

Training Manual



## Training Manual for Newly Recruited Technical and Administrative Personnel: **Ready, Skilled, and Grow**

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ICAR Research Complex for Eastern Region  
Patna 800 014



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### *Compiled and edited by*

Anirban Mukherjee, Banda Sainath, Arti Kumari, Dhiraj Kumar Singh, Abhay Kumar, Ujjwal Kumar, Anup Das

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## Preface

The journey of welcoming newly recruited technical and administrative personnel to the ICAR Research Complex for Eastern Region (ICAR RCER), Patna, Bihar, is both an exciting and pivotal phase. This book, *Orientation for Newly Recruited Technical and Administrative Personnel at ICAR RCER, Patna, Bihar*, has been thoughtfully curated to provide a comprehensive guide that will help new entrants understand the institution's ethos, operational framework, and their role in contributing to its goals.

This book is designed to serve as a practical reference, combining institutional knowledge with skill-building components to enhance professional efficiency. In addition to administrative knowledge, the book introduces readers to key research activities undertaken by ICAR RCER, such as those under **DLWM**, **DLFM**, and **FSRCHPR**. These sections aim to bridge the gap between the institution's research objectives and the roles of its personnel, promoting a deeper connection and shared purpose.

This book is not just a resource but a reflection of ICAR RCER's commitment to nurturing an informed, skilled, and aligned workforce that is aligned with the institution's mission. We believe that the guidance provided here will enable our new recruits to transition seamlessly into their roles and contribute effectively to the goals of agricultural research, innovation, and extension in the eastern region of India.

We express our heartfelt gratitude to all contributors, reviewers, and stakeholders who have enriched this book with their insights and expertise.

## Editor's Message

It gives us immense pleasure to introduce this comprehensive book, *Orientation for Newly Recruited Technical and Administrative Personnel at ICAR RCER, Patna, Bihar*. This resource has been meticulously crafted to serve as a foundational guide for our recruits, ensuring their seamless integration into the institution's vibrant ecosystem.

ICAR RCER has a legacy of excellence in addressing the unique challenges of agriculture in the eastern region of India. The contributions of technical and administrative personnel are indispensable in driving this mission forward. To equip our new team members with the tools for success, this book covers a wide array of topics, blending institutional knowledge with practical strategies to enhance productivity and efficiency.

The chapters in this book provide a holistic orientation, beginning with essential skills such as **time, stress, and conflict management**, and extending to more specialized areas like **Good Agricultural Practices (GAP), teamwork, and financial management**. Detailed guidance on **service, administrative, and purchase rules** at ICAR ensures a thorough understanding of institutional protocols. Moreover, the inclusion of chapters on modern systems like **e-HRMS, SPARROW, and GeM** demonstrates our commitment to leveraging technology for streamlined operations.

Special emphasis has also been placed on developing soft skills, with chapters on **communication, personality development, and teamwork**, reflecting the importance of interpersonal effectiveness in achieving collective goals. Additionally, the book introduces new recruits to the research activities of ICAR RCER's key divisions, such as **DLWM, DLFM, and FSRCHPR**, ensuring a deeper connection to the core objectives of our institution.

This book is more than an orientation manual; it is a guide to fostering a sense of belonging, collaboration, and professional excellence. We are deeply grateful to the subject matter experts, contributors, and the editorial team whose efforts have brought this vision to life.

To our recruits, I extend a warm welcome to the ICAR RCER family. I trust that this book will serve as your compass, guiding you towards a fulfilling and impactful journey with us. Together, let us work towards advancing agricultural research and development for the betterment of our nation.

Warm regards,

*Editors*

**Training Manual for Newly recruited technical and administrative personnel: Ready, Skilled and Grow**

**Anirban Mukherjee**

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**Anup Das**

## Director's Message

The success of any institution lies in the dedication, competence, and vision of its people. As new members of the ICAR Research Complex for Eastern Region (ICAR RCER), Patna, Bihar, you are stepping into an organization that holds a significant role in advancing agricultural research and development in the eastern region of India

This book, *Orientation for Newly Recruited Technical and Administrative Personnel at ICAR RCER, Patna, Bihar*, has been thoughtfully prepared to serve as a comprehensive guide for new team members. It encapsulates the essence of our institution's goals, the operational framework, and the principles that drive our work.

ICAR RCER has consistently been at the forefront of innovation and excellence in agricultural research, development, and extension. Each of you plays a critical role in strengthening this legacy, whether through supporting research activities, facilitating administrative processes, or contributing to our collaborative environment. This book is designed to ease your transition, offering valuable insights into key areas such as institutional rules, service protocols, research initiatives, and skill-building strategies.

