to the previous years.

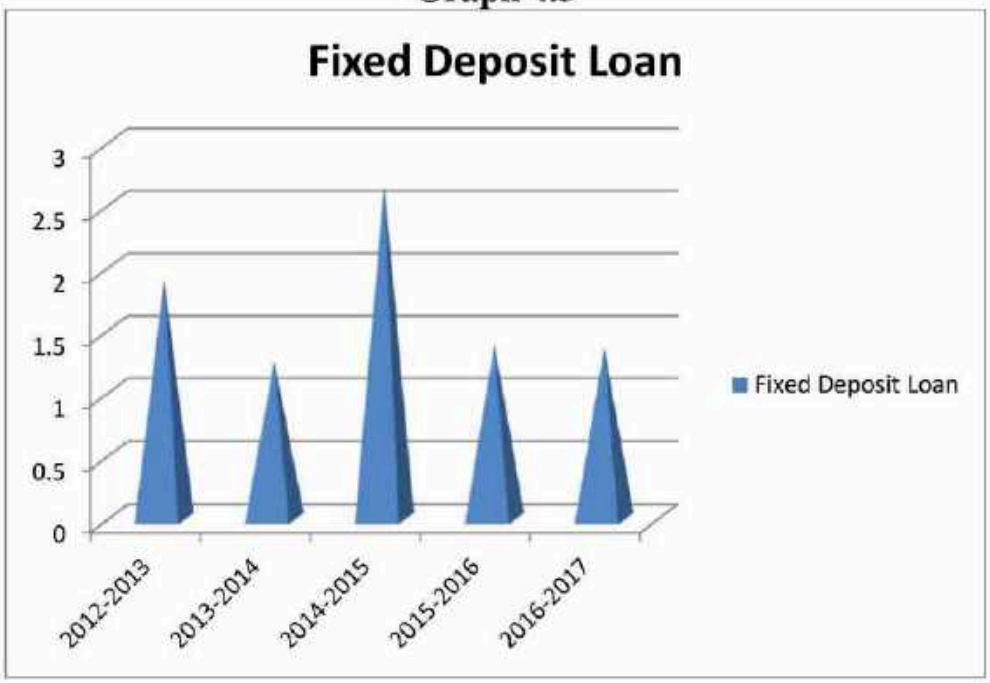
Table No. 4.5

FIXED DEPOSITS LOAN

Years	Loan Amounts	Total Loans	Amount in Percentage
2012-2013	12,08,112.00	6,35,10,515.61	1.90
2013-2014	8,57,686.00	6,85,04,118.00	1.25
2014-2015	18,69,000.00	7,02,92,709.20	2.66
2015-2016	11,46,500.00	8,19,97,399.21	1.39
2016-2017	11,24,000.00	8,25,63,619.21	1.36

Source: Annual Reports of the Bank from the year 2012-13 to 2016-17

Graph 4.5



Data Interpretation:

Given graph shows the fixed deposit loan has gradually decreased from 1.90% to 1.25% in the year 2013-2014 as compared to the year 2012-2013. And it has increased 2.66% in the year 2014-2015 and it has decreased to1.36% in the year 2016-2017.

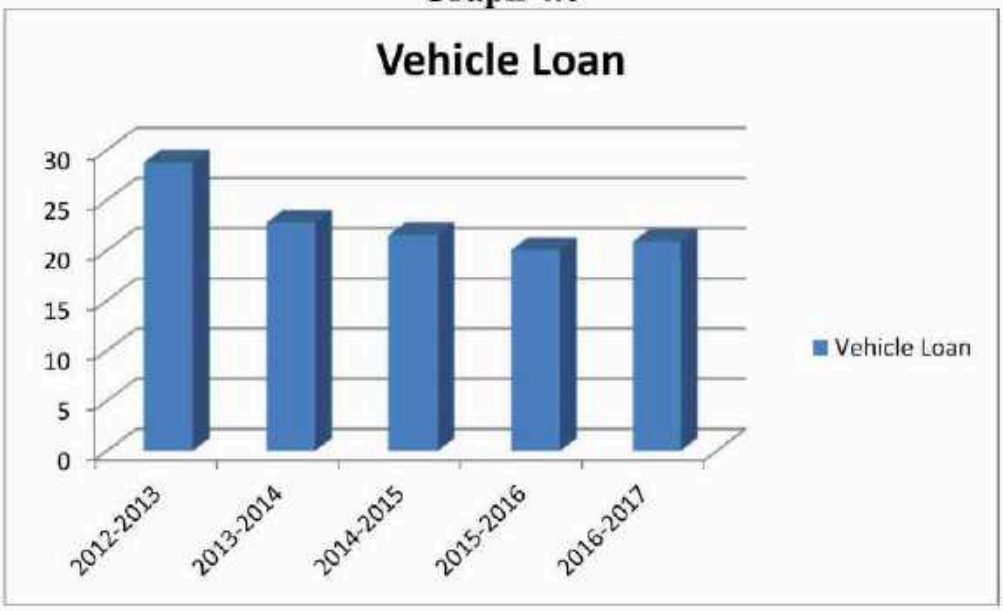
Table No. 4.6

VEHICLE LOAN

Years	Loan Amount	Total Loans	Amount in Percentage
2012-2013	1,82,64,382.00	6,35,10,515.61	28.75
2013-2014	1,55,81,784.00	6,85,04,118.00	22.75
2014-2015	1,51,26,911.00	7,02,92,709.20	21.52
2015-2016	1,64,29,915.00	8,19,97,399.21	20.03
2016-2017	1,72,21,437.00	8,25,63,619.21	20.85

Source: Annual Reports of the Bank from the year 2012-13 to 2016-17

Graph 4.6



Data Interpretation:

The vehicle loan continuously decreased from 28.75% to 20.85% in the year 2016-2017 as compared to the previous year 2012-2013.

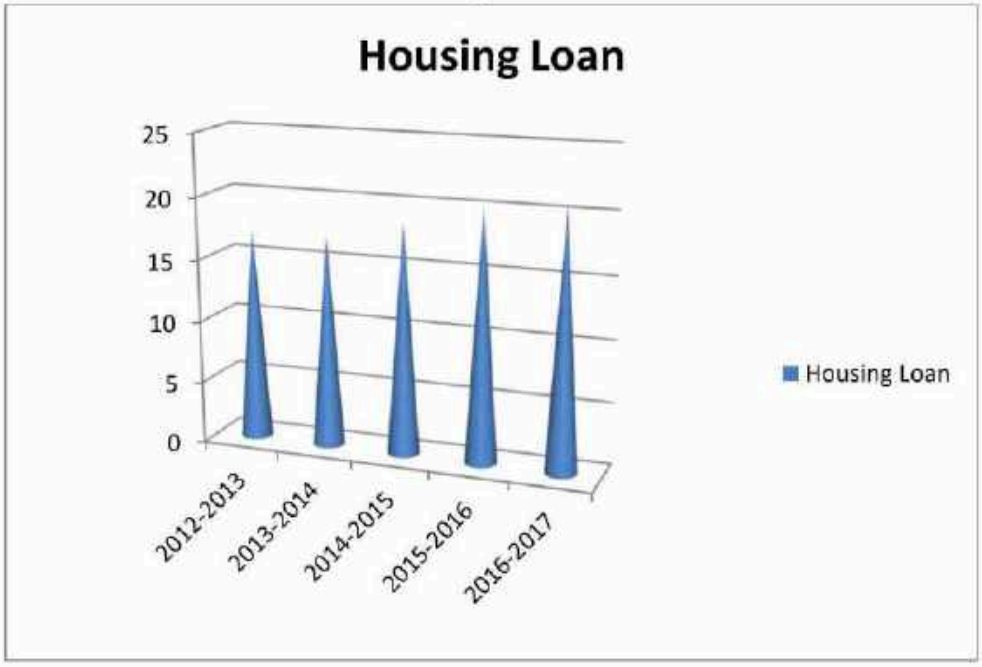
Table No. 4.7

HOUSING LOAN

Years	Loan Amount	Total Loans	Amount in Percentage
2012-2013	1,08,60,915.00	6,35,10,515.61	17.10
2013-2014	1,16,40,062.00	6,85,04,118.00	16.99
2014-2015	1,30,29,756.00	7,02,92,709.20	18.54
2015-2016	1,66,22,201.00	8,19,97,399.21	20.27
2016-2017	2,20,79,585.00	8,25,63,619.21	26.74

Source: Annual Reports of the Bank from the year 2012-13 to 2016-17

Graph 4.7



Data Interpretation:

The above graph shows that the housing loan has decreased from 17.10% to 16.99% in the year 2013-2014 as compared to the previous year 2012-2013. And it has continuously increased from 18.54% to 26.74% in the year 2016-2017.

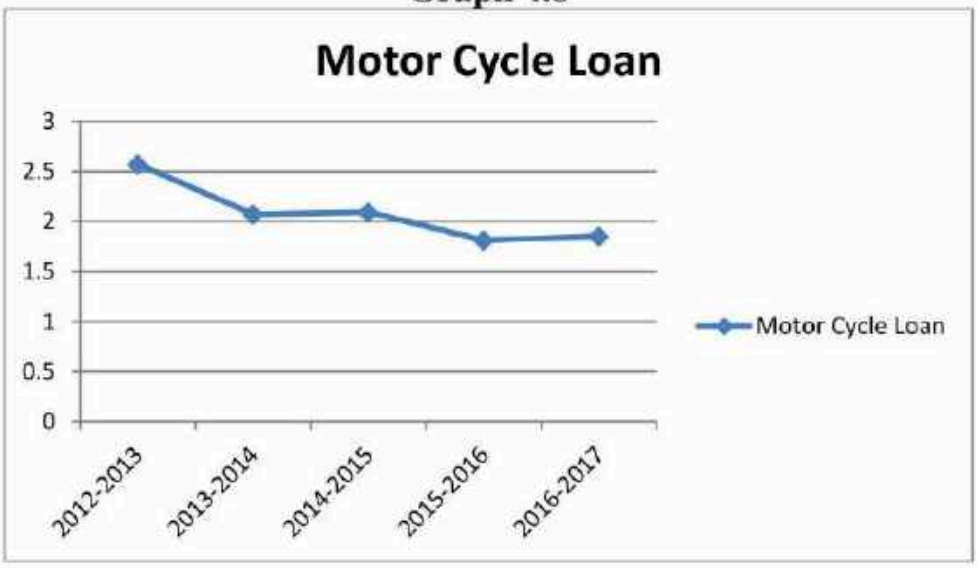
Table No. 4.8

MOTOR CYCLE LOAN

Years	Loan Amount	Total Loans	Amount in Percentage
2012-2013	16,35,208.00	6,35,10,515.61	2.57
2013-2014	14,20,394.00	6,85,04,118.00	2.07
2014-2015	14,74,387.00	7,02,92,709.20	2.09
2015-2016	14,90,299.00	8,19,97,399.21	1.81
2016-2017	15,31,861.00	8,25,63,619.21	1.85

Source: Annual Reports of the Bank from the year 2012-13 to 2016-17

Graph 4.8



Data Interpretation:

Given graph shows that the motor cycle loan has decreased from 2.57% to 2.07%in the year 2013-2014 as compared to the previous year 2012-2013. And it gradually increased to 2.09% in the year 2014-2015. And it has decreased 1.81% in the year 2015-2016 and it has increased 1.85% in the year 2016-2017.

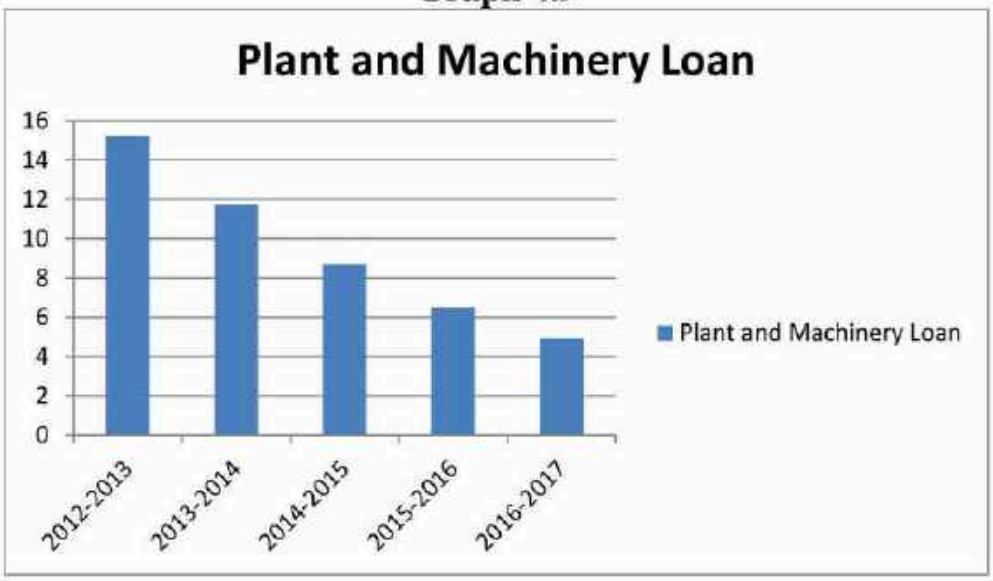
Table No. 4.9

PLANT AND MACHINERY LOAN

Years	Loan Amounts	Total Loans	Amount in Percentage
2012-2013	96,51,066.00	6,35,10,515.61	15.20
2013-2014	80,49,681.00	6,85,04,118.00	11.75
2014-2015	61,29,562.00	7,02,92,709.20	8.72
2015-2016	53,30,462.00	8,19,97,399.21	6.50
2016-2017	40,64,308.00	8,25,63,619.21	4.92

Source: Annual Reports of the Bank from the year 2012-13 to 2016-17

Graph 4.9



Data Interpretation:

The above graph shows that the plant and machinery loan was 15.20% in the year 2012-2013. And it continuously decreased from 15.20% to 4.92% during the study period.

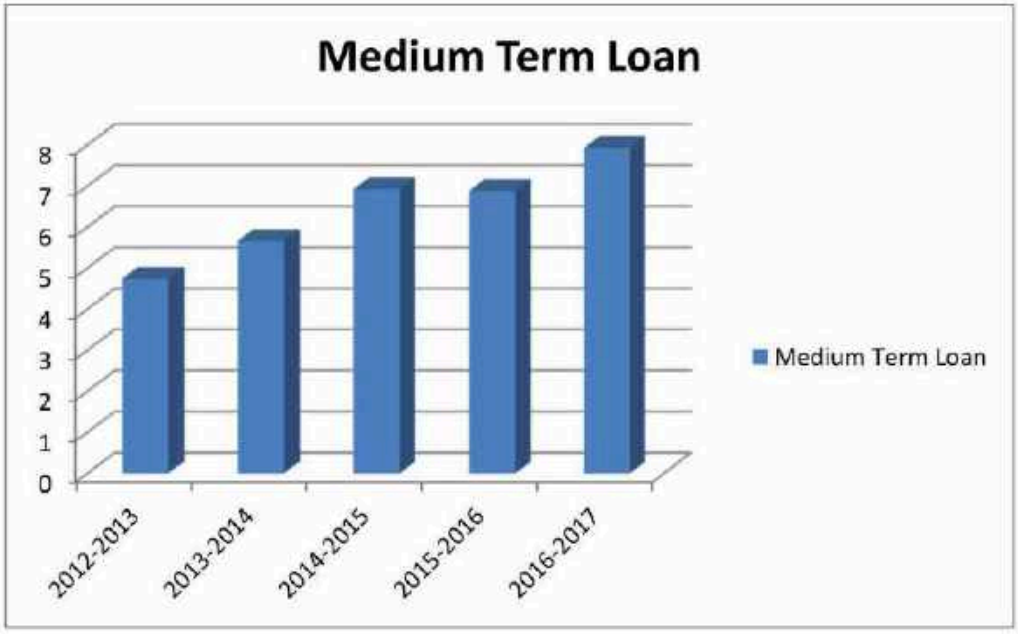
Table No. 4.10

MEDIUM TERM LOAN

Years	Loan Amount	Total Loans	Amount in Percentage
2012-2013	30,11,459.00	6,35,10,515.61	4.74
2013-2014	38,60,471.00	6,85,04,118.00	5.66
2014-2015	48,64,987.00	7,02,92,709.20	6.92
2015-2016	56,45,425.41	8,19,97,399.21	6.88
2016-2017	65,47,167.41	8,25,63,619.21	7.93

Source: Annual Reports of the Bank from the year 2012-13 to 2016-17

Graph 4.10



Data Interpretation:

The above graph shows that the medium term loan was 4.74% in the year 2012-2013. And it has continuously or simultaneously increased from 4.74% to 7.93% during the study period.