As you embark on this journey, I encourage you to view this orientation process not just as a learning phase but as a stepping stone towards making meaningful contributions to the field of agriculture. The chapters within this book cover a wide spectrum of topics, from **time and stress management** to **Financial Management** and **technological tools like e-HRMS and GeM**, ensuring a well-rounded understanding of your roles and responsibilities.

I would like to commend the editorial team and contributors for their diligent efforts in creating this invaluable resource. Their commitment reflects the ethos of ICAR RCER—collaboration, innovation, and a shared vision for agricultural advancement.

To our new recruits, I welcome you to the ICAR RCER family. May your time here be marked by professional growth, teamwork, and the fulfillment of contributing to the betterment of agriculture and rural livelihoods in the eastern region of India. Together, let us uphold the ideals of excellence, innovation, and service that define ICAR RCER.

With best wishes,

Director  
ICAR RCER,

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## Chapter:1

# Updated Administrative Rules including Delegation of Powers, GeM, and e-Procurement

Mr. Pushpnayak

Chief Administrative Officer (CAO) ICAR-RCER, Patna

*Updated Administrative Rules: An Introduction & The Mechanisms for their Compliance:*

*Why to know Rules?*

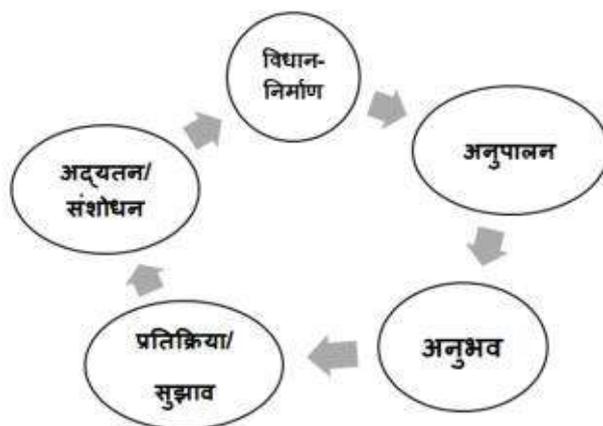
If I do not know some Rule(s) and thereby commit some mistake in performing my official duties during my service to the Government/Council, the mere lack of knowledge of Rule(s) or updated Rule(s) cannot be accepted as an excuse and I shall still be held responsible for my mistake. Hence, it is always better to remain apprised of the updated Rule position.

*Updating: Why?*

Change is the law of Nature.

According to Darwin's "Theory of Evolution", the Principle of Natural Selection leads to the Survival of the Fittest on this Earth.

*नियमों का अद्यतन: एक सतत् प्रक्रिया:*



*Jurisprudence:*

- Jurisprudence is the study of the subject of framing, amending and gradually evolving the Laws and Rules.
- Updating of Rules keeps them relevant to changing times.

*Evolution of Modern Democracy in India:*

- King John of England agrees to the terms of Magna Carta in 1215 AD.
- Queen Elizabeth-I signs the Royal Charter in 1600 AD, to grant monopoly of trade in East Indies, to the East India Company.
- The **Regulating Act, 1773** passed by **British Parliament**, to regulate the administrative affairs of East India Company in India, followed by the establishment of **Hon'ble Supreme Court** in 1774 AD.
- The Government of India Act, 1858 passed by British Parliament, to end Company's Rule and proclaim Direct Rule in India, followed by the constitution of an Indian Civil Service.
- Government of India Act, 1919 passed by British Parliament after the First World War and Jallianwala Bagh massacre, carried a Preamble, to pledge the evolution of "Responsible Government" in India, followed by the establishment of Federal Public Service Commission in India.
- **Government of India Act, 1935**, followed by the **Indian Independence Act, 1947**, ultimately led to the evolution of the **Constitution** of an independent **Republic of India**. The Constitution, adopted by our **Constituent Assembly** on **26<sup>th</sup> November, 1949**, ultimately came into force on **26<sup>th</sup> January, 1950**.

### **प्रशासकीय अधिनियम एवं नियम : परिचय**

- Payment of Wages Act, 1936
- Agricultural Produce (Cess) Act, 1940
- Central Services (Medical Attendance) Rules, 1944
- Minimum Wages Act, 1948
- Apprentices Act, 1961
- Central Civil Services (Conduct) Rules, 1964
- Central Civil Services (**Classification, Control & Appeal**) Rules, 1965
- Central Civil Services (Temporary Service) Rules, 1965
- Payment of Bonus Act, 1965
- **Contract Labour (Regulation & Abolition)** Act, 1970
- Contract Labour (Regulation & Abolition) Rules (Central), 1971
- Central Civil Services (Pension) Rules, 1972
- Central Civil Services (Leave) Rules, 1972
- Delegation of Financial Powers Rules, 1978
- Central Government Account (Receipts & Payments) Rules, 1983
- Central Treasury Rules
- Administrative Tribunals Act, 1985
- Central Administrative Tribunals (Process) Rules, 1987
- Central Civil Services (**Recognition of Service Associations**) Rules, 1993
- Right to Information Act, 2005
- Right to Information Rules, 2012

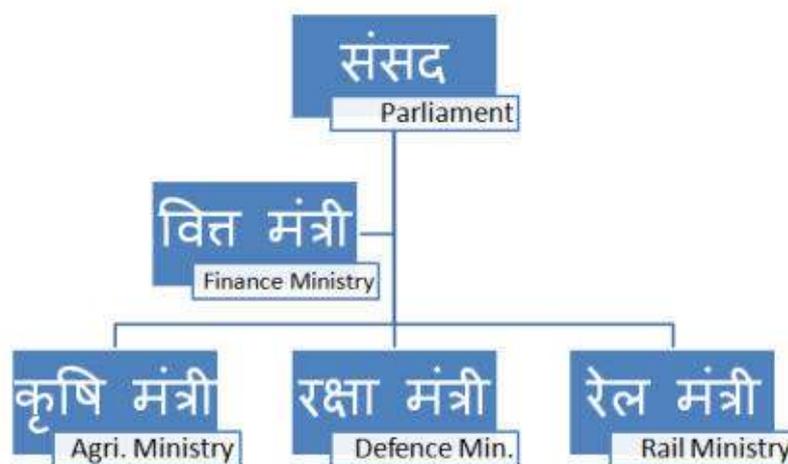
### **प्रशासनिक नियम/दिशानिर्देश : परिचय**

- Recruitment Rules and Service Rules notified under Article 309
- Fundamental Rules & Supplementary Rules
- Guidelines on Seniority and Promotions under Recruitment Rules
- Guidelines on writing of Annual Performance Assessment Reports

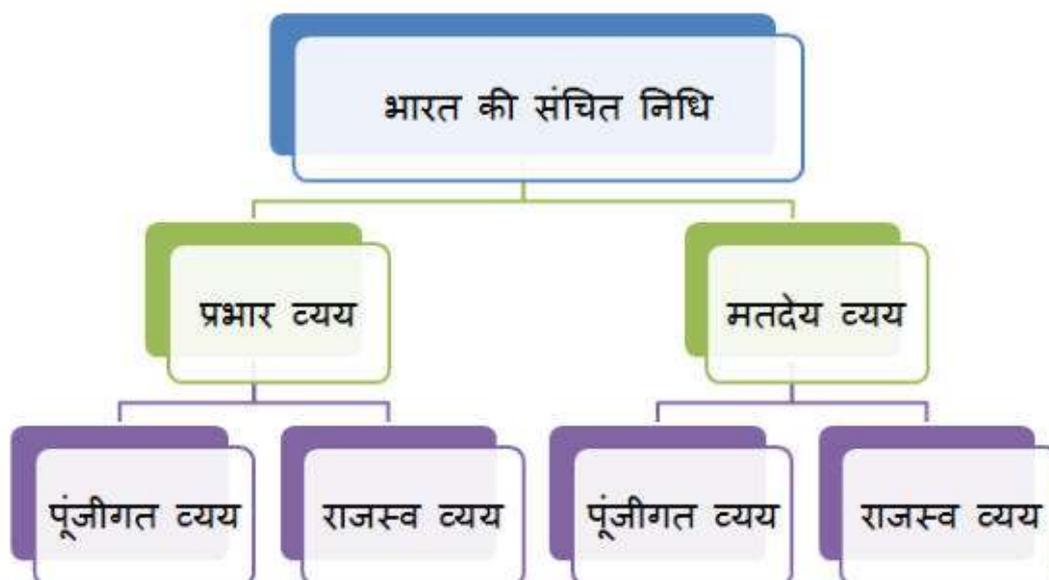
### Delegation of financial powers RULES, 1978 (updated):