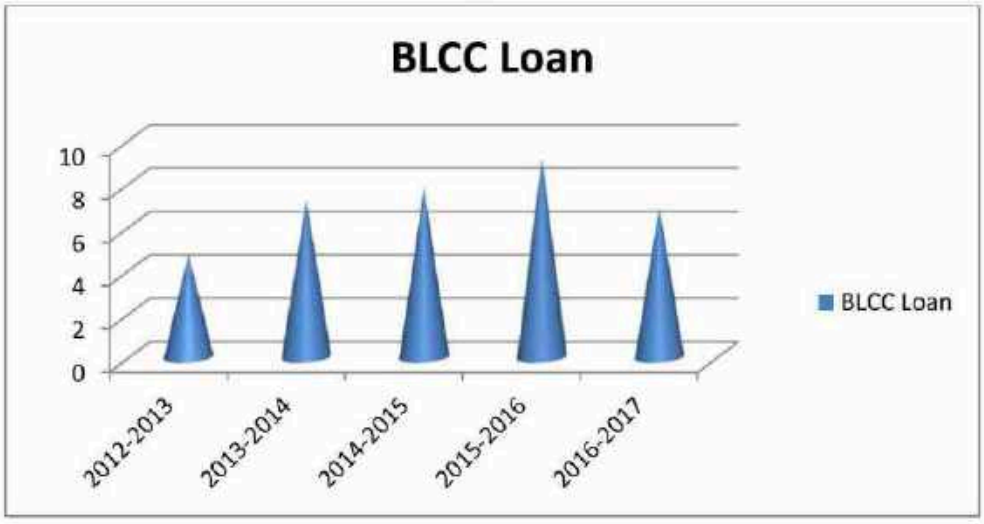
Table No. 4.11

B.L.C.C LOAN

Year	Loan Amount	Total Loan	Amount in percentage
2012-2013	30,11,459.00	6,35,10,515.61	4.74
2013-2014	49,89,628,00	6,85,04,118.00	7.28
2014-2015	54,71,338.00	7,02,92,709.20	7.78
2015-2016	75,20,593.00	8,19,97,399.21	9.17
2016-2017	56,95,438.00	8,25,63,619.21	6.89

Source: Annual Reports of the Bank from the year 2012-13 to 2016-17

Graph 4.11



Data Interpretation:

Given graph shows that the BLCC loan was 4.74% in the year 2012-2013. And it has increased from 4.74% to 7.78% in the year 2014-2015. And it has again increased to 9.17% in the year 2015-2016. But it decreased 6.89% in the year 2016-2017.

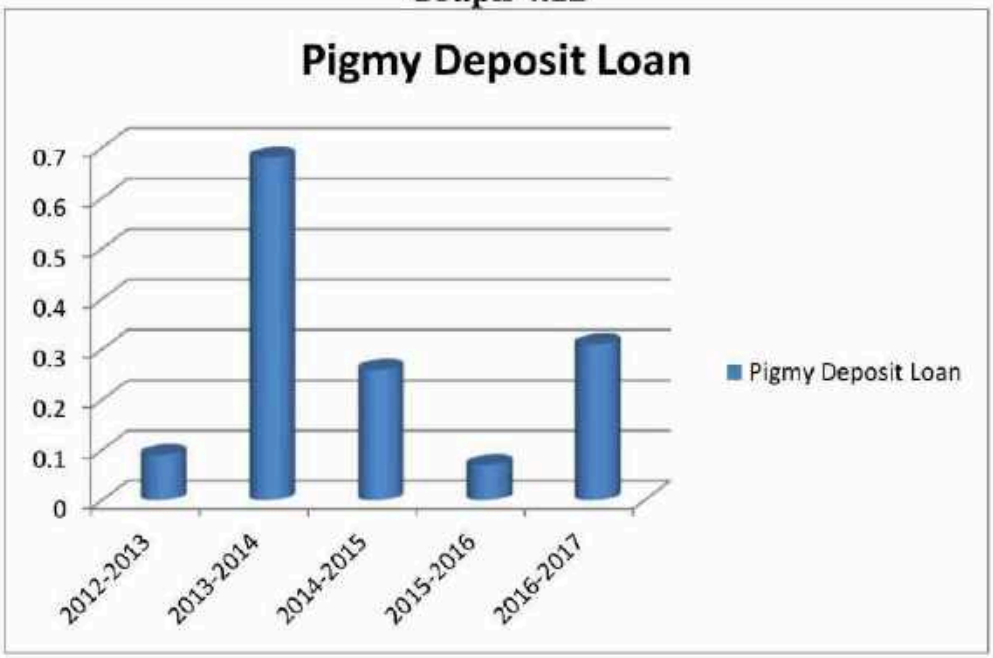
Table No. 4.12

PIGMY DEPOSIT LOAN

Year	Loan Amount	Total Loan	Amount in percentage
2012-2013	32,500.00	6,35,10,515.61	0.09
2013-2014	4,69,000.00	6,85,04,118.00	0.68
2014-2015	1,68,000.00	7,02,92,709.20	0.26
2015-2016	65,137.00	8,19,97,399.21	0.07
2016-2017	2,57,000.00	8,25,63,619.21	0.31

Source: Annual Reports of the Bank from the year 2012-13 to 2016-17

Graph 4.12



Data Interpretation:

Given graph shows that the pigmy deposit loan was increased from 0.09% to 0.68% in the year 2013-2014 as compared to the previous year and it has decreased 0.26% in the year 2014-2015. And again it has decreased 0.07% in the year 2015-2016. But it increased 0.31% in the year 2016-2017 as compared to the previous year.

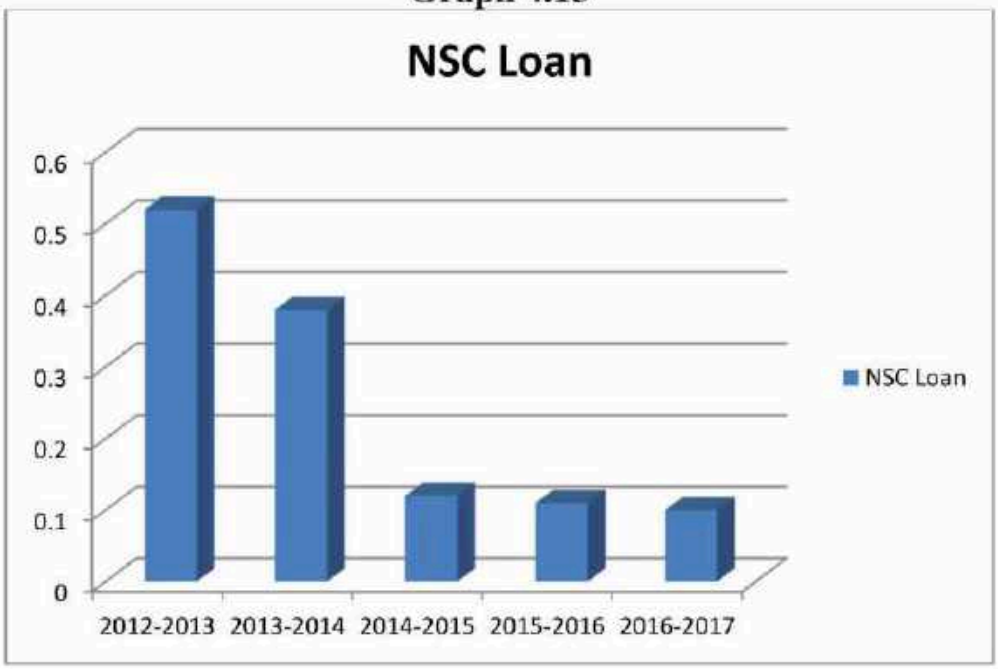
Table No. 4.13

NSC LOAN

Year	Loan Amount	Total Loan	Amount in percentage
2012-2013	3,40,903.00	6,35,10,515.61	0.52
2013-2014	2,60,754.00	6,85,04,118.00	0.38
2014-2015	82,300.00	7,02,92,709.20	0.12
2015-2016	95,908.00	8,19,97,399.21	0.11
2016-2017	90,296.00	8,25,63,619.21	0.10

Source: Annual Reports of the Bank from the year 2012-13 to 2016-17

Graph 4.13



Data Interpretation:

The above graph shows that the National Saving Certificate Loan continuously decreased from 0.52% to 0.10% during the study period.

Table No. 4.14

RECURRING DEPOSIT LOAN

Year	Loan Amount	Total Loan	Amount in percentage
2012-2013	7000.00	6,35,10,515.61	0.01
2013-2014	Nil	6,85,04,118.00	Nil
2014-2015	45000.00	7,02,92,709.20	0.06
2015-2016	28000.00	8,19,97,399.21	0.03
2016-2017	2,16,000.00	8,25,63,619.21	0.26

Source: Annual Reports of the Bank from the year 2012-13 to 2016-17

Graph 4.14

Data Interpretation:

Given graph shows that the recurring deposit loan 0.01% in the year 2012-2013 and in the year 2013-2014 it was nil and it increased 0.06% and again it was increased to 0.26% in the year2016-2017.

Chapter -5

FINDINGS, SUGGESTION AND CONCLUSION

FINDINGS:

On the basis of Data Presentation, Interpretation

The findings & Observations are as follows:

1. From the study we can see that the number of members has increased from 2985 in the 2011-2012 to 3116 in the year 2015-2016.
2. From the study we can see that the amount of deposits in the 2011-2012 was Rs. 6013.33 lakhs and it increased to Rs.8255.74 lakhs by the year 2015-2016.
3. The Loans sanctioned in the year 2011-2012 were Rs. 3734.90 lakhs and it has reached to Rs. 4386.56 lakhs in the 2015-2016.
4. The Mortgage loan initial it was stood at Rs. 51, 36,091.00 when it is compared to total loans it was just 8.08%. It reveals that in the subsequent years rate is increased from 0.08% to10.67% in last year's. (Table No. 4.1)
5. The loans like salary secured loan and surety loan have shown decreasing trend over the study period.
6. During the study it was found that the cash credit loan was Rs.80, 96,070.61 when it is compared to total loans it was just 12.75%. But it increased from 12.75% to 16.41% in the year 2015-2016. (Table No.4.4)
7. During the study period it was found that the vehicle loan shows continuously decreasing trend over the study period. Initial it was Rs.1, 82, 64,382 when it is compared to total loans it was 28.75%. But it decreased to 20.85% in the year 2015-2016. (Table No.4.6)
8. The Housing loan have shown increasing trend over the study period. The Housing loan was 17.10% in the year 2011-2012 and it was increased to 26.74% in the year 2015-2016. (Table No.4.7)
9. The Medium Term Loan was increased year by year. Initial it was 4.74%, over the year it increased to 7.93%. (Table No.4.10)
10. The Motor Cycle Loan was decreasing year by year. In the year 2011-2012 it was 2.57% but it decreased to 1.85% in the year 2015-2016. (Table No.4.8)

11. The Plant and Machinery Loan initial was stood Rs 62, 55,064 when it is compared to total loans it was just 15.20%. It reveals that in the subsequent years rate is decreased from 15.20% to 4.92% in the year 2015-2106. (Table No. 4.9)
12. The BLCC Loan was lowest 4.74% in the year 2011-2102. But it was highest 9.17% in the year 2014-2015. (Table No.4.11)
13. Few others loans like Fixed Deposit Loan and Pigmy Deposit Loan have been fluctuating over the study period.

14. The NSC Loan has been shows decreasing trend. Initial it was 0.52% but it was decreased to 0.10% in the year 2015-2016. (Table No. 4.13)

15. In Recurring Deposit Loan initial was stood at Rs. 7000. When it is compared to total loans it was just 0.01%. It reveals that in the subsequent years rate is increased from 0.01% to 0.26% in last year. It predicts the recovery tool is not utilized in effective manner. (Table No.4.14)

After the financial statement analysis of the Janata Co-operative Bank ltd Raibag. It is observe that the Federal Bank Ltd is doing business very good in banking sector. The bank is providing Credit Card, Debit card and Online banking facility to customer.

From the balance sheet it observes that the Asset of bank is increase year to year. It indicates that the bank is having good position of Asset as compare to liability.

SUGGESTIONS

All through the banks performance is very good and at par with industry, here is the some humble suggestion.

1) The trend of surety loan is decreasing year by year by observing this I would like to suggest that bank should maintain the increasing in future.
2) The trend of cash credit loan and housing loan increasing year by year by observing this I would like to suggest that the bank should maintain the increasing in future.
3) The trend of Vehicle loan and Motor cycle loan decreasing year by year by observing this I would like to suggest that the bank should maintain increasing in future.
4) It is suggested to the bank to arrange more training and development programs for the workers of the bank.
5) The success of any loan scheme depends on how the bank can identify eligible borrower. Therefore appropriate action should be taken by field officers.
6) Bank should open its branches at various rural areas places in the district. ATM facility should be provided to the account holders. Insist PAN Cards while operating the bank accounts. Prov ide facilities regarding recent developments like, Mobile Banking System, Core banking system, Tele Banking System and Anywhere Banking System. The bank should try to increase its interest spread ratio significantly by increasing its credit deposit ratio.
7) The bank must also try to increase its other income ratio by introducing more and more other lucrative services to its customers.
8) The procedure for sanctioning loans and advances needs to be customer friendly and not too rigid.
9) The bank has to improve their infrastructure facilities.
10) Finally, the bank should Endeavour to reduce its other expenditure by implementing stringent controls on all types of expenses.

CONCLUSION:

The study conduct on Performance of Loans and Advances of Janata Co-operative Bank Limited, Raibag has shown concern for the growth of rural economy by providing required amount of credit facilities to the rural artisans, small and medium business units.

The bank is doing very good job and providing various types of loans to the customer. This bank is in the growth path because loans and advances are increasing year by year. The loan amount advanced to the needy borrower is increasing from year to year during the study period which indicates greater benefit to the members and customers. The amount of deposits is also showing increasing trend from year to year which reflects the confidence and trust of the public on the management of the bank and efficiency of the staff members. The amount of profit earned is found increasing from year to year. The increasing rate of dividend at the rate 14% distributed from year to year represents the operational efficiency of the bank.

However the researcher feel that the staff members need to be updated with new technology of banking business which facilities the management in introducing new business services to the present and potential customers.

To conduct a project work was a great experience at "Janata Co-operative Bank Limited, Raibag. I really come to know what are the procedure and formalities required to take loans and advances even the problem faced while recovery of such loans taken.

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K.L.E SOCIETY'S

BASAVAPRABHU KORE ARTS, SCIENCE & COMMERCE COLLEGE, CHIKODI

Reaccredited At 'A' Level by NAAC

DEPARTMENT OF ZOOLOGY

B.sc – IV SEMESTER

2016 – 2017

CERTIFICATE

Date: 20.4.17

This is to certify that the IV semester students of CBZ combination have satisfactorily completed the field visit for IV semester as prescribed in the syallbus by the Rani Chennamma University Belagavi, during the year 2016-2017

Staff member
In-chege of the batch

Head of the Department
HEAD
DEPARTMENT OF ZOOLOGY

Examiners 1)

2) 5.5.17

Students Name	Register No.
Pradnya Aitwade	S1515704
Prajwal Naduvinkeri	S1515707
Pratiksha Kamble	S1515711
Praveen Tamadaddi	S1515712
Preeti Bhimannaver	S1515713
Priyanka Salunkhe	S1515727
Ravindra Naik	S1515732
Rohan Hawaldar	S1515733
Rohit Bhiste	S1515736
Sadashiv Pukate	S1515745
Saloni Khemalapure	S1515747
Sandesh Kustigar	S1515751

Introduction

We planned a field visit which is compulsory according to our syllabus. Studying in class rooms is not enough at least in some portion of syllabus theoretically. Class room study may not expose us to a reality so, observation in field is inevitable. As it is one day visit, we confined our visit to Phanal and its surroundings a place with hilly and forest area also nearly to chikodi.

This place is well known for its beauty in this area so we all decided to go to Phanal on 05/03/2017 for the study of mimicry and social organization in animals"

ACKNOWLEDGEMENT

We are indebted to our beloved Principal Dr. M. T. Kurani for his all kind of help in this regard.

With deep sense of gratitude let us express deep indebtedness to Prof. Y. H. Yalavagi , H.O.D. Department of zoology for his support to undertake this field visit on "study of mimicry habitats communities".

We sincerely thank, 1. M.S.Yadawade

2 .S.K.Annure

3. P.R.Patil

For their continuous support in this regards.

And also thankful to V.S.Devarushi and our friends who helped in completing this project.

Students of IV semester

Butterfly mimicry

Plate from Henry Walter Bates (1862) illustrating Batesian mimicry between *Dismorphia* species (top row, third row) and various Ithomiini (Nymphalidae, second row, bottom row)

Batesian mimicry is a form of mimicry where a harmless species has evolved to imitate the warning signals of a harmful species directed at a predator of them both. It is named after the English naturalist Henry Walter Bates, after his work on butterflies in the rainforests of Brazil.

Batesian mimicry is the most commonly known and widely studied of mimicry complexes, such that the word mimicry is often treated as synonymous with Batesian mimicry. There are many other forms however, some very similar in principle, others far separated. It is often contrasted with Müllerian mimicry, a form of mutually beneficial convergence between two or more harmful species. However, because the mimic may have a degree of protection itself, the distinction is not absolute. It can also be contrasted with functionally different forms of mimicry. Perhaps the sharpest contrast here is with aggressive mimicry, where a predator or parasite mimics a harmless species, avoiding detection and improving its foraging success. Batesian mimicry need not involve visual mimicry, but can employ deception of any of the senses. While visual signals have attracted most study, some moths mimic the ultrasound warning signals sent by unpalatable moths to bat predators, constituting auditory Batesian mimicry.

Stick Insect

The model is usually another species, except in automimicry, where members of the species mimic other members, or other parts of their own bodies, and in inter-sexual mimicry, where members of one sex mimic members of the other. It is often thought that models must be more abundant than mimics, but it has been shown that this is not necessarily a requirement.