#### *Delegation of financial powers rules, 1978:*

- Irrespective of the nature of powers being delegated, the power to delegate any power is actually an administrative power.
- Effective from August 1, 1978 [संदर्भ/Ref.: Rule 1.(2)]
- Power to relax any or all of DFPR, 1978 lies with President of India [Ref.: DFPR Rule 2]
- Power to relax, includes Power to either enhance or reduce the delegated Powers.
- Applicable to Central Government and Union Territories [Rule 3.(1)(d)]
- Union Finance Ministry (MoF) is the Nodal Ministry for DFPR. [Rule 3.(1)(e)]
- Residuary Financial Powers i.e. Powers undelegated under DFPR, to vest in MoF [Rule 5]
- Provision of Funds by Parliament through passing Appropriation Act [Rule 7]
- Parliament to only discuss the Charged expenditure (i.e. Expenditure charged upon Consolidated Fund of India, meant for Constitutional Bodies like President, Supreme Court, High Courts, Speaker, Deputy Speaker, Governors, CAG, Lokpal, etc., & for satisfying Court Judgements,/Decrees/Awards) [Article 113(1) of Constitution of India]
- **Parliament to vote** (i.e. **assent** or **refuse to assent**) the **Estimates of Voted Expenditure** (to be incurred from **Consolidated Fund of India**), submitted by **Ministries** (through **MoF**) to **Lok Sabha** in form of “**Demands for Grants**” [Article 113(2) of Constitution of India]



- “Capital Expenditure” and “Revenue Expenditure” constitute Budgetary Heads, for distribution of both “Charged Expenditure” and “Voted Expenditure” [Rule 8]
- These Budgetary Heads have further been sub-divided into Budgetary Sub-Heads of Salary,



- Establishment, TA & DA, Pensions, Construction Works, etc.
- Ministry distributes Funds among subordinate Controlling & Disbursing Officers [Rule 9]
- Funds not to be appropriated/re-appropriated to meet an Expenditure not sanctioned by the Competent Sanctioning Authority [Rule 10.(1)]
- Funds provided for Charged Expenditure not to be appropriated/re-appropriated to meet Votable Expenditure & Vice-versa [DFPR Rule 10.(2)]
- Funds not to be re-appropriated from one Grant/Appropriation of Charged Expenditure to Another Grant/Appropriation of Charged Expenditure [DFPR Rule 10.(3)]
- Maximum Re-appropriation admissible upto 15% of the originally sanctioned budget-amount for an administratively approved and technically sanctioned Works item, provided Savings are available elsewhere against some other Works item(s), under the same Budget-Head of “Works”. [Proviso to DFPR Rule 10.(5).(b)]
- Re-appropriation of Expenditure amongst allied Sub-Heads under the Head of “Works
- Re-appropriation admissible amongst allied Works Sub-Heads like “Major Works”, “Minor Works”, “Maintenance” and “Tools and Plants”, under the same Budget

Grant, provided such a provision is made under Revenue Head in that Budget.  
[Proviso to DFPR Rule 10.(5).(c)]

- Without the prior consent of Finance Ministry, the Financial Advisers not to allow diversion/re-appropriation of funds from other Budget-Heads to “Secretariat Expenditure” *which includes fund provision for “Salaries”, “Travel Expenses”, “Wages”, “Office Expenses”, “Other Charges”, etc.;* nor to allow the Administrative Secretary to re-appropriate funds within “Secretariat Expenditure” so as to enhance fund provision for “Travel Expenses” beyond 10% of the original fund provision [DFPR Rule 10.(6).(b) and GID (3), (3-A) & (5) below DFPR Rule 10]
- No Re-appropriation between Capital Budget-Head and Revenue Budget-Head. [GID (4) below DFPR Rule 10]
- A post shall be created, only in the Time-Scale of Pay pre-approved by the Presid [DFPR Rule 11.(1).(a), read with GID (3) below DFPR Rule 11]
- A post of the level below Joint Secretary, shall be created, only with prior approval of Finance Minister. [DFPR Rule 11.(1).(b), read with Para 3.2 of O.M. dated 12.4.2017]
- A post of the level of Joint Secretary and above, shall be created, only with prior approval of Union Cabinet. [ Para 3.2 of O.M. dated 12.4.2017].
- A **newly created post, without Recruitment Rule**, must be filled up **within 3 years of its creation, otherwise it would be deemed ‘abolished’**. {Para 5.1.(d) of O.M. dated 12.4.2017]
- **Other posts, kept in abeyance or lying vacant for 2 years**, would be **deemed abolished**.
- A proposal for Creation of Posts or for any Cadre Review, should ideally be preceded and justified by a Report on Work Study, *which may be conducted by the Work Study Unit or by Internal Staff Inspection Unit of Department, or by Finance Ministry’s Staff Inspection Unit*
- [GIDs below DFPR Rule 11; Check-list for Creation of Posts, vide O.M. dated 12.4.2017]
- Cadre Review of Group ‘A’ Service Cadres is imperative after every 5 years.
- Cadre Review exercise should also involve consultations with Service Associations, or with Representatives of affected Employees.
- In the event of litigation in Courts, the Cadre Review process should await Judgement(s).
- An Authority competent to create a post, is also equally competent to abolish it. [Rule 12]
- A post sanctioned for a specific purpose in an organization may not be diverted for another purpose at the same or different station. Cases of transfer/diversion/adjustment of posts, *would amount to creation of new post with simultaneous abolition of existing post and prior approval of DoE’ is required for the same*. [Para 7 of MoF, O.M. dated 12.4.2017]
- Scientific Departments like ICAR to have own Work Study Units involving SIU Member.