Though visual mimicry through animal coloration is most obvious to humans, other senses such as olfaction (smell) or hearing may be involved, and more than one type of signal may be employed. Mimicry may involve morphology, behaviour, and other properties. In any case, the mimetic signal always functions because it resembles that of another organism. In evolutionary terms, this phenomenon is a form of co-evolution. It can involve an evolutionary arms race if mimicry negatively affects the model, and the model can evolve a different appearance from the mimic. Mimicry should not be confused with other forms of convergent evolution, which occurs when species come to resemble each other by adapting to similar lifestyles that have nothing to do with a common signal receiver.

Mimics may have different models for different life cycle stages, or they may be polymorphic, with different individuals imitating different models. Models themselves may have more than one mimic, though frequency dependent selection favours mimicry where models outnumber mimics. Models tend to be relatively closely related organisms, but mimicry of vastly different species is also known. Most known mimics are insects, though many other animal mimics are known.

Ants

Defensive or protective mimicry takes place when organisms are able to avoid harmful encounters by deceiving enemies into treating them as something else.

The first three such cases discussed here entail mimicry of animals protected by warning coloration:

- Batesian mimicry, where a harmless mimic poses as harmful.
- Müllerian mimicry, where two or more harmful species mutually advertise themselves as harmful.
- Mertensian mimicry, where a deadly mimic resembles a less harmful but lesson-teaching model.

The fourth case, Vavilovian mimicry, where weeds resemble crops, involves humans as the agent of selection.

Bees Mimicry

Bees feed on flowers. Bees have powerful defense mechanisms such as painful sting and group defense. Most predators will avoid bees. Bees are the ideal model for other insects which also feed on flowers. Most bees mimics feed on nectar and are the pollinators of plants as well.

Most of the flies in family Bombyliidae mimic wasps or bees (Batesian mimics of Hymenoptera). However, they have stout bodies and do not have narrowed waist. Their wings are easily recognized with distinctive vein pattern, usually dark in colour, some with patterns or spots. When at rest, their wings are flat in outspread position.

Hover Flies may sometimes confused with stinging bees or wasps because of their mimic colour (Batesian mimics of Hymenoptera). Their bodies are medium to slender. On their abdomen there are the yellow-black wasps pattern and the narrow waist mimic pattern

Monkey

Monkeys are haplorhine ("dry-nosed") primates, a group generally possessing tails and consisting of about 260 known living species. There are two distinct lineages of monkeys: New World Monkeys and catarrhines. Apes emerged within the catarrhines with the Old World monkeys as a sister group, so cladistically they are monkeys as well. However, traditionally apes are not considered monkeys, rendering this grouping paraphyletic. The equivalent monophyletic clade are the simians. Many monkey species are tree-dwelling (arboreal), although there are species that live primarily on the ground, such as baboons. Most species are also active during the day (diurnal). Monkeys are generally considered to be intelligent, particularly Old World monkeys.

Lemurs, lorises, and galagos are not monkeys; instead they are strepsirrhine ("wet-nosed") primates. Like monkeys, tarsiers are haplorhine primates; however, they are also not monkeys. There are two major types of monkey: New World monkeys (platyrrhines) from South and Central America and Old World monkeys (catarrhines of the superfamily Cercopithecoidea) from Africa and Asia. Hominoid apes (consisting of gibbons, orangutans, gorillas, chimpanzees, and humans), which all lack tails, are also catarrhines but are not considered monkeys. (Tailless monkeys may be called "apes", incorrectly according to modern usage; thus the tailless Barbary macaque is sometimes called the "Barbary ape".)

Leaf Insect

Leaf insects are camouflaged (using mimicry) to take on the appearance of leaves. They do this so accurately that predators often are not able to distinguish them from real leaves. In some species the edge of the leaf insect's body even has the appearance of bite marks. To further confuse predators, when the leaf insect walks, it rocks back and forth, to mimic a real leaf being blown by the wind.

While the venom of a few species is dangerous to humans, scientists are now researching the use of spider venom in medicine and as non-polluting pesticides. Spider silk provides a combination of lightness, strength and elasticity that is superior to that of synthetic materials, and spider silk genes have been inserted into mammals and plants to see if these can be used as silk factories. As a result of their wide range of behaviors, spiders have become common symbols in art and mythology symbolizing various combinations of patience, cruelty and creative powers. An abnormal fear of spiders is called arachnophobia

Leaf insects measure roughly 28 to 100 mm (1.1 to 3.9 inches) in body length. Females of the largest known species, Phyllium giganteum, may exceed 100 mm. Males tend to be smaller than females. In addition, females typically have large forewings (elytra, or tegmina) that lie edge to edge on the abdomen. They also tend to lack hind wings and usually are flightless.

Spider

Spiders (order Araneae) are air-breathing arthropods that have eight legs and chelicerae with fangs that inject venom. They are the largest order of arachnids and rank seventh in total species diversity among all other orders of organisms. Spiders are found worldwide on every continent except for Antarctica, and have become established in nearly every habitat with the exceptions of air and sea colonization. As of November 2015, at least 45,700 spider species, and 113 families have been recorded by taxonomists. However, there has been dissension within the scientific community as to how all these families should be classified, as evidenced by the over 20 different classifications that have been proposed since 1900.

Anatomically, spiders differ from other arthropods in that the usual body segments are fused into two tagmata, the cephalothorax and abdomen, and joined by a small, cylindrical pedicel. Unlike insects, spiders do not have antennae. In all except the most primitive group, the Mesothelae, spiders have the most centralized nervous systems of all arthropods, as all their ganglia are fused into one mass in the cephalothorax. Unlike most arthropods, spiders have no extensor muscles in their limbs and instead extend them by hydraulic pressure.

Their abdomens bear appendages that have been modified into spinnerets that extrude silk from up to six types of glands. Spider webs vary widely in size, shape and the amount of sticky thread used. It now appears that the spiral orb web may be one of the earliest forms, and spiders that produce tangled cobwebs are more abundant and diverse than orb-web spiders. Spider-like arachnids with silk-producing spigots appeared in the Devonian period about 386 million years ago, but these animals apparently lacked spinnerets. True spiders have been found in Carboniferous rocks from 318 to 299 million years ago, and are very similar to the most primitive surviving suborder, the Mesothelae.

Grass hopper

Aggressive mimicry is found in predators (or parasites) that share the same characteristics as a harmless species, allowing them to avoid detection by their prey (or host). The mimic may resemble the prey or host itself, or another organism that is either neutral or beneficial to the signal receiver. In this class of mimicry, the model may be affected negatively, positively or not at all. Just as parasites can be treated as a form of predator, host-parasite mimicry is treated here as a subclass of aggressive mimicry.

The mimic may have a particular significance for duped prey. One such case is spiders, amongst which aggressive mimicry is quite common both in luring prey and disguising stealthily approaching predators. One case is the golden orb weaver (Nephila clavipes), which spins a conspicuous golden colored web in well-lit areas. Experiments show that bees are able to associate the webs with danger when the yellow pigment is not present, as occurs in less well-lit areas where the web is much harder to see. Other colours were also learned and avoided, but bees seemed least able to effectively associate yellow-pigmented webs with danger. Yellow is the colour of many nectar-bearing flowers, however, so perhaps avoiding yellow is not worthwhile. Another form of mimicry is based not on colour but pattern. Species such as the silver argiope (Argiope argentata) employ prominent patterns in the middle of their webs, such as zigzags. These may reflect ultraviolet light, and mimic the pattern seen in many flowers known as nectar guides. Spiders change their web day to day, which can be explained by the ability of bees to remember web patterns. Bees are able to associate a certain pattern with a spatial location, meaning the spider must spin a new pattern regularly or suffer diminishing prey capture.

Conclusion

Every one of we all worked great in our groups and we studied lot about mimicry and community in habituations it is real wonderful experience because in class room we only imagine but here we know the reality and it increase our thinking capacity.

KLE Society's

BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE, CHIKODI

(Accredited at 'A' with 3.26 CGPA in 3rd Cycle of A & A)

DEPARTMENT OF CHEMISTRY

REPORT

ON

INDUSTRIAL VISIT

TO

SHREE DOODHAGANGA KRISHNA SAHAKARI SAKKARE KARKHANE NIYAMIT

Chikodi, Examba Nanadi road, Nanadiwadi, Belagavi, Karnatak State , India

ON

26/03/2017

Arranged for

B.Sc final year students

INDUSTRIAL VISIT REPORT

One Day Educational Industrial Visit To Shree Doodhaganga Krishn Sahakari Sakkare Karkhane Niyamit Chikodi, Examba Nanadi road ,Nanadiwadi, Belagavi-591247,Karnatak State , India.

Our college arranged one day Educational visit to **Shree Doodhaganga Krishna Sahakari Sakkare Karkhane Niyamit Chikodi, Examba Nanadi road ,Nanadiwadi,** on 26thMarch 2017 for B.Sc final year (VI sem) students of Chemistry Department . This industrial tour was helpful to impart the practical knowledge of sugar production amongst the students and the faculty members.

Name of company	Shree Doodhaganga Krishna Sahakari Sakkare Karkhane Niyamit Chikodi.
Address of company	Post: chikodi, Examba Nanadi road, Nanadiwadi, Belagavi-591247, Karnatak State , India.
Chairman of company	Shri. Amit P. kore
Established year	1974
Nature of business	Producing sugar , Spirits(alcohol).
Capacity	5500 TCD TO 10000 , 30 KLPD Ethanol & Cogeneration Power Plant 20.5 MWhr to 50 MWhr.
Date of visit	26thMarch 2017
Branch involved	Department of chemistry (B.Sc. PCM And CBZ VI sem)
Concerned subject	B.Sc.VIth sem Chemistry Paper –II Prctical Curriculum
Total students	121

Transport facility	College bus
Faculty coordinators	1.Prof.B.Rajaiah 2.S.B.Banakar 3. G.B. Jambagi 4. J.R. Patil 5.S.S.Latte 6.P.M.Palankar 7.S.D.Kotabagi 8.P.B.Dubale
Objectives	1. To enhance the knowledge of producing sugar from sugar cane juice. 2.To develop the student interest in the different fields.

Outcome	At Industry students were able to see and understand different mechanical operation carried out in industry e.g. cutting, shredding, screening, centrifuging etc

HOD
Head of the
Department of Chemistry
B. K. College, CHIKODI - 591 201

PRINCIPAL
B.K.Arts, Science & Commerce College
CHIKODI - 591201.

K.L.E. SOCIETY'S
BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE, CHIKODI – 591 201.

(Accredited at 'A' Grade by NAAC with CGPA Of 3.26 In 3rd Cycle)

Date:17/03/2017

Department of Chemistry

Notice

As every year department of chemistry is organizing an Industrial visit to Shree Doodhaganga Krishna Shakari Sakkare Karkhane Niyamit Chikodi (DKSSK Chikodi), On 26th March, 2017 for B.Sc final year students.

Objectives of Industrial visit:

1. To create awareness about manufacturing process of industry.
2. To give industrial exposure.

Departure Time: 8:30 A.M on 26th March, 2017

Arrival Time:6:00 P.M. on 26th March, 2017

Name of Industry: Shree Doodhaganga Krishna Shakari Sakkare Karkhane Niyamit Chikodi (DKSSK Chikodi), *Examba Nanadi Rd, Nanadiwadi, Karnataka State , India*

All B.Sc. Final year students are required to register their names along with 100/- Rs. In department of chemistry on or before **21st March, 2017** without fail.

Note: Industrial visit is compulsory for all B.Sc. final year students.

HOD
Head of the
Department of Chemistry
B K College CHIKODI - 591 201

KLE Society's
BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE COLLEGE, CHIKODI
(Accredited at 'A' with 3.26 CGPA in 3rd Cycle of A & A)

Date:17/03/2017

To,
The Managing Director,
Shree Doodhaganga Krishna Sahakari Sakkare Karkhane
Niyamit Chikodi (DKSSK Chikodi),
Examba Nanadi Rd, Nanadiwadi, Karnataka State , India

Sir,

Sub: Seeking Permission for Industrial Visit to your esteemed organization.

As part of the Rani Channamma University Belagavi, curriculum of B.Sc. third year (VIsem) students have industrial visit. To facilitate the onsite working procedure of a esteemed organization such as yours and the curriculum demand, we request you for the industrial visit. Kindly permit us to visit your esteemed organization for a team of 45 students 3 groups (Including staff member) on 26/03/2017 .

Kindly grant us permission for the industrial visit and make the necessary arrangement for the same. We look forward to a positive reply from your side.

Thanking You,

Yours Sincerely,

Prof. S .B. Vanjire,
Head of the Department of chemistry,
KLE'S B.K.College , Chikodi-591201, Dist: Belagavi
Contact: 7349747434

Website: www.klesbkcollegechikodi.edu.in

17 MAR 2017
Shree Doodhaganga Krishna
Sahakari Sakkare Karkhane
Niyamit,Chikodi-591247

K.L.E.Society's

BASAVAPRABHU KORE ARTS SCIENCE AND COMMERCE COLLEGE, CHIKODI

PG DEPT. OF COMMERCE

Affiliated to Rani Channamma University, Belgavi.

KARNATAK LINGAYAT EDUCATION SOCIETY

K.L.E. S's BASAVAPRABHU KORE COLLEGE ☆CHIKODI☆ NAAC-A

CERTIFICAT

This is to certify that, the project entitled "*A STUDY ON FINANCIAL PERFORMANCE ON RATIO ANALYSIS* ***with special reference to*** *"JANATA CO-OPERATIVE BANK LIMITED, HARUGERI BRANCH RAIBAG"* is submitted by **Mr.GANGAPPA D HARAKE**, M.Com. IV. Sem, Reg.No MC151610 in partial fulfillment of the requirement for the award of degree of master of commerce in the P.G. department of commerce, at K.L.E. Society's Basavaprabhu Kore Arts, Science and Commerce college, Chikodi, affiliated to Rani Channamma University, Belagavi. The Project work is undertaken at ***"JANATA CO-OPERATIVE BANK LIMITED, HARUGERI BRANCH RAIBAG "*** Dist. Belgaum under the guidance of **Dr. S.T. Salunke.**

Dr. M. T. KURANI
PRINCIPAL

Prof. S. S. MALI
CO-ORDINATOR

Dr. S.T. SALUNKE
PROJECT GUIDE

ಜನತಾ ಸಹಕಾರ ಬ್ಯಾಂಕ ನಿಯಮಿತ,
ಹಾರೂಗೇರಿ-591220.
ತಾ|| ರಾಯಬಾಗ) ಕರ್ನಾಟಕ ರಾಜ್ಯ (ಜಿ|| ಬೆಳಗಾವಿ

JANATA CO-OPERATIVE BANK LTD;
HARUGERI - 591 220.

ESTD. 1977
R.B.I. LICENCE
NO. : U.B.D. KAN-1499P Tq. Raibag) ☎ : (08331) 257054, 257747 (Dist. Belgaum

Ref. No. 71/17-18 Date : - 9 JUN 2017

CERTIFICATE

This is to certify that **Mr. Gangappa D Harake** M.Com 4th semester student of K.L.E. Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikkodi has done his project work entitled as "**Ratio Analysis of Janata Co-Operative Bank Ltd. Harugeri Branch:Raibag**".

During his 4th semester period i.e., from April 2017 to May 2017, during this period his conduct was good. We wish all the best in his future career; we wish all the success in his future and all the best.

For, Janata Co-op. Bank Ltd.,
Harugrei (HO) Br. Raibag

Br. Manager

Chapter-1

RESEARCH METHODOLOGY

1.1 INTRODUCTION:

About Co-operative Bank:

A co-operative or credit is an autonomous association of person who voluntarily co-operate for their mutual social, economic, and cultural benefit. In India Co-operative Societies Engaged in banking barriers are regulated with the RBI and governed Co-operative Societies Act, 1965.

As co-operative bank is retail and commercial banking organized on a co-operative basis. Co-operative banking institutions take deposits and lend money in most parts of the world. The Banking Industry was once a simple and reliable business that took deposits from investors and lent it to borrowers at a higher rate.

THE PROJECT TITLE

"Ratio analysis"

The bank is an institution which deals in money. It borrows money from those who have surplus money and lends the same to those who are in need of it. Beyond the millennium, the Indian co-operative and other private bank will emerge larger size, technologically better equipped and stronger capital base. The health of Indian private bank is preserved and improved and they continue to play an important role in the Indian economy. Janata co-operative bank ltd., has large number of customer data base with variety of full services retail banking products including deposits and loans, mutual funds, investments. Janata co-operative bank also provides credit services cash management services, SMS banking service along with treasury, investment and wealth management.

The **Financial Performance on ratio analysis** of private co-operative bank reflect the health of the bank and inherent risk, this entire project focuses on liabilities and assets of janata co-operative bank ltd., and it indicates that the sources from which bank raised funds and how it utilized that fund. It deals with capital structure of bank deposits which are collected from public.

1.2 Need For the Study:

Ratio analysis is the powerful tool applied for measuring financial soundness and performance of a firm. And now a day it is necessary to all companies to know as well as to show the financial soundness i.e. position and operation of company to know their financial position and operation of the company.