- Financial Powers for Incurring of Contingent and Miscellaneous Expenditure and for re-appropriation not exceeding 10% of original budget provisions within Budgetary Sub-Heads, say “*Secretarial Expenses*” or “*Works*”, to be delegated by the Department to the subordinate level of “Head of Department” [DFPR Rule 13.(2)]
- Department/Authority, even on delegating the Power to subordinate Authority, continues to remain competent to exercise the delegated powers [DFPR Rule 13.(5)]
- Even on delegating all or any of his powers to any other **subordinate officer**, the **Head of Department** continues to **remain accountable** therefor. [Rule 13.(3) and Rule 14]
- In ICAR, the “Section – VI of ICAR Delegation of Powers” declares the Directors of ICAR Institutes to be “Head of Department”, for the purpose of all the Central Government Rules.
- Under Secretary (Administration) to be declared as Head of Office [DFPR Rule 14]
- Mutatis mutandis, the senior-most among Administrative Officers’ cadre to be declared as “Head of Office”

### **Government e-Marketplace (GeM):**

#### ***Government e-Marketplace (GeM): Evolution:***

- Earlier, DGS&D used to conclude Rate-Contracts for various Goods items.
- Except the listed S&T Departments including ICAR, CSIR, etc., all other Ministries/Departments were bound to procure only through DGS&D Rate-Contracts for such Goods items. S&T exemption arrived in 1987.
- However, an exempted S&T Department was required to develop its own Procurement Rules, to continue availing exemption from DGS&D.
- In 2003, ICAR Procurement Manual was drafted by NIFM, MoF, GoI.
- In 2005, ICAR decided to fully adopt and implement GFR, 2005.
- GFR, 2005 has been revised and updated to evolve into the new GFR, 2017.
- The idea of GeM was still in conception, under GFR, 2017.
- The GFR Amendment dated 3<sup>rd</sup> April, 2019 is the final Authority on GEM.
- So, henceforth, the erstwhile manual Procurement mechanism of DGS&D Rate Contracts has been completely replaced with the latest digital mechanism of GeM Portal, which hosts similar fixed Rate-offers of Suppliers having GeM-SPV-certified credentials, for both Goods and Services.

#### ***Government e-Marketplace (GeM): Salient points***

- Covered under Rules 147 and 149 of new GFR, 2017.
- Modelled on Global online Purchase portals like Amazon, Flipkart, etc.
- Substitute for the erstwhile Rate-Contracts concluded by DGS&D
- Goods and Services available on GeM must be procured through GeM
- Reasonability of Rates to be verified by the Buyer department/office
- Imported Items may be exempted from GeM and e-procurement.

- Open Tender items, too, may be exempted from GeM.
- User-friendly.

### **अद्यतित प्रशासनिक नियमों का कार्मिक द्वारा अनुपालन कैसे सुनिश्चित करें**

- प्रारंभतः, अधिकारियों/कर्मचारियों को अद्यतित प्रशासनिक नियमों का सम्यक ज्ञान होना चाहिए.
- ज्ञानार्जन हेतु, अधिकारियों/कर्मचारियों को उचित प्रशिक्षण दिया जाए और साथ ही स्वयं अध्ययन करने के लिए भी प्रोत्साहित किया जाना चाहिए.
- अद्यतित नियमों की जानकारी का अपने सरकारी कार्य में इस्तेमाल एवं अनुपालन करने के लिए अधिकारियों/कर्मचारियों को उत्साहवर्धन एवं समुचित मार्गदर्शन प्रदान करना चाहिए.
- यदि कोई अधिकारी अद्यतित नियमों की जानकारी का अपने सरकारी कार्य में अनुपालन करने में कोई संकोच करता है, तो उससे मशविरा करके पहले उसे उचित सलाह और परामर्श दे कार देखें. अंततः दंड दें.
- प्रारंभतः, देखें और जांचें कि विभाग में उच्चतर अधिकारियों को संबंधित विषय पर अद्यतित प्रशासनिक नियमों का सम्यक ज्ञान है अथवा नहीं.
- यदि नहीं, तो साहस करें और अधिकारियों को संबंधित विषय पर अद्यतित प्रशासनिक नियमों से अवगत कराएं.
- यदि फिर भी हल न निकले, तो शिकायत निवारण समिति के समक्ष अपनी बात रखें.