In this report researcher tried to know the financial position of Janata co-operative bank ltd. Harugeri Branch Raibag by using the 5 years Annual Report of the organization. The financial analysis of this report will show the strength and weakness of theJanata co-operative bank ltd. Harugeri Branch Raibag. Financial analysis will help the firm to take decision.

This study can say that, financial analysis is a starting point for making plans before using any sophisticated forecasting and planning.

1.3 STATEMENT OF PROBLEM:

As the study is pertaining to financial performance of study unit. It is entitled as "A study of financial performance of Janata co-operative bank ltd. Harugeri Branch Raibag"

1.4 OBJECTIVES OF THE STUDY:

1. To know the financial performance of Janata co-operative banks based on ratios.

2. To find out the organization efficiency based on past and present profitability ratios

3. To study the liquidity position of the organization.

4. To improve its future performance by analyzing its financial statements.

1.5 SCOPE OF STUDY:

The benefits of the study for the researcher are that it helped to gain knowledge and experience and also provided the opportunity to study and understand the prevalent ratio analysis procedures.

The key points of my research study are:-

1. To study the facts about the Janata co-operative bank ltd as a group.
2. To understand ratio analysis procedure at Janata co-operative bank ltd.
3. To suggest any measures / recommendations for the improvement of the ratio analysis procedures.

1.6 RESEARCH DESIGN:

The present study is mainly based on the primary and secondary data viz.; discussion, annual report of the bank for the respective year is from 2008 to 2013, etc. The necessary primary data is collected through informal discussion with the secretary, founder and also with the members of the bank.

- **Tools for data collection:**

The tools for data collection are divided into two parts i.e.

1) **Primary Data:**

This data is collected with the help and guidance of **Shri Anand.A.Gurava,** manager of the **janata co operative bank ltd. Harugeri branch Raibag.** The conversation helped to have an idea about the society, its functions and other aspects of the society.

- **Source of Primary data**:

- Observation
- Discussion

2) Secondary Data:

Secondary data which includes the annual report of the society for the past years helped to study the financial aspects of the society. This data shows about the gain/ loss in the financial statement of the society. It is the data, which gives relevant information in the different fields ofthe janata co operative bank ltd. Harugeri branch Raibag.The secondary data also includes the data collected from other sources mentioned below ;

- **Sources of Secondary data**:
  - Annual Report
  - Internet
  - Books
  - Reference material.

1.7 Limitations of the study:

My research was limited because of the fact that the major source of data was from the **annual reports** of the company, which were subject to accounting policies and practices followed by the organization.

- The major limitations are:
  - The study is data based on the data supplied by the bank personnel.
  - The project is just a brief study due to lack of comprehensive and practical knowledge.
  - Lack of sufficient time to get required information of Janata co-operative bank ltd. Harugeri..
  - Study is concerned for five years only.

1.8 Statistical tools:

- Financial ratio.
- Proportions.

1.9 CHAPTER SCHEMA:

Unit I-Research Methodology:

The first chapter gives detail introduction of Ratio analysis, Statement of problem, Need for study, Objectives of the study, Scope, and Research Methodology and Limitations.

Unit II- Industry and:Bank Profile :

It gives the profile of the bank where the project is conducted. It also explains about future plan of the bank.

Unit III- Conceptual frame work of study:

It gives detailed information about banking sectors and loans and advances in India.

Unit IV- Analysis and Interpretation:

This chapter gives detail regarding the analysis and interpretation of data. It also consists of the tables, graphs, and its interpretation.

Unit V -Findings suggestions and conclusion:

This chapter concluded the project report it comprises of findings, conclusion draw form above analysis based on the data collected and also included suggestions.

CHAPTER- 2

INDUSTRY AND BANK PROFILE

MEANING OF BANK:

A Bank is an institution which deals in money and credit. In other words, a bank is an institution accepting money as deposit for lending.

DEFINATION OF CO-OPERATIVE:

The **co-operative**

A co-operative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly owned and democratically controlled enterprise.

CO-OPERATIVE BANKS IN INDIA:

Co-operative is organized group of people and jointly managed and democratically controlled enterprises.

They exist to serve their members and depositors and produce better benefits and service for them. Professionalism in co-operative banks reflects the co-existence of high level of skills and standards in performing, duties interested to an individual. Co-operative banks need current future development. In information technology. It is indeed necessary for co-operative banks to devote adequate attention to maximizing their returns on every unit of recourses. In Indian, they play a very important role in the financial system. The co-operative banks in India from the integral part of our money market today. Therefore, a brief resume of their development should be taken into account. The history of co-operative banks goes back to the 1904. In 1904, the co-operative credit society act was enacted to encourage movement in India. But the development of co-operative banks from 1904 to 1951 was the most disappointing one.

The first phase of co-operative bank development was the formation and regulation of co-operative society.The constitutional reforms which led to the passing of the government of India at India at in 1919.Transferred the subject of "co-operative" from government of India to the provincial government. The government of Bombay passed the first co-operative societies act in 1925 "which not only gave the movement, its size and shape but was a pace setter of co-operative activities and stressed the basic concept of thrift, self help mutual aid". This marked the beginning of the second phase in the history of co-operative credit institutions.There was the general realization that urban banks have an important role to play economic construction.The India central banking enquiry committee (1931) felt. That urban bank has a duty to help the small business and middle class peoples. The Mehta-Bhansali committee [1939] recommended that those societies which had full filled the criteria of banking should be allowed to work as banks and recommended an association for these banks. The co-operative planning committee [1946] went on record to say that urban banks have the best agencies for small people in whom joint stock banks are not generally interested, the rural banking equity

committee[1950], impressed by the law of establishment and operations recommended the establishment of development of co-operative banks took place only after the recommendations of all Indian rural credit survey committee [AIRCSC],which were made with the view to faster the growth of co-operative banks.

The co-operative banks are accepted to perform some duties normally, extend all type of credit facilities, to customer in cash, advances consumption loans, extend banking facilities, in rural areas, mobilize deposit, supervise the use of loans ect. Co-operative banks needs are different. They have lot of problems, which has affected the development of co-operative banks. Therefore, it was necessary to study this matter. The first study of urban co-operative banks was taken up by RBI in the year 1958-1959. The report published in 1961 acknowledged the widespread and financially sound framework of urban co-operative banks, emphasized the need to establish primary urban co-operative banks in new centers and suggested that state government lend active support to their department. In 1963, Verde committee recommended that such banks should be organized at all urban centers with a population of 1 lakh or more or more and not by any single community or customer. The committee introduced the concept of minimum capital requirements and the criteria of population for defining the urban center where UCBs were incorporated.

FEATURES OF CO-OPERATIVE:

Co-operative are voluntary organizations of the have notes in the same cadre, joined together to achieve the common goal "co" and "opus" the two Latin words make it 'jointly operate'. Mutual help for self help is the principle and service is the motto of co-operative movement. Important features of co-operative movement are:

- Voluntary membership,
- One member- one vote,
- Service motto,
- Public good,
- Non exploitative nature,
- Decentralized decision making,

- Eminently qualities for development,
- Combines private ownership,
- Economic, social and political- dimensions.
- Formed on the foundation of such eminent features, co-operative credit has become the Back bone of agriculture in the country.

PROFILE OF BANK:

SRI BASAVESHWAR CREDIT CO-OP SOCIETY LTD., CHIKODI is an autonomous association which is established for the fulfillment of all needs and wants related to credit facilities. It provides various loans and facilities to share holders and the persons who are in associate members too.

The bank is transacting almost all kinds of banking business. It receives current savings, fixed, call and cumulative, pigmy deposits and cash credits on personal security certificate of ten years and advances &loans and cash credits on personal security or on mortgage of property and against agricultural and industrial goods and gold & silver ornaments.

ORIGIN OF URBAN CO-OPERATIVE SOCIETY:

"SHRI BASAVESHWAR CREDIT CO.OP SOCIETY LTD., CHIKODI" was started in 23 March 1991 and registered under Karnataka Co-operative Society Act 1959 with just few of members. It is a small profit oriented society in the taluk serves the depositors and the account holders, who exceed 873 members for present period. The first Chairman of the bank was Shri Madhukar Shivalal Mehta.

Banking sector is under tremendous pressure, and is required to perform well due to immense competition from various domestic and foreign banks. Profitability is one of the means by which the performance is measured. It is also meant to know their strength and weakness.

The bank is formed on the co-op principle and as such they are more serve oriented than profit oriented. The bank provides credit at low rate of interest to common and economically weaker sections. The bank follows the rules and regulations strictly.

NATURE OF SOCIETY:

- Locker facility in head office as well as branch offices.
- Increased interest rate of 0.50% to the senior citizen for all type of deposits.
- Demand draft facility at a discount rate for the main cities of the country.
- Pay order facility.
- Computerized transaction in head office and also in branch office.
- Good services to the costumers and special interest for senior citizens.
- Credit on jewelries.
- Sanctioning of loans of a higher speed, charging lower interest rates.
- 1% discount allowed on loans, which are repaid within the agreed period.

AIMS AND OBJECTIVES OF THE SOCIETY:

1. To encourage thrift, self-help and co-operation among the members and depositors of the society.
2. As per by-law, extend financial assistance to needy members for genuine purposes by collecting funds.
3. To arrange programs to give financial assistance for social and educational development of members and welfare of them.
4. To lend money to its members to purpose on hire-purchase / hypothecation of machineries, equipment and motor vehicles as defined in the motor vehicles act.
5. Conducting programs for improvement of economic conditions of SC/ST and women members.
6. To lend loans for its members on deposit of gold and silver ornaments.
7. To sanctions loan to its members against the security of industrial and commercial producers.

8. To give financial and technical assistance to small scale/cottage industries, transportation and self employed professionals to promote their business.
9. To enter in to agreement with banks and other any financial institutions to receive loans and advances from them.
10. To provide safe lockers facility and other concerned services to its members.
11. As per Karnataka co-operative societies act 1959 and rules 1960 to invest surplus fund in deposits with other institutions.
12. According to the rules and regulation framed by the board of directors and approved by the registrar, to provide all grants and incentives to employees of the society and loans for genuine purpose at reasonable rate of interest.
13. Providing loans to self-help groups.
14. Providing financial assistance to members for higher education of their children and family members.
15. To receive deposits from charitable institution / trusts and other public institutions.

Introduction of Banking:

Bank is financial institution that is licensed to deal with money and its substitutes by accepting time and demand deposits, making loans and investing in securities. The bank generates profits from the difference in the interest rates charged and paid.

A strong banking sector is important for flourishing economy. One of most important and major roles played by banking sector is that of lending business.It is generally encouraged because it has the effect of fund being transferred from the system of productive purpose, which also results into economic growth. As there are pros and cons of everything, the same is with lending business that carries credit risk, which arises from the failure of borrower to fulfill its contractual obligations either during the course of a transaction or on a future obligation. The failure of the banking sector may have an adverse impact on other sectors. Non-performing assets are one of the major concerns for banks in India. NPAs reflect the performance of banks.The development of banking is an inevitable precondition for the healthy and rapid development of the national economic structure.

HISTORY OF BANK:

The concept of banking business is as old as civilization itself. As early as 2000 BC., the Babylonians had developed a system of banks. Babylonians are first who developed this

concept by lending moneys at higher rates of interest against gold and silver which had been left them for safe custody for this transaction they used their temples. At the same period Greek temples were used, as depositories for peoples surplus fund these were the centers of money lending transactions.

There is a controversy amongst the economist about the origin of the word 'BANK' according to some economist word 'BANK' has been derived from the German word 'banc' which means a joint stock firms. Other economists say it derived word 'BANCO' which means a help or mound. Later on with the passage of time came to be known as 'BANK' however, during 1157, bank of Vedic started. It is the first bank in word, it is also first public banking institution in the world.

INDIAN BANKING SECTOR:

Banking in India has its origin as early as the Vedic period. It is believed that the transition from money lending to banking must have occurred even before Manu, the great Hindu Jurist who has devoted a section of his work to deposits and advances and led down rules relating to rates of interest. During the Mogul period indigenous bankers played a very important role in lending money and financing foreign trade and commerce. During the days of the East India Company,it was the turn of the agency house to carry on the banking business. The general bank of India was the first Joint Stock Bank to be established in the year 1786. The others which followed were the Bank of Hindustan and the Bengal bank. The Bank of Hindustan is reported to have continued till 1906 while the othr two failed in the meantime. In the first half of the 19th century the East India Company established three banks: the Bank of Bengal in 1809, the Bank of Bombay in 1840 and the Bank of Madras in 1843. These three banks also known as Presidency Bank were independent units and functioned well. These three banks were amalgamated in 1920 and a new bank, the Imperial Bank of India was established on 27thJanuary 1921. With the passing of the State Bank of India Act in 1955 the undertaking of the Imperial Bank of India was taken over by the newly constituted State Bank of India. The Reserve Bank which is the Central Bank was created in 1935 by passing Reserve Bank of India Act 1934. In the wake of the Swadeshi Movement, a number of banks with Indian management were established in the country namely, Panjab National Bank Ltd, Bank of India Ltd, Cenera Bank Ltd, Indian Bank Ltd, the Bank of Baroda Ltd, the Central Bank of India Ltd. On July 19, 1969, 14 major banks of the country were nationalized and in 15th April 1980 six more commercial private sector banks were also taken over by the government.

Meaning of bank:

Bank is financial institution that is licensed to deal with money and its substitutes by accepting time and demand deposits, making loans and investing in securities. The bank generates profits from the difference in the interest rates charged and paid.

Definition of bank:

According to the Banking Regulation Act, 1949 as per section 5(b) banking means, "the accepting, for the purpose of lending or investment, of deposits of money from the public, repayable on demand or otherwise, and withdrawable by cheque, draft,order or otherwise."

CHARACTERISTICS AND IMPORTANCE OF BANKING:

The primary functions of the banker are to accept the deposits from the persons who have surplus money and lending the same to the needy persons. The deposits are accepted at the lower rate of interest and lend at the higher rate of interest. Difference in interest rate would be the case of profit or expenses for the banks.

Day to day with the emergence of the new banks and due to the severe competition the banks were not able to earn the profits and maintain their profit margin with their primary functions of accepting the deposits and lending the loans.

In order to keep the profit percentage high the banks started giving the auxiliary or subsidiary services to its customers besides the basic functions of deposits and lending.

These subsidiary services such as remitting the money from one place to another, offering the facility of safe deposit lockers, accepting the articles for safe custody, exchange of currency etc. For providing such services the banks were charging nominal fees from the customers and the customers were happy to pay the fees and utilize such services as both the secretion and the risk of such transactions were passed on to the bankers.

INDIAN BANKING STRUCTURE:

The Indian banking industry has Reserve Bank of India as its Regulatory Authority. This is a mix of the public sector, private sector, co-operative banks and foreign banks.

Indian banking industry is categorized into Scheduled Commercial Banks, Co-operative Banks and financial institutions. Nationalized Banks, Private Banks and Regional Rural Banks come under commercial banks Whereas NABARD, SIDBI, EXIM and IDBI are under all Indian financial institutions.

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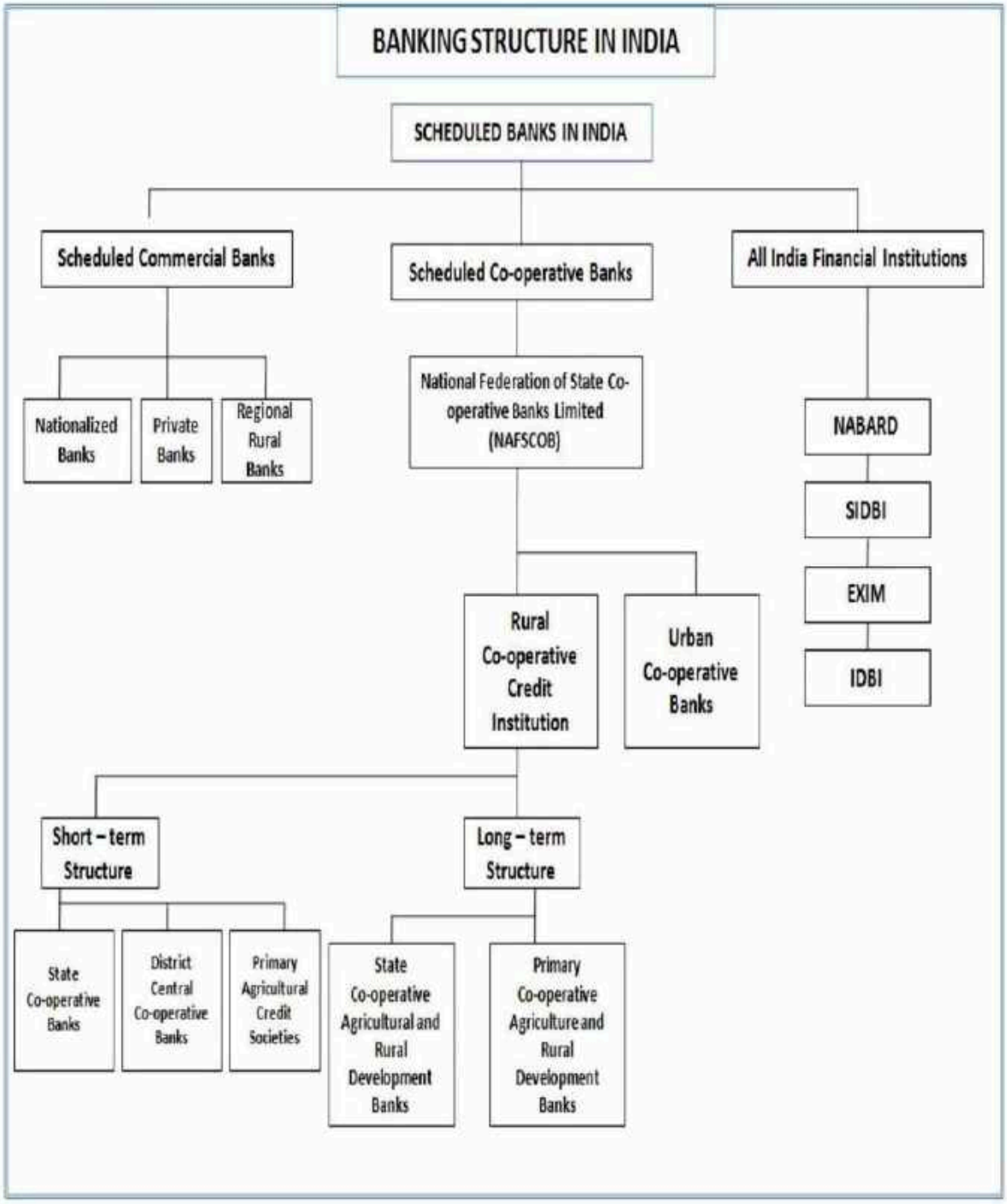
Co-operative banks are categorized into Rural Co-operative Credit Institutions and Urban Co-operative banks headed by NAFSCOB. Co-operative credit institutions are classified into short term and long term structure. Short term structure has state co operative banks, DCC banks and primary agricultural credit societies. And long term structure has state co operative agricultural and rural development banks and primary co operative agricultural and rural development banks.


BANKING STRUCTURE IN INDIA
SCHEDULED BANKS IN INDIA
Scheduled Commercial Banks
Scheduled Co-operative Banks
All India Financial Institutions
Nationalized Banks
Private Banks
Regional Rural Banks
National Federation of State Co-operative Banks Limited (NAFSCOB)
NABARD
SIDBI
EXIM
IDBI
Rural Co-operative Credit Institution
Urban Co-operative Banks
Short – term Structure
Long – term Structure
State Co-operative Banks
District Central Co-operative Banks
Primary Agricultural Credit Societies
State Co-operative Agricultural and Rural Development Banks
Primary Co-operative Agriculture and Rural Development Banks

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JANATA CO-OPERATIVE BANK LTD, HARUGRI BRANCH RAIBAG.

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Name of the bank	**JANATA CO OPERATIVE BANK LTD. HARUGERI BRANCH RAIBAG**
Location of the bank	**RAIBAG**
e-mail	**Janata_hrg@rediffmail.com**
Telephone no.	**08331-225784**
Branches	**03**
Head office	**Harugeri**
Working hours	**10.30 am to 5.30 pm** **10.30 am to 2.30 pm Saturday**
Year of Establishment	**23-09-1977**
No of members	**3116**
Share Capital	**2,61,45,000**
Deposits	**24,00,15,200.66** ,
Loans	**8,25,63,619.21**
Profit	**23,59,750.00**

2.7 Origin and history of banks:

The name of the bank is janata co-operative bank limited. Harugeri. Established in the year 15-10-1977. The bank is situated in Harugeri, the bank register NO. C/ARCD/6193/77-78AND Reserve bank license number. UBD/KA-N/1499P. This bank has 3 branches:

1) Raybag
2) Ugarkhurd
3) Athani

The janata co-operative bank limited is head quartered at Harugeri is professionally managed bank. Started 3 decades back, at a time when banking was less known to the people. The bank grew in strength over the years. The janata co-operative bank two branches spreads over in Belgaum. The bank has ambitious plans for growth in branches total business and profits. The bank has achieved substantial sophistication in the various banking services provided.

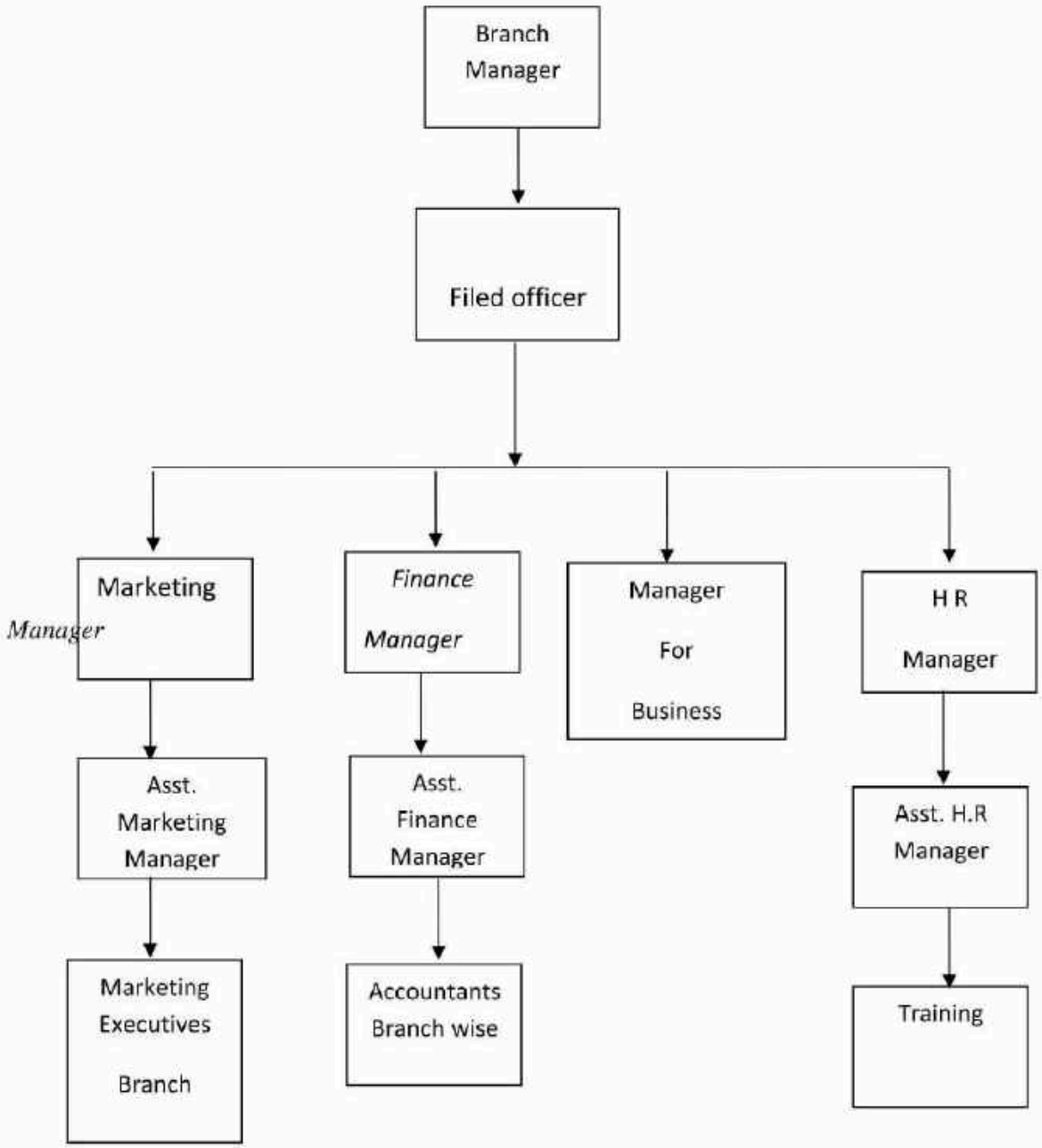
The bank is managed by a group of professionals' administrators and businessman. From the starting the bank has been going in 'A'as an audit classification. And also it is giving 20% as dividend to the share holders. On 26-9-1996 the bank opened its first branch in Ugar khurdha and Raibag.

REGISTERED OFFICE:

The address of the registered office of the bank shall be bank janata co-operative bank ltd., Harugeri. If any change in above address shall be intimated to the Reserve Bank of India and registrar of co-operative societies within fourteen days from the date of occurrence of such a change. Such a change of address shall also be immediately published in a local news papers and displayed on the banks notice board.

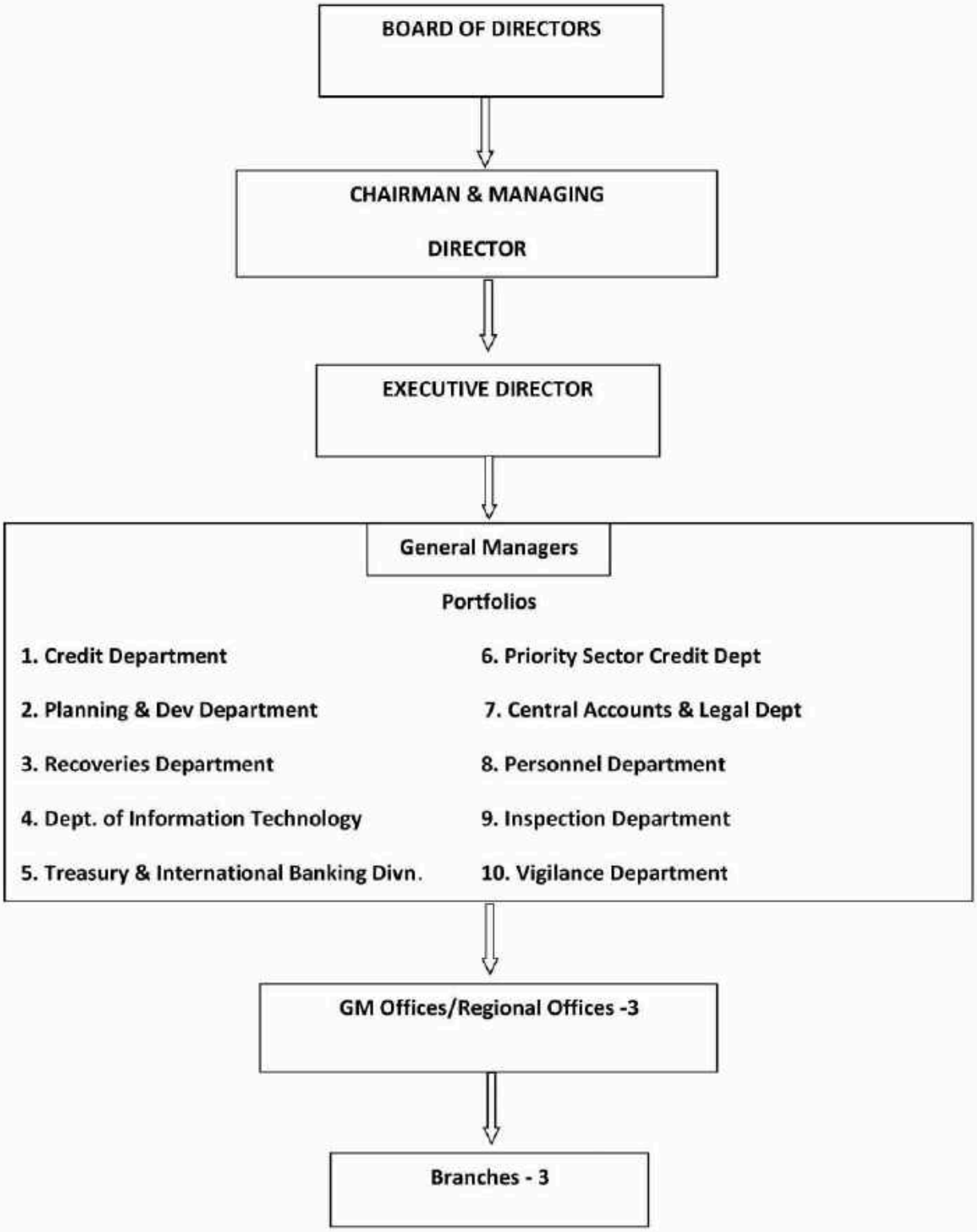
2.8 Organizational structure:

Organizational structure of Janata co-operative Bank at Harugeri Branch Raibag.



JANATA CO-OPERATIVE BANK

ORGANISATIONAL STRUCTURE



2.9 Vision, Mission and Objectives of the Society:

Vision: "To be the most admired Credit Society in Karnataka State"

Mission:

"Explore and enhance the quality of life of Member through financial security by providing products and services that would be helpful to him in his path to prosperity"

Objectives:

1. Enhanced Co-operation between everybody involved with an organization.
2. To provide good and quick service.
3. To earn high profits in future and improve firm's reputation.
4. To provide better facilities and also to establish branches all over the country.

2.10 STRATEGY:

A set of decision and action aimed at gaining a sustainable competitive advantage. It includes mission and vision of the Bank.

The term strategy is derived from the Greek word 'strategies' which means general. Strategy can be defined as the general programs of action and deployment of resource to attain comprehensive objectives. Strategy is the route that the organization has chosen for its future growth, and plan an organization formulates to gain a sustainable competitive advantage.

2.11 SWOT ANALYSIS:

Strength	Weakness
• JANATA Bank has been in the banking industry since 1994. It has successfully completed SILVER JUBLI CEREMONY. • The bank has a sound network i.e. it providing mobile sms service to their customer. • The bank is having well experienced, trained, most dedicated and committed staff. • In has a strong customer base.	• Lengthy procedure to grant loans.
Opportunities	**Threat**
• The bank can optimize the growth opportunities arising out of retail banking and small and medium enterprises (SMEs). • Further expansion of business networks and possible arrangements of sharing	• Bank is facing competition from its other Private Sector Banks • Changing economic policies of Government will have serious impact on interest rates and reserve ratio maintained with RBI .

networks of other banks by issuing mutual funds and insurance	

2.12 List of Banks (Relation to Bank):

1. **Axis** Bank
2. S.B.I Bank
3. Syndicate Bank
4. KVG Bank
5. Union Bank
6. Corporation of India

2.13 Competitors:

1. Beereshwar Urban Credit Souhard Sahakari Ltd,
2. DCC Bank.
3. Jagrati co-operative bank.
4. Karnataka co-operatives bank.
5. Other co-operative societies and

2.14 Conduct of meetings:

- Annual General Meeting – Once in every year.
- Board of directors Meeting – Every Month.

- ❖ Staff Based Meeting
  - Cluster head meeting – 10th of every month
  - Branch managers meeting – Need based and every three month
  - Department head meeting – need based, and every month .

- ➢ **The Following Types of shares:**

- Equity Shares
- Preference Shares

- ➢ **Product and Services Profile:**

- Deposits
- Short term Loans
- Long term Loans

2.15 Deposits:

Interest Rate of Fixed Deposits

Deposit Term	New Interest Rate
45 days -90 days	5.50%
91 days – 180 days	7.00%

181 days – 364 days	**8.25%**
1year	**10.25%**
1year – 3 year	**10.50%**
3 year & above	**9.50%**

(Senior citizen {above 60 years} 0.50% extra interest will be

Provided)

Source: Annual Reports of the Bank

Various Deposits of Interest Rates

Particulars	**Interest rates**
Saving Deposits	4%
Recurring Deposits	10%
Current Deposits	No Interest

Pigmy Deposits	3%

Various Short Term Loans of Interest Rates

Particulars	**Interest rates**
Surety loan, house loan and Gold loan	12%
Mortgage Loan, N S C loan, two wheelers loans and consumer durable loan.	14%
Vehicle Loan, salary based loan, plant or machinery loan, cash credit loan.	13.50%

Requirement to open an account:

- Fill the form.
- Affix a passport size photo

- Attached identity proof i.e. photo proof, address proof, etc…

CHAPTER -3

CONCEPTUAL FRAME WORK OF STUDY

Conceptual Framework

3.1 Ratio Analysis

Meaning:

A ratio is a simple arithmetical expression of the relationship of one number to another. It may be defined as the indicated quotient to two mathematical expressions. According to Accountants hand book by Knell and Bedford, a ratio "is an expression of the quantitative relationship between two numbers".

Ratio analysis is a process of comparison of one figure against another, which make a ratio, and the appraisal of the ratios to make proper analysis about the strengths and weakness of the firm operations. The calculations of ratios are a relatively easy and simple task but the proper analysis and interpretation of the ratios can be made only by the skilled analyst. While interpreting the financial information, the analyst has to be careful in limitations. The analyst has to be careful in limitations imposed by the accounting concept and methods of valuation. Information of non-financial nature will also be taken into consideration before a meaningful analysis made.

3.2 Significance of Ratio Analysis:

The ratio analysis is one of the most powerful tools of financial analysis. It is used as a device to analysis and interprets the financial health of the enterprise. The use of ratio is not confined to financial manager only. There are different parties interested in the ratio analysis for knowing the financial position of a firm for different purpose. The suppliers of goods on credit, banks, financial institution, investors, shareholders and management all make use of ratio analysis as a tool in evaluating the financial positions and performance of a firm for granting credit, providing loans or making investment in the firm with use of ratio analysis, one can measure the financial condition of a firm and one can point whether the conditions of a firm and one can point whether the conditions is strong, good, questionable or poor.

- **Helps in financial forecasting and planning:**

Ratio analysis is of much help financial forecasting and planning. Planning is looking ahead and the ratio calculated for a number of year work as guide for the future. Meaningful conditions can be drawn for future from these ratios.