अंततः, अदालत, यथा केंद्रीय प्रशासनिक न्यायाधिकरण, उच्च न्यायालय, इत्यादि का दरवाजा खटखटाएं.

## **Chapter:2**

### **GENERAL FINANCIAL RULES, 2017**

Rajat Kumar Das

## Finance & Accounts Officer ICAR- RCER, Patna

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### Definition

- General Financial Rules (GFRs) are a compilation of rules and orders of Government of India to be followed by all while dealing with matters involving public finances.
- These are treated as executive instructions to be observed by all Departments and Organisations under the Government and specified Bodies except otherwise provided for in these Rules.

### Introduction

- GFR are issued by the Ministry of Finance, Department of Expenditure.
- General Financial Rules were issued for the first time in 1947 bringing together in one place all existing orders and instructions pertaining to financial matters.
- These have subsequently been modified and issued as GFRs 1963, GFRs 2005 & GFRs 2017.

#### **General Financial Rules, 2017 are applicable to:**

- All Central Government Ministries/ Departments, attached and subordinate bodies.
- Autonomous Bodies except to the extent the bye-laws of an Autonomous Body provides for separate Financial Rules which have been approved by the Government.

### **Public Financial Management System Rule 86:**

- Public financial management system (PFMS) an integrated financial management system of Controller General of Accounts, Govt. Of India, shall be used for sanction preparation, bill processing, payment, receipt management, Direct benefit Transfer, fund flow management and financial reporting.

### **CAPITAL & REVENUE EXPENDITURE Rule 98:**

- **Capital Expenditure:** Acquiring Tangible assets of a permanent nature or enhancing the utility of existing assets shall broadly be defined as Capital expenditure.
- **Revenue expenditure:** Charges on maintenance, repair, upkeep and working expenses, which are required to maintain the assets in a running order as also all other expenses incurred for the day to day running of the organisation including administrative and establishment expenses shall be classified as revenue expenditure

### Works

#### **Rule 130:**

- Original works means all new constructions, site preparation, additions and alterations to existing works, special repairs to newly purchased or previously abandoned buildings or structures, including re-modelling or replacement.

- Minor works mean works which add capital value to existing assets but do not create new assets.
- Repair works means works undertaken to maintain building and fixtures. Works will also include services or goods incidental or consequential to the original or repair works.

**Rule 133 (1):** A Ministry or Department at its discretion may directly execute repair works estimated to cost up to Rupees Sixty Lakhs after following due procedure indicated in Rule 139, 159 & 160.

**Rule 133(2):** A Ministry or Department may, at its discretion, assign repair works estimated to cost above Rupees Sixty Lakhs and original/ minor works of any value to any Public Works Organisation (PWO) such as Central Public Works Department (CPWD), State Public Works Department, Government others Central organisations authorised to carry out civil or electrical works such as Military Engineering Service (MES), Border Roads Organisation (BRO), etc. or Ministry/ Department's construction wings of Ministries of Railways, Defence, Environment & Forests, Information & Broadcasting and Departments of Posts, and Space, etc.

**Rule 133(3):** As an alternative to 133(2), a Ministry or Department may award repair works estimated to cost above Rupees Sixty Lakhs and original works of any value to:

- any Public Sector Undertaking set up by the Central or State Government to carry out civil or electrical works or
- to any other Central/ State Government organization/ PSU which may be notified by the Ministry of Housing and Urban Affairs (MoHUA) for such purpose after evaluating their financial strength and technical competence. For the award of work under this sub-rule, the Ministry/ Department shall ensure competition among such PSUs/Organisations. This competition shall be essentially on the lump sum service charges to be claimed for execution of work.