- **Helps in control:**

Ratio analysis even helps in making effective control of business standard ratio can be based upon perform financial statement variance or deviation, if any can be found by comparing the actual with standards to take a corrective action at the right time. The weakness or otherwise, if any come to the knowledge of the management which helps in control of business.

- **Utility to shareholders/investors:**

Investors in the company will like to assess the financial position of the concern where he is going to invest, this first interest will be the security of his investment and then a return in the form of dividend or interest.

- **Utility to creditors:**

The creditors or suppliers extend short-term credit to the concern. They are interested to know whether financial positions of the concern enable their payments at a specified time or not. The concern pays short-term creditors out of its current position.

3.3 Advantages of Ratio Analysis:

1. It simplifies and summarizes the huge financial Data

Financial data contained in the financial statements is summarized and simplified by the ratio in order to make them more understandable. Ratio helps in comprehending complex financial statements.

2. Useful in finding strength and weakness of business

The ratio analysis is powerful tool of financial used in diagnostic studies of the enterprise to determine their strength and weaknesses.

3. Tool for financial forecasting and planning

Internal management takes time series of ratio forecasting purpose. Significant ratio of the firm over past years will help in projecting the future. Trend analysis is used to forecast on the basis of present ratio. Thus ratio analysis helps the management for forecasting, planning of budgets etc.

4. It helps in decision making

Ratio analysis provides a meaningful analysis and interpretation of the data contained in financial statements. Thus ratio analysis facilities the manager to take correct decision based on the ratios.

5. The strength and weakness

The ratio analysis is analysis of strength and weakness of the organization may be communicated to the users of financial statements. Thus, ratio analysis helps in better communication, to take prudent decisions.

3.4 Limitations of Ratio Analysis:

Ratio analysis is very useful in many aspects. However, its importance should not be exaggerated because it has number of limitations which are as follows.

- Ratio computed from historical dated are used for predicting and projecting the likely events in the future. Such ratio may provide a glimpse of the firms past performance but the forecast for the future may not be correct.
- Ratios are tools of quantitative analysis only. As such only quantitative aspects are taken into account in ratio analysis, there by ignoring qualitative factors which generally where the conclusion are drawn.

3.5 Categories of ratios:

The ratio analysis is made fewer than five broad categories as follows:

- Long – term solvency ratios.
- Short –term solvency ratios.
- Profitability ratios.
- Activity ratios.
- Operating ratios.

❖ **Long-term solvency ratios:**

The long term liability financial stability of the firm may be considered as dependent upon its ability to meet all its liabilities, including those not currently payable. The ratios which are important in measuring the long-term solvency are as follow.

Debt-equity ratio.

Shareholders equity ratio.

Debt to net worth ratio.

Capital gearing ratio.

Fixed assets to long-term funds ratio.

Proprietary ratio.

Debt service coverage ratio.

Dividend cover.

Debt-equity ratio: -capital is derived from two sources: share and loans. It is quite likely for only share to be issued when the company is formed, but loans are invariably raised at some later date. There are numerous reasons for issuing loan capital. For instance, the owners might want to increase their investment but avoid the risk which attaches to share capital, and key can do this by making secured loan.

$$\text{Debt equity ratio} = \frac{\text{Long term debt}}{\text{Shareholders fund}}$$

This ratio indicates the relationship between loan funds and net worth of the company, which is known as gearing. If the proportion of debt to equity is low, a company is said to be low–geared and vice-versa. A debt equity ratio of 2:1 is the normally accepted by financial

institutions, for financing of projects. The higher gearing, the more volatile the return to the shareholders.

Debt to net worth ratio:- The ratio comprises long-term debt to the net worth of the firm i.e. the capital and free reserves less intangible assets. This ratio is finer than the debt–equity ratio and includes capital which is invested in fictitious assets like deferred expenditure and carried forward losses. This ratio would be more interest to the contributors of long–term finance of the firm.

$$\text{Debt to net worth ratio} = \frac{\text{Long term debt}}{\text{Net worth}}$$

Capital gearing ratio:-It is the proportion of fixed interest bearing funds to equity shareholders funds. The fixed interest bearing funds include debentures, long term loans and performance share capital, reserves and surplus. Capital gearing ratio indicates the degree of vulnerability of earnings available for equity share holders.

$$\text{Capital gearing ratio} = \frac{\text{Fixed interest bearing funds}}{\text{Equity shareholders fund}}$$

Fixed assets to long tem funds ratio:- This ratio indicates the proportion of long term funds deployed in fixed assets. Fixed assets represent the gross fixed assets less depreciation provided on this till date of calculation. Long term funds include share capital, reserves and surplus and long term loans. The higher the ratio indicates the safer the funds available in case of

liquidation. It also indicates the proportion of long term funds that is invested in working capital.

$$\text{Fixed assets to long term funds ratio} = \frac{\text{Fixed assets}}{\text{Long term funds}}$$

Proprietary ratio:- It express the relationship between net worth and total assets.

Net worth =equity share capital + preference share capital + reserves fictitious assets. Total assets =fixed assets +current assets.

Reserves embarked specifically for a particular purpose should not be included in calculation of net worth. A high proprietary ratio is indication of strong financial position of the business. The higher ratio the better it is

$$\text{Proprietary ratio} = \frac{\text{Net worth}}{\text{Total assets}}$$

Interest cover:- The interest coverage ratio shows how many times interest charges are covered by funds that are available for payment of interest. An interest cover of 2:1 is considered reasonable by financial institutions. A very high ratio indicates that the firm is conservative in using debt and a very low ratio indicates excessive use of debt.

$$\text{Interest cover} = \frac{\text{Profit before interest+ depreciation and tax}}{\text{Interest}}$$

Dividend cover:-This ratio indicates the number of times the dividends are coed by net profits. This highlights the amount retained by a company for financing of future option.

$$\text{Dividend cover} = \frac{\text{Net profit after tax}}{\text{Dividend}}$$

- **Short term solvency ratios:-**

The short-term solvency ratios, which measures the liquidity of the firm and its matching short-term obligations. Liquidity is defined as the ability to realize values in money the most of liquid assets. It refers to the ability to pay in cash in the obligations that are due.

The corporate liquidity has two dimensions viz, quantitative concept includes the quantum, structure and utilization of liquid assets and in the qualitative concept it is the ability to meet all present and potential demands on cash from any source in a manner that minimizes cast maximizes the value of the firm. Thus, corporate liquidity is a vital factor in business excess liquidity, through a guarantor of solvency would reflect lower profitability, deterioration in managerial efficiency, increased speculation and unjustified expansion, extension of too liberal credit and dividend policies.

The important ratios in measuring short term solvency are:

1. Current ratio
2. Quick ratio or liquid ratio

1) Current ratio:-This ratio measures the solvency of the company in the short term. Current assets are those assets which can be convert into cash within a year. Current liabilities and provisions are those liabilities that are payable within a year. A current ratio of 2:1 indicates a highly solvent position. A current ratio of 1.3:1 is considered by banks as the minimum acceptable level for providing working capital finance. A high current ratio may be due to the

pilling up of inventory, inefficiency in collection of debtors, high balances in cash and bank account without the proper investment.

$$\text{Current Ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

2) Quick ratio or liquid ratio:-This ratio is used as measure of company's ability to meet its current obligations. Since bank overdraft is secured by the inventories, the other current assets must be sufficient to meet other current liabilities. A quick ratio of 1:1 indicates highly solvent position. This is called test ratio. This ratio serves as a supplement to the current ratio in analyzing liquidity.

$$\text{Quick Ratio} = \frac{\text{Current assets, loans \& advances - inventories}}{\text{Current liabilities \& provisions - bank over draft}}$$

❖ **Profitability Ratios**

The purpose of study and analysis of profitability ratio are to help assessing the adequacy of profits earned by the company and also to discover whether profitability of the firms is the net result of a large number of policies and decisions. The profitability ratios show the combined effects of liquidity, assets management and debt management on operating results, profitability ratios are measured with reference to sales, capital employed, total assets employed, share holders fund etc. The major profitability ratios are as follows:

- Return on capital employed or return on investment (ROI).
- Earnings per share (EPS).
- Cash earnings per share (cash EPS).
- Cash profit margin.

- Return on net worth (return on shareholders' fund).

1. **Return on capital employed:-** The strategic aim of business enterprises is to earn a return on capital. In any particular case, the return on long-run is not satisfactory then the deficiency should be corrected or the activity be abandoned for a more favourable one. Measuring the historical performance of an investment centre calls for a comparison of the profits that has been earned with capital employed.

$$\text{Return on capital employed} = \frac{\text{Net profit}}{\text{Capital employed}} \times 100$$

2. **Earnings per share (EPS) :-** The objective of financial management is wealth or value maximization of a corporate entity. The value is maximized when the market price of entity share is maximized. The use of the objective of wealth maximization has been advocated as an appropriate and operationally feasible criterion to choose among the alternatives financial actions. A higher EPS means better capital productivity.

$$\text{Earnings per share} = \frac{\text{Net profit after tax\& preference dividend}}{\text{No of equity shares}}$$

3. **Gross profit margin:-**The ratio measures the gross profit margin on the total net sales made by the company. The gross profit represents the excess of sale proceeds during the period under observation over their costs, before taking in to account administration, selling and distribution and financing charges. The ratio measures the efficiency of the company operations and this can be compared with the previous year's results to ascertain the efficiency partners with respect to the previous years. The gross profit margin may be compared with that of competitors in the industry to assess the operational performance relative to the other players in the industry.

$$\text{Gross profit margin} = \frac{\text{Sales-cost of goods sold}}{\text{Sales}} \times 100$$

4) **Net profit margin:-** The ratio is designed to focus attention the net profit margin from business operations before interest and tax is deducted. The convention is to express profit after tax and interest as a percentage of sales. A drawback is that the percentage which a result varies depending on the source of employed to finance business activity, interest is charged above the line while dividends are deducted below the line. It is for this reason that net profit earnings before interest and tax (EBIT) are used. It is to be observed that majority of the costs debited to the profit and loss account are fixed in nature and any increase in sales will cause the cost per unit to decline because of the spread of same fixed cost over the increased number of units sold.

$$\text{Net profit margin} = \frac{\text{Net profit before interest \& tax}}{\text{Sales}} \times 100$$

Cash profit ratio:-

Where cash profit = net profit + depreciation.

Cash profit ratio measures the cash generation in the business as a result of the operation expressed in terms of sale. The cash profit ratio is more reliable indicator of performance where there are sharp fluctuations in the profit before tax and net profit from year to year owing in depreciation charged. It also facilitates inter–firm comparison of performance since different methods of depreciation may be adopted by different companies.

$$\text{Cash profit Ratio} = \frac{\text{Cash profit}}{\text{Sales}} \times 100$$

4. Return on assets:-

The profitability of the firm is measured establishing relation of net profits with the total assets of the organization. This ratio indicates the efficiency of utilization of assets in generating the revenue.

$$\text{Return on assets} = \frac{\text{Net profit after tax}}{\text{Total assets}} \times 100$$

❖ **Activity ratios or Turn over ratios:-**

Activities ratio measures how effectively the firm employs its resources. These ratios are also called turnover ratios which involves comparison between the level of sales and investments in various accounts inventories, debtors, fixed assets, etc activity ratios are used to measure the speed with which various account are converted into sales or cash. The following activity ratios calculated for analysis.

Inventory ratio:-

A considerable amount of company's capital may be tied up in the financing of raw materials, work- in –progress and finished goods. It is imported to ensure that the level of stocks is kept is kept as low as possible, consistent with the need to fulfill customer's order in time.

$$\text{Inventory turnover ratio} = \frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

$$\text{Average inventory} = \frac{\text{Opening stock + closing stock}}{2}$$

Inventory ratio:-

The level of inventory in a company may be assessed by the use of the Inventory ratio, which measures how much, has been tied up in inventory. The inventory turnover ratio has decreased from past, it means that either inventory is growing or sales are dropping. In addition to that, if a firm has a turnover that is slower than for its industry, than there may be absolute goods on hand or inventory stocks may be high. How turnover has impact on the liquidity of the business.

Inventory ratio= Inventory/ current assets*100

Fixed Assets Turnover Ratio:-

This ratio establishes a relationship between net sales and fixed. The objective is to determine the efficiency with which the fixed assets are utilized.

Components –

(i) Net sales which means gross sales minus sales returns;

(ii) Net fixed assets which mean original cost of fixed assets minus depreciation thereon.

Fixed assets turnover ratio = Net sales / Net Fixed Assets

Current Assets Turnover Ratio

This ratio establishes a relationship between net sales and current assets. The objective is to determine the efficiency with which the current assets are utilized.

Components-

(i) Net sales which means gross sales minus sales returns.

(ii) Current assets.

Current assets =Net sales/current assets

- **Stock Turnover Ratio**

This ratio establishes a relationship between costs of goods average inventory (stock). The objective is to determine the efficiency which the inventory is converted into sales.

Components-

(i) Cost of goods sold = opening inventory + net purchases + Direct expenses closing inventory.

Or

(ii) Average inventory = (opening inventory plus closing inventory)/2.

Stock turnover ratio = cost of sold /Average inventory

Working capital turnover ratio

This ratio establishes a relationship between net sales and working capital. The objective is determining the efficiency with which the working capital is utilized.

Debtors:-

There are three main debtors ratios as follows:

- **Debtor turnover ratio:-** Debtor turnover, which measures whether the amount of resources tied up in debtors is reasonable and whether the company has been efficient in converting debtors into cash.

$$\text{Debtors turnover ratio} = \frac{\text{Credit sales}}{\text{Average debtors}}$$

- **Debtors collection period :-**

Average collection period, which measures how long it take to collect amounts from debtors. The actual collection period can be compared with the stated credit terms of the company. It is longer than those terms, and then this indicates some insufficiency in the procedure of collecting debts.

Debtors collection period = Average debtors/credit sales * 100

➢ **Bad debts to sales ratio:-**

This ratio indicates the efficiency of the control procedures of the company. Its level will depend on the type of the business. Mail order companies have to accept a fairly high level of bad debts, while retailing organization should maintain very low levels or, do not allow credit accounts, none at all. The actual ratio is compared with the target or norm to decide whether on not acceptable.

$$\text{Bad debts to sales ratio} = \frac{\text{Bad debts}}{\text{Sales}}$$

❖ **Operating ratios:**

The ratio of all operating expenses (i.e. materials, labour factory over heads, administration, &selling expenses) to sales is operating ratio. A comparison of the operating ratio would indicate whether the cost content is high or low in the figure of sales. If the annual comparison shows that the sales has increased the management would be naturally interested and concerned to know as to which element of the cost has gone up.

1) Material cost ratio.
2) Administrative expenses ratio.
3) Labour cost ratio.
4) Selling and distribution expenses ratio.
5) Factory overhead ratio.

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CHAPTER -4

DATA ANALYSIS AND INTERPRETATION

1) Profitability Ratio:

❖ **Ratio of net profit to total income:**

$$\text{Ratio of net profit to total income} = \frac{Netprofit}{TotalIncome}$$

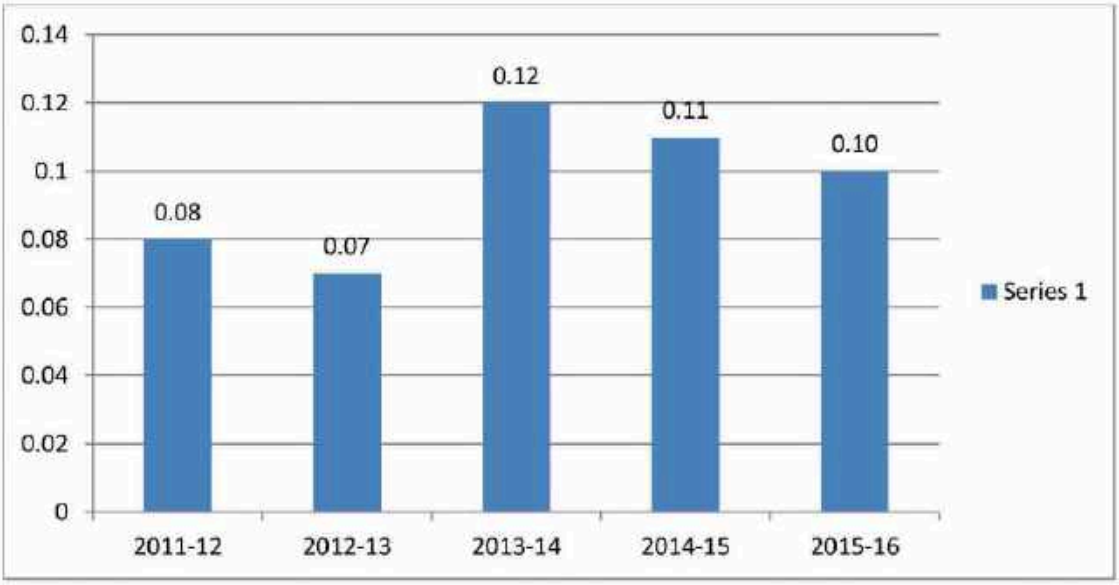
Table No –4.1

Ratio of net profit to total income

2YEARS	2011-12	2012-13	2013-14	2014-15	2015-16
NET PROFITS	926939.14	1035332.43	2073699.76	2300051.79	2359750.00
TOTAL INCOME	11014531.14	14557267.43	16496967.76	20221529.09	21488660.00
RATIO	0.08	0.07	0.12	0.11	0.10

Graph No –4.1

Ratio of net profit to total income



Data in Table No.- 4.1 reveals ratio of net profit to total income for study period.In the year 2011-12 the net profit to total income ratio in 0.08 and in the year 2012-13 the net profit to total income ratio in 0.07 and in the year 2013-14the net profit to total income ratio in 0.125and in the year 2014-15the net profit to total income ratio in 0.113 and in the year 2015-16 the net profit to total income ratio in 0.10 the ratio at net profit to total income in two years equal and but last years are increase. This indicates fluctuations in ratio.

- **Ratio of net profit to total deposit:**

$$\text{Ratio of net profit to total deposit} = \frac{Netprofit}{totaldeposit}$$

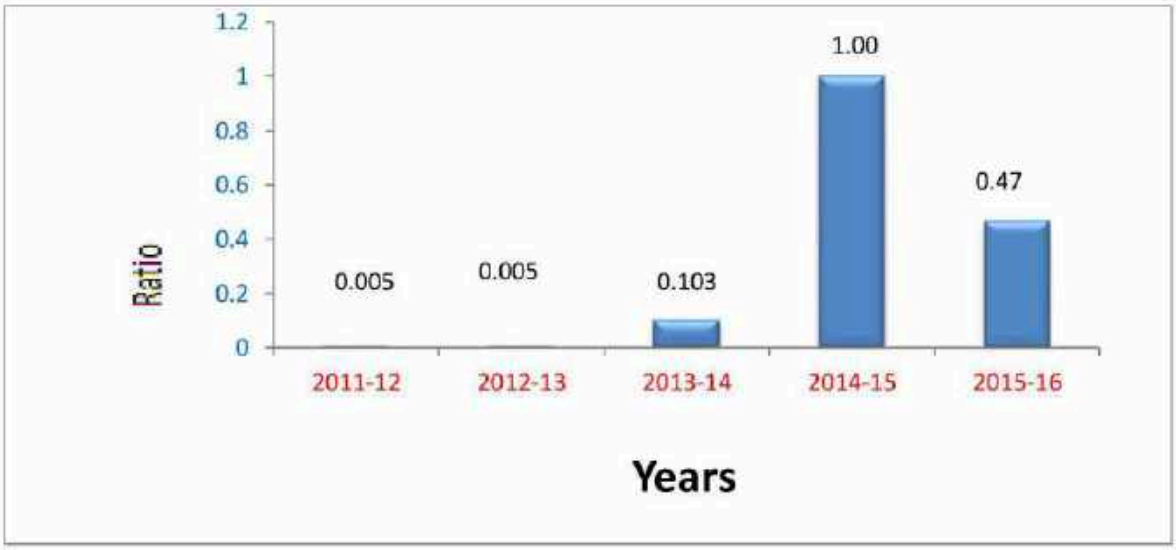
TABLE – 4.2

Ratio of net profit to total deposit

YEARS	2011-12	2012-13	2013-14	2014-15	2015-16
NET PROFIT	926939.14	1035332.43	2073699.74	2300051.79	2359750.00
TOTAL DEPOSIT	155316345.30	181907074.00	200656108.69	213828262.70	7153461.13
RATIO	0.005	0.005	0.103	1.00	0.47

Graph no 4.2

Ratio of net profit to total deposit



Data in Table No.- 4.2 In the year 2011-12 the ratio of net profit to total deposits is 0.005, but in the year 2012-13the ratio of net profit to total deposits in 0.005 , in the year 2013-14 the ratio of net profit to total deposits in 0.13. and in the year 2014-15 the ratio of net profit to total deposits in 1.00.and in the year 2015-16 the ratio of net profit to total deposits in 0.47.

❖ **Ratio of net profit to total assets:**

Ratio of net profit to total assets= $\frac{Net\ profit}{Total\ assets}$

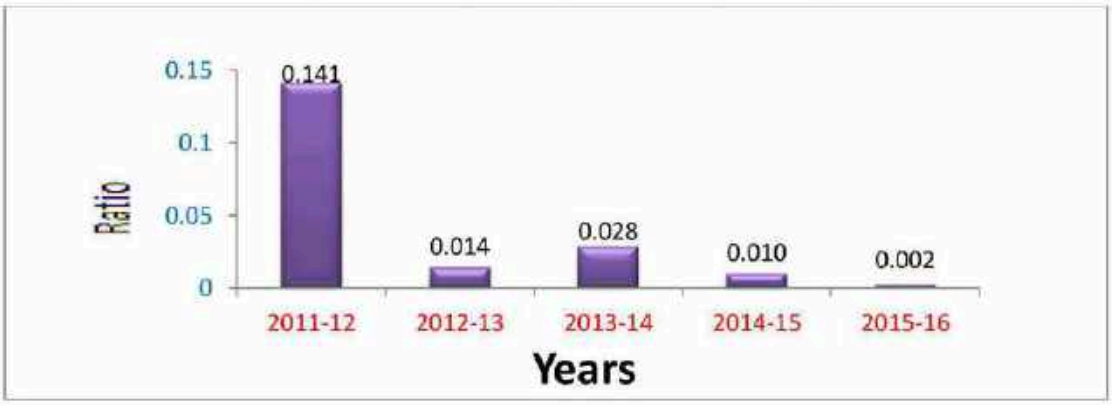
TABLE- 4.3

Ratio of net profit to total assets

YEARS	2011-12	2012-13	2013-14	2014-15	2015-16
NET PROFIT	926939.14	1035332.43	2073699.74	2300051.79	2359750.00
TOTAL ASSET	6527790.56	69153936.00	73861314.10	213828262.70	1149210162.20
RATIO	0.141	0.014	0.028	0.010	0.002

Graph no 4.3

Ratio of net profit to total assets



Data in Table No.- 4.3The ratio of net profit to total assets is in the year 2011,2012,2013,2014 and 2015 at 0.0078,0.0079,0.0072,0.0010 and 0.0093 respectively it is increased in the year of 2011, 2012 and decreased in the year 2014.

❖ **Ratio of net profit to total working capital:**

Ratio of net profit to total working capital= $\frac{Net\ profit}{Total\ working\ capital}$

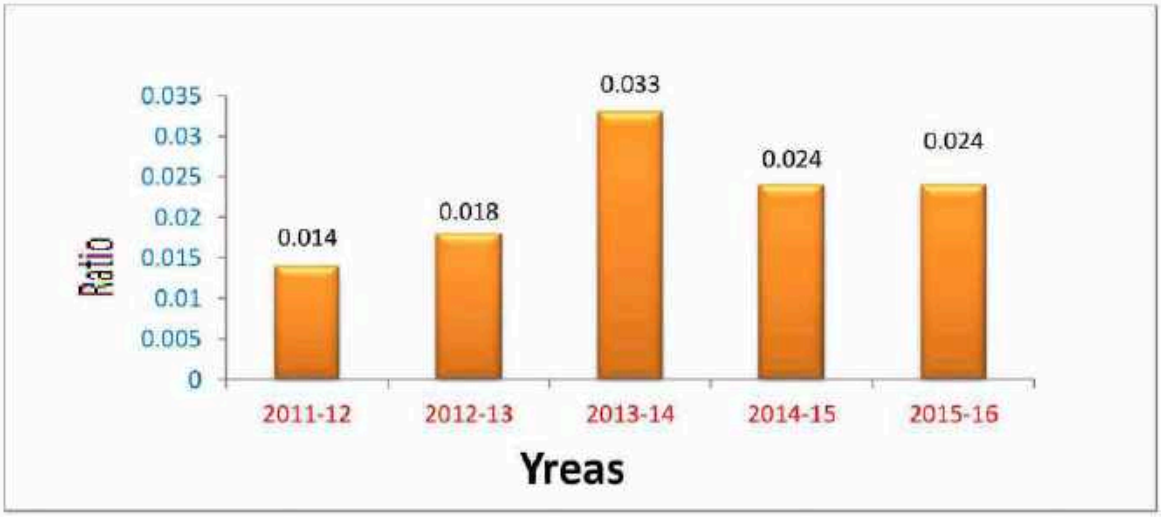
TABLE-4.4

Ratio of net profit to total working capital:

YEARS	2011-12	2012-13	2013-14	2014-15	2015-16
NET PROFIT	926939.14	1035332.43	2073699.74	2300051.79	2359750.00
TOTAL WORKING CAPITAL	64185027.00	57481598.00	61191614.30	92297297.18	94555319.22
RATIO	0.014	0.018	0.033	0.024	0.024

Graph no 4.4

Ratio of net profit to total working capital



Data in Table No.- 4.4The ratio of net profit to total working capital is in the year 2011 ,2012, 2014 and 2015as 0.011 increased but it is in the year 2013 as0.007 equal to the current year the ratio of net profit to total working capital.

2. Operational Ratio:

❖ **Ratio of interest earned to total income:**

Ratio of interest earned to total income= $\frac{Interest\ earned}{Total\ income}$

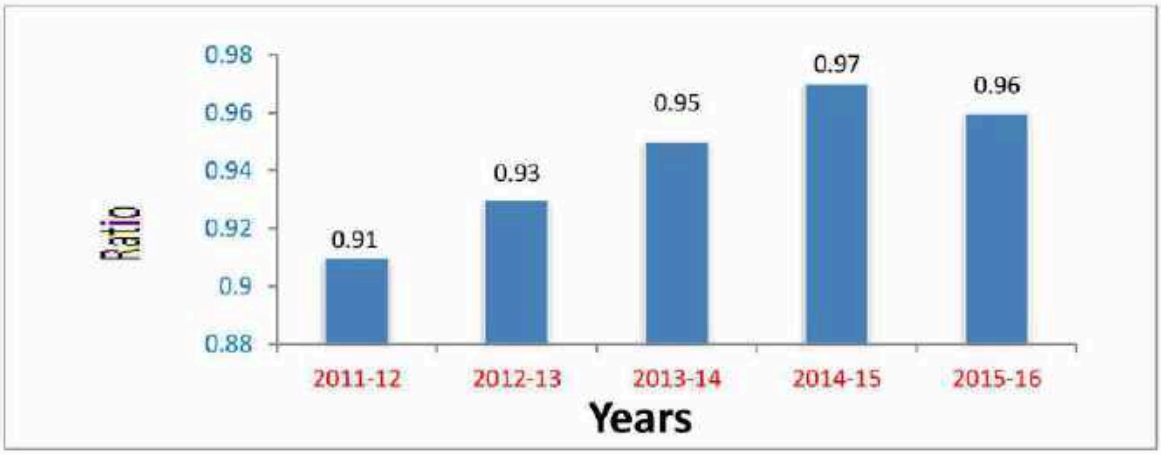
TABLE-4.5

Ratio of interest earned to total income

YEARS	2011-12	2012-13	2013-14	2014-15	2015-16
INTEREST EAREND	10044048.00	13674608.30	15779788.00	19708015.30	20657776.98
TOTAL IMCOME	11014531.14	14557267.43	164967.76	20221529.09	21488660.00
RATIO	0.91	0.93	0.95	0.97	0.96

Graph no 4.5

Ratio of interest earned to total income



Data in Table No.- 4.5The ratio of interest earned to total income is in the year 2011, and 2012 at 0.96% and 2013 at 0.97% the ratio of interest earned to total income is decreased at 0.01% and 0.02% the compared to current year 2015.

❖ **Ratio of interest paid to total income:**

$$\text{Ratio of interest paid to total income} = \frac{Interest\ paid}{Total\ income}$$

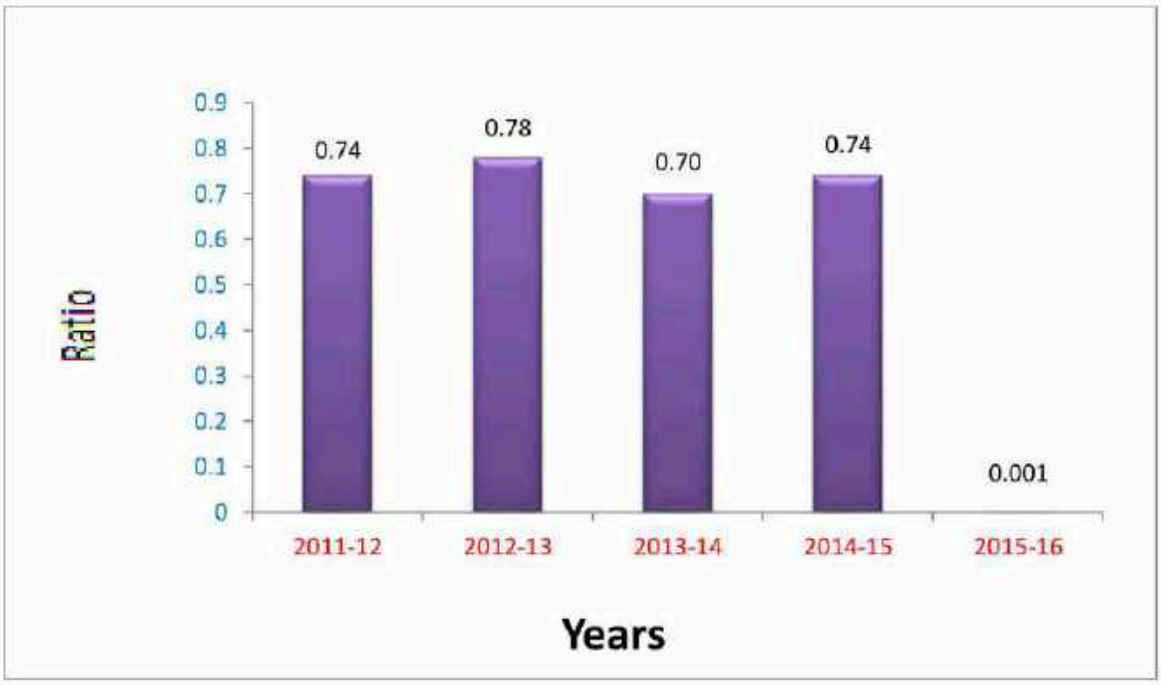
TABLE-4.6

Ratio of interest paid to total income

YEARS	2011-12	2012-13	2013-14	2014-15	2015-16
INTEREST PAID	2812701.00	11389567.00	11570588.00	15133447.30	16105065.00
TOTAL IMCOME	11014531.14	14557267.43	164967.76	20221529.09	21488660.00
RATIO	0.74	0.78	0.70	0.74	0.74

Graph no 4.6

Ratio of interest paid to total income



Data in Table No.- 4.6 Interest paid to total income ratio in the year 2011 as 0.54%, 2012 as 0.60%, 2013 as 0.63%, 2012 as 0.60% but in the current year 2015 it is 0.38%. The interest paid to total income ratio is decreased in the year.

❖ **Ratio of total expenditure of total income:**

Ratio of total expenditure of total income= $\frac{Total\ expenditure}{Total\ income}$

TABLE-4.7

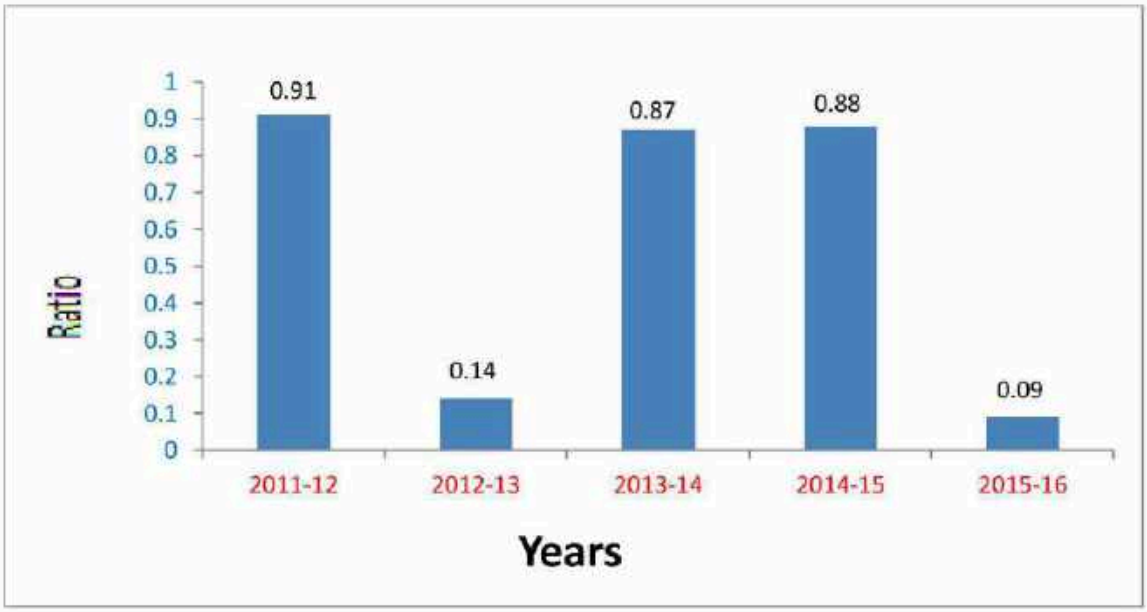
Ratio of total expenditure of total income

YEARS	2011-12	2012-13	2013-14	2014-15	2015-16
TOTAL EXPENDITURE	10087592.00	2132368.00	14423268.00	17921477.3	19128910.00

TOTAL IMCOME	11014531.14	14557267.43	164967.76	20221529.09	21488660.00
RATIO	0.91	0.14	0.87	0.88	0.09

Graph no 4.7

Ratio of total expenditure of total income



Data in Table No.- 4.7 Total expenditure of total income ratio in the year 2011 as 0.90%. and 2012 as 0.91% ,2013 as 0.92% and 2014 as 0.86% In the current year it is as 0.92%. Therefore the ratio of total expenditure to total income is decreased in the year 2015 as compared to the current year.