**Rule 139: (Procedure for Execution of Works)**

- Preparation of detailed design and estimates shall precede any sanction for works;
- No work shall be undertaken before Issue of Administrative Approval and Expenditure Sanction by the competent Authority on the basis of estimates framed;
- Open tenders – for the works costing Rs. 10 lakhs to Rs. 60 lakhs
- Limited tenders – for works costing less than Rs. 10 lakhs
- Execution of Contract Agreement or Award of work should be done before commencement of the work
- Final payment for work shall be made only on the Personal Certificate of the Officer-in-charge of execution of the work

**Procurement of Goods:**

**Rule 143:** Definition of Goods: The term 'goods' includes all articles, material, commodity, livestock, furniture, fixtures, raw material, spares, instruments, machinery, equipment, industrial plant, vehicles, aircraft, ships, medicines, railway rolling stock, assemblies, subassemblies, accessories, a group of machinery comprising of an integrated production process or such other category of goods or intangible products like software, technology transfer, licenses, patents or other intellectual properties purchased or otherwise acquired for the use of Government but excludes books, publications, periodicals, etc. for a library. The term 'goods' also includes works and services that are incidental or consequential to the supply of such goods, such as transportation, insurance, installation, commissioning, training, and maintenance.

**Rule 147: (Powers for procurement of goods)**

The Ministries or Departments have been delegated full powers to make their own arrangements for the procurement of goods and services that are not available on GeM. Common-use Goods and Services available on GeM are required to be procured mandatorily through GeM as per Rule 149.

**Rule 149: Government e-Marketplace (GeM)**

- The Procurement of Goods and Services by Ministries or Departments will be mandatory for Goods or Services available on GeM. The procuring authorities will certify the reasonability of rates. The GeM portal shall be utilized by the Government buyers for direct online purchases as under:
- Up to Rs. 50,000/- through any of the available suppliers on the GeM, meeting the requisite quality, specification and delivery period.
- Above Rs.50,000/- and up to Rs.10,00,000/- through the GeM Seller having lowest price amongst the available sellers, of at least three different manufacturers, on GeM, meeting the requisite quality, specification and delivery period.
- Above Rs. 10,00,000/- through the supplier having lowest price meeting the requisite quality, specification and delivery period after mandatorily obtaining bids, using online bidding or reverse auction tool provided on GeM.

**Rule 154: (Purchase of Goods without quotation)**

- Purchase of goods upto the value of Rs. 1,00,000/- (Rupees One Lakh) only on each occasion may be made without inviting quotations or bids based on a certificate to be recorded by the Competent Authority in the following format:-
- "I \_\_\_\_\_, am personally satisfied that these goods purchased are of the requisite quality and specification and have been purchased from a reliable supplier at a reasonable price."
- [These Powers can be used for the procurement of any item. Further, these powers are to be used only when the required goods are not available on Government e-Marketplace (GeM)].

**Rule 155: (Purchase of goods by Purchase Committee)**

Purchase of goods costing above Rs. 1,00,000/- and upto Rs. 10,00,000/- on each occasion may be made on the recommendations of a duly constituted Local Purchase Committee consisting of three members of an appropriate level as decided by the Head of the Department. The committee will survey the market to ascertain the reasonableness of rate, quality and specifications and identify the appropriate supplier. Before recommending Placement of the purchase order, the members of the committee will jointly record a certificate as under:-

"Certified that we, members of the purchase committee are jointly and individually satisfied that the goods recommended for purchase are of the requisite specification and quality, priced at the prevailing market rate and the supplier recommended is reliable and competent to supply the goods in question, and it is not debarred by Department of Commerce or Ministry/ Department concerned."

These powers are to be used only when the required goods are not available on Government e-Marketplace (GeM).

**Rule 157:** A demand for goods should not be divided into small quantities to make piecemeal purchases to avoid the necessity of obtaining the sanction of higher authority required with reference to the estimated value of the total demand.

**Rule 158: (Purchase of goods by obtaining bids)**

Except in cases covered under Rule 154 & 155, Ministries or Departments shall procure goods under the powers referred to in Rule 147 above by following the standard method of obtaining bids in:

- Advertised Tender Enquiry – upto Rs. 50.00 lakhs
- Limited Tender Enquiry – upto Rs. 50.00 lakhs (in normal case)
- Two-Stage Bidding – Technical & Financial
- Single Tender Enquiry – Single Manufacturer firm or Proprietary item
- Electronic Reverse Auctions - an online real-time purchasing technique

**Rule 159: (E-Publishing)**

- It is mandatory for all Ministries/ Departments of the Central Government, their attached and Subordinate Offices and Autonomous /Statutory Bodies to publish their tender enquiries, corrigenda thereon and details of bid awards on the Central Public Procurement Portal (CPPP).
- Individual cases where confidentiality is required, for reasons of national security, would be exempted from the mandatory e-publishing requirement. In the case of Autonomous Bodies and Statutory Bodies' approval of the Head of the Body with the concurrence of the Head of the Finance should be obtained in each such case.
- The above instructions apply to all Tender Enquiries, Requests for Proposals, Requests for Expressions of Interest, Notice for pre Qualification/ Registration or any other notice

inviting bids or proposals in any form whether they are advertised, issued to a limited number of parties or to a single party.