- **Ratio of salary to total expenditure:**

Ratio of salary to total expenditure= $\frac{Salary}{Total\ expenditure}$

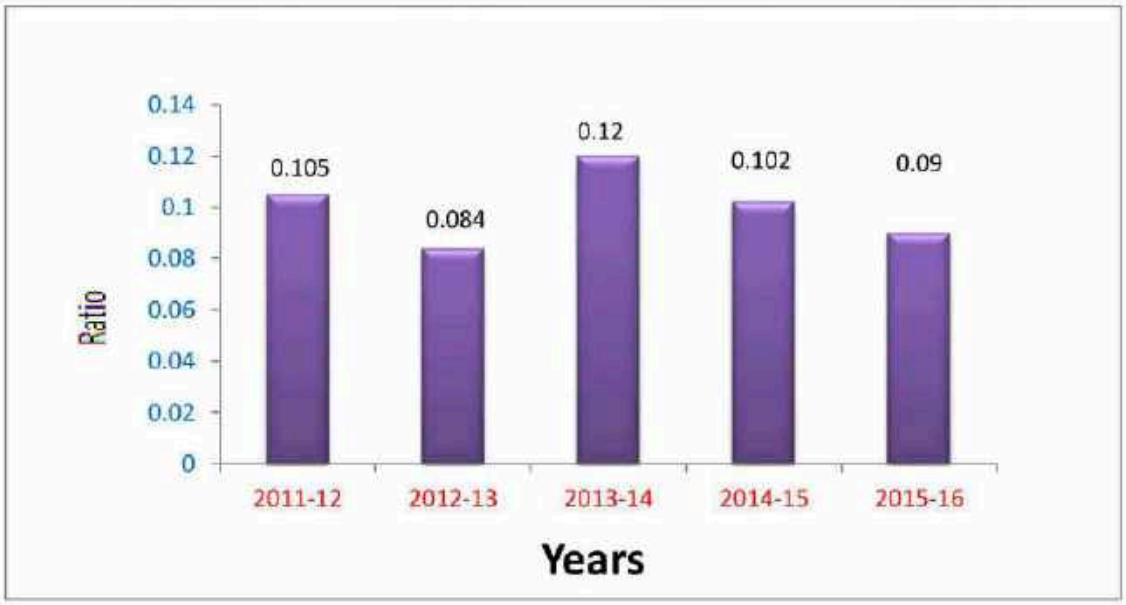
TABLE-4.8

Ratio of salary to total expenditure

YEARS	2011-12	2012-13	2013-14	2014-15	2015-16
SALARY	1063340.00	1234398.00	1735484.00	1839180.00	1729665.00
EXPENDITURE	10087592.00	2132368.00	14423268.00	17921477.3	19128910.00
RATIO	0.105	0.084	0.120	0.102	0.090

Graph no 4.8

Ratio of salary to total expenditure



Data in Table No.- 4.8The ratio of salary to total expenditure in the year 2011 at 0.21, 2012 at 0.11, 2013 at 0.10 and 2014 at 0.19. But it is at 0.18 in the current year 2015 the ratio of salary to total expenditure is increased in the current year as compared to previous year.

❖ **Ratio of other expenses to total expenditure:**

Ratio of other expenses to total expenditure= $\frac{Other\ expenses}{Total\ expenditure}$

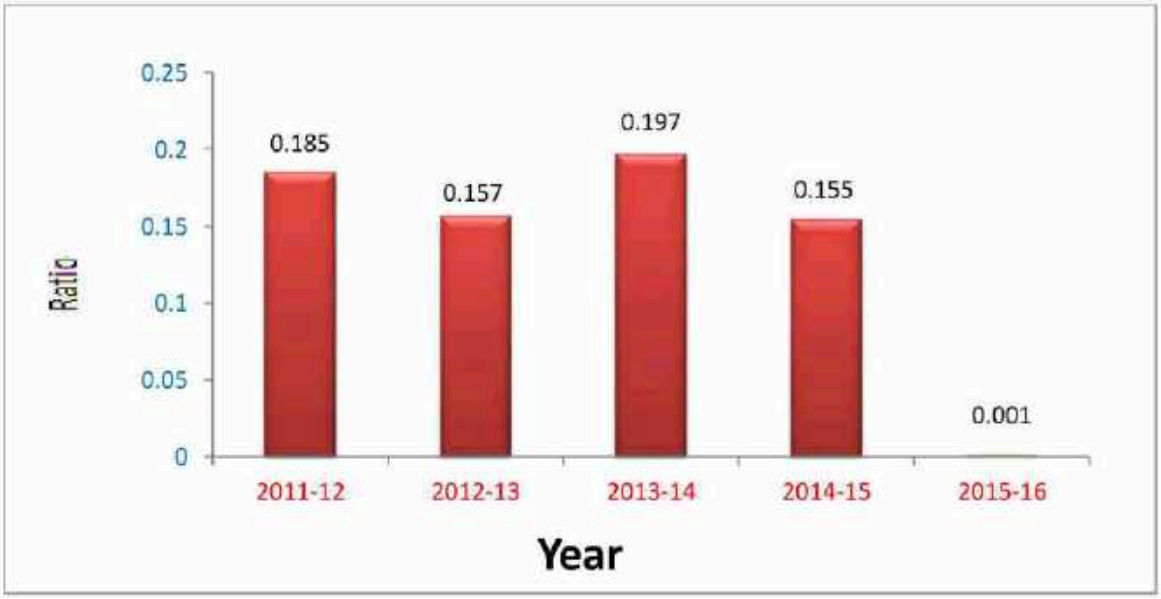
TABLE-4.9

Ratio of other expenses to total expenditure

YEARS	2011-12	2012-13	2013-14	2014-15	2015-16
OTHER EXPENSES	1874891.00	2132368.00	2852680.00	2788030.00	20429.00
EXPENDITURE	10087592.00	2132368.00	14423268.00	17921477.3	19128910.00
RATIO	0.185	0.157	0.197	0.155	0.001

Graph no 4.9

Ratio of other expenses to total expenditure



Data in Table No.- 4.8 Ratio of other expenses to total expenditure is 0.45 in the current year 2015. But it is 0.23 in the year 2012 and in the year 2011, 2012 and 2013 at 0.27, 0.23 and

0.20. The ratio of other expenses to total expenditure is increased in the year2014 and 2015 .but in the year 2013 decreased.

CHAPTER- 5

FINDING, SUGGESTIONS AND CONCLUSIONS

FINDINGS

On the basis of Data analysis and Interpretation the following findings were found.

1. The percentage of profit to total Income in the year 2013-14 is 0.12%. It is increase up to 0.08% in the year 2011-12. This shows the decreasing trend in percentage of profit to total income.

   (Reference Table No – 4.1)

2. It is observe that the Credit Deposit Ratio is increase year to year. In the year 2014-15 it is 1.0% and in the year 2015-16it is 0.47%. This showing decreasing trend in Credit Deposit Ratio.

   (Reference Table No – 4.2)

3. The Interest Spread Ratio in the year 2011-12 is 0.141 % but in the year 2015-16 it is 0.002. It is clear that that there is decreasing trend in Interest Spread Ratio.

   (Reference Table NO – 4.3)

4. It observes that the Working Capital ratio in the year 2011-12 is 0.33 %. It is decrease year to year. In the year 2015-16 it is 0.24%. This shows that the deceasing trend in Working Capital Ratio.

   (Reference Table No – 4.4)

5. It observes that the interest earned ratio in the year 2011-12 is 0.91 % but in the year 2015-16 it is 0.99%. This showing increasing trend in Interest Earned Ratio.

(Reference Table No – 4.5)

6. It observes that the Interest Paid Ratio in the year 2011-12 is 0.74% and in the year 2015-16 it is 0.01%. This show that the Interest Paid Ratio is between 0.54% and 0.63%.

(Reference Table No – 4.6)

7] The total expenditure Ratio is fluctuating year to year. The expenditure Ratio in the year 2011-12 is 0.91% and in the year 2015-16 it is 0.9%.

(Reference Table No – 4.7)

8] The salary to total expenditure Ratio in the year 2011-12 is 0.120 %. It is decreased up to 0.90 % in the year 2015-16.

(Reference Table No – 4.8)

9] The other expenses ratio in the year 2013-14 is 0.197%.it decreased in the year 2015-16 is 0.001%.

(Reference Table No – 4.9)

After the financial statement analysis of the janata co-operative Bank ltd.HARUGERI.Branch Raibag.It is observe that the Federal Bank Ltd is doing business very good in banking sector. The bank is providing Credit Card, Debit Card and Online banking facility to customer.

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From the balance sheet it observes that the Asset of bank is increase year to year. It indicates that the bank is having good position of Asset as compare to its liability.

SUGGESTION

All though the banks performance is very good and at par with industry, here is the some humble suggestion.

1) To Increase the Interest earned ratio, bank has to mix loans portfolio in such a way to earn maximum Interest.
2) The bank should try to increase its low cost deposit base to reduce the interest paid ratio.
3) The bank should try to increase its interest spread ratio significantly by increasing its credit deposit ratio.
4) The bank must also try to increase its other income ratio by introducing more and more other lucrative service to its customers.
5) Finally, the bank should endvedour to reduce its other expenditure by implementing stringent controls on all types of expenses.

CONCLUSION

1. By studying or observing it is clear that interest earned ratio depends on RBI's policy.

2. By studying or observing the Table No.2-A it is clear that interest paid ratio is fluctuate year to year. So mostly interest paid ratio depends on RBI's policy.

3. Since Banks could not reduce the interest paid deposit in proportion to interest earned on Advances. This result in almost decreasing trends in interest spread ratio of the bank.

4. Since Banks capital has remained almost same. Over the years, profit being increased, the profit to capital ratio has increased.

5. The ratio of profit to total income shows increasing trend due to the fact that under the fierce competition, the blank managed to cut down other expenditure significantly over the years.

6. Due to increase in credit distribution over the years, the interest income has increased resulting into increase in interest income to total income ratio.

7. Te Other Income to Total Income ratio has decreased due to decrease in other income due to sever competition among the banks over the years.

8. The Investment ratio has decreased due to RBI's changing monetary policies over the years such as decrease in CRR and SLR etc.

9. The cash reserve ratio has changed in accordance with RBI's policies.

ANNEXURE

Consolidated profit and loss as on 31-3-2012 and 31-3-2013

Expenses	2012	2013	Income	2012	2013
Interest paid	8212601.00	11389567.00	Interest Received	10044048.00	13674608.30
Other Expenses	1874891.00	2132368.00	Other income	970483.14	882659.10
Profit	9269390.14	1035332.43			
	11014531.14	**14557267.43**		**11014531.14**	**14557267.43**

Consolidated profit and loss as on 31-3-2014and 31-03-2015

Expenses	2014	2015	Income	2014	2015

Interest paid	11570588.00	15133447.30	Interest Received	15779788.00	19708015.30
Other Expenses	2852680.00	2608349.00	Other Income	717179.70	513513.79
Profit	2073699.67	2300051.79			
	16496967.76	**20221529.09**		**16496967.76**	**20221529.09**

Consolidated profit and loss as on 31-3-2016

Expenses	2016	Income	2016
Interest paid	16105065.00	Interest Received	20657776.98
Other Expenses	3023845.00	Other Income	830883.02
Profit	2359750		
	21488660.00		**21488660.00**

Consolidated Balance Sheet as on 31-03-2012 and 31-03-2013.

Liability	2012	2013	Asset	2012	2013

Share capital			**Cash**	**1548135.00**	**645597.00**
Reserve Fund			**Bank**	4033257.40	4805692.60
Deposit	155316345.30	181907074.00	**Investment**		
Bills sent for collection			**Loan and Advances**	63510515.60	68504118
Overdue Interest payable			**Interest Received**	100440448	13674608.30
Branch Adjustment			**Building**		
			Other Assets	219255.00	4221.00
Others	873623.00	278550.00	**Bills received for collection**		
Profit	926939.14	1035332.43			
			Branch adjustment	87805744.40	109261327.83
			Overdue Interest receivable		
	157116907.44	**183220956.43**		**157116907.44**	**183220956.43**

Consolidated Balance Sheet as on 31-03-2014 and 31-03-2015

JANATA CO-OPERATIVE BANK LTD, HARUGRI BRANCH RAIBAG.

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Liability	2014	2015	Asset	2014	2015
Deposit	20,06,56,108.69	21,38,28,262.70	**Cash**	**31,11,155.00**	**73,51,069.00**
Others	6,41,661.90	20,14,704.00	**Bank**	71,16,392.5	52,15,068.97
Profit	20,73,699.76	23,00,051.79	**Investment**	-	
			Loan and Advances	7,02,92,709.20	8,19,96,399.21
			Interest Received		
			Building		
			Other Assets	4,57,449.90	2,23,824.00
			Bills received for collection		
			Branch adjustment	12,23,93,763.70	
			Overdue Interest receivable		
	203371470.35	**218143018.49**		**203371470.35**	**218143018.49**

Consolidated Balance Sheet as on 31-03-2016

Liabilities	2016	Asset	2016
Deposits	24,00,15,200.66	**Cash**	**43,93,806.00**
Other liabilities And provisions	30,76,557.91	**Bank**	84,62,733.01
		Investment	.....
Profit	23,59,750.00		
		Loan and Advances	8,25,63,619.21
		Inter branch account	4,46,52,346.37
		Other Assets	10,53,79,003.98
	24,54,51,508.57		**245451508.57**

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CHIKKODI – 591201 District – Belagavi (Karnataka state)
WEBSITE: www.klebkcollegechikkodi.edu.in

1.3.2

Consolidated list of the courses that include experiential learning through project work / field work / internship year-wise during last five years

2020-21				
Sl. No	**Program name**	**Program code**	**Name of the Course that include experiential learning through project work/field work / internship**	**Course code**
1	M.Com	MCOM	Project report	4.3
2	MSc	MSCBOT	Project 4.4	DO51
3	BSc Chemistry, Botany and Zoology	BSC4	Chemistry Sixth Semester Paper - II	14BSCCHEP62
4	BSc Chemistry, Botany and Zoology	BSC4	Chemistry Sixth Semester Paper - II	14BSCCHEP62

Coordinator
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2019-20				
Sl. No	**Program name**	**Program code**	**Name of the Course that include experiential learning through project work/field work / internship**	**Course code**
1	BSc Chemistry, Botany and Zoology	BSC4	Chemistry Sixth Semester Paper - II	14BSCCHEP62
2	M.Com	MCOM	Project report	4.3
3	M.Sc	MSCBOT	Practical based on 4.2	D041
4	M.Sc	MSCBOT	Project 4.4	D051
5	BSc Chemistry, Botany and Zoology	BSC5	Biology of Chordates	B380
6	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	E460
7	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	F460
8	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	F460
9	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	F460
10	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	F460
11	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	F460
12	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	F460
13	BSc Chemistry, Botany and Zoology	BSC4	Applied Zoology	F460
14	BSc Chem Project VI Sem	Inorganic chemistry	Chemistry Sixth Semester Paper - II	14BSCCHEP62

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2018 - 19				
Sl. No	**Program name**	**Program code**	**Name of the Course that include experiential learning through project work/field work / internship**	**Course code**
1	BSc VI Sem Chem Tour	BSC4	Chemistry Sixth semester Paper II	14BSCCHEP62
2	BSC Cemistry, Botany and Zoology	BSC4	Cell biology, histology, animal behaviour	D380
3	BSc II Sem Zoo	BSC5	Biology of Chordates	B240
4	MSc	MSCBOT	Practical based on 4.2	D041
5	M.Com	MCOM	Project report	4.3

2017- 18				
Sl. No	**Program name**	**Program code**	**Name of the Course that include experiential learning through project work/field work / internship**	**Course code**
1	Bachelor of Science - Chemistry, Botany and Zoology	BSC4	Chemistry Practical Sixth Semester Paper II	14BSCCHEP62
2	BSc II Sem Chemistry, Botany and Zoology	BSC5	Biology of Chordates	B240
3	BSc Chemistry, Botany and Zoology	BSC4	Cell biology, histology, animal behaviour	D380
4	M.Com	MCOM	Project report	4.3

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2016- 17				
Sl. No	**Program name**	**Program code**	**Name of the Course that include experiential learning through project work/field work / internship**	**Course code**
1	Bachelor of Science - Chemistry, Botany and Zoology	BSC4	Cell Biology, Histology and Animal Behaviour	D380
2	Bachelor of Science - Chemistry, Botany and Zoology	BSC4	Chemistry Practical Sixth Semester Paper II	14BSCCHEP62
3	M.Com	MCOM	Project report, Viva-voce	4.6

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