- These instructions would not apply to procurements made in terms of provisions of Rules 154 (Purchase of goods without quotations) or 155 (Purchase of goods by purchase committee) of General Financial Rules.

***Rule 160: (e -Procurement)***

- It is mandatory for Ministries/ Departments to receive all bids through e-procurement portals in respect of all procurements.
- Ministries/ Departments which do not have a large volume of procurement or carry out procurements required only for the day-to-day running of offices and also have not initiated e-procurement through any other solution provided so far, may use e-procurement solution developed by NIC. Other Ministries/ Departments may either use an e-procurement solution developed by NIC or engage any other service provider following due process.
- In the individual case where national security and strategic considerations demand confidentiality, Ministries/ Departments may exempt such cases from e-procurement after seeking approval of the concerned Secretary and with the concurrence of Financial Advisers

**DISPOSAL OF GOODS THROUGH ADVERTISED TENDER Rule 219**

- The broad steps to be adopted for this purpose are as below :
- (a)Preparation of bidding documents.
- (b)Invitation of tender for the surplus goods to be sold.
- (c)Opening bids.
- (d)Analysis and evaluation of bids received.
- (e) Selection of highest responsive bidder.
- (f)Collection of sale value from the selected bidder
- (g)Issue of sale release order to selected bidder
- (h)Release of sold surplus goods to the selected bidder.
- (i) Return of bid security to the unsuccessful bidders

**DUE DATE OF LEAVE TRAVEL CONCESSION Rule 292**

- Leave travel concession claim of a government servant shall fall due for payment on the date succeeding the date of completion of return journey. The time limit for submission of the claims shall be as under :
- In case of advance drawn: within thirty days of the due date.
- (b)In case of advance not drawn: within sixty days of the due date.

**Destruction of Records Rule 320**

Subject to any general or special rules or orders applicable to particular departments as prescribed in their departmental manuals, no government record connected with accounts shall be destroyed except by the provisions of Appendix -9

## **Chapter: 3**

### **e-Office**

Mr. Sarafaraj Ahmad, Senior Technical Officer, ICAR-RCER, Patna

### Why e-Office?

- An average document is photocopied 19 times
- Paper files get doubled every 3.5 years
- Paper usage in an average office grows 22 percent a year and doubles every 3.3 years
- Every 12 filing cabinets require an additional employee to maintain them
- The average search time for any document is 18 minutes and some are never found
- At any given time, 3-5 percent of an organization's files are lost or misplaced
- Large organizations lose/misplace a document every 12 seconds
- 92 percent of information is in manila folders
- Almost half of an office's time is spent handling paper/data entry
- 80 percent of today's information is paper based
- The average time to retrieve and file a paper document is 10 minutes
- E-mail causes an average 40 percent increase in paper consumption
- 12,500 sheets of paper can be made from one tree
- A letter has to pass through 41 steps and entered in dozens of the registers before it is answered.



### e-Office – Benefits:

- Enhance transparency
- Increase accountability
- Assure data security and data integrity
- Transform the government work culture and ethics
- Promote innovation by releasing staff energy and time from unproductive procedures.

### File Management System (e-File):

- eFile is a workflow based system that replaces the existing manual handling of files with a more efficient electronic system.
- This system involves all stages, including the electronic diarization of inward correspondence, creation of files, movement of correspondences and files, electronic signing of notings & drafts using Digital Signature Certificates (DSC), eSign, and finally, the archival of records.

Receipts	Files
<ul style="list-style-type: none"> <li>• <b>Diarization – Electronic / Email / Physical</b></li> <li>• <b>Acknowledgement Generation</b></li> <li>• <b>Receipt to Receipt and File Attachment</b></li> </ul>	<ul style="list-style-type: none"> <li>• File Creation – Electronic and Physical</li> <li>• Notings (Green and Yellow Note)</li> <li>• Correspondence</li> <li>• Draft for Approval (DFA)</li> </ul>

<ul style="list-style-type: none"> <li>• <b>VIP Letter Tracking</b></li> <li>• <b>Address Book</b></li> <li>• <b>Signing on remarks</b></li> <li>• <b>Legends on priority</b></li> <li>• <b>Advanced Search on metadata</b></li> <li>• <b>Receipt Status Monitoring System</b></li> <li>• <b>Closing of Receipts</b></li> </ul>	<ul style="list-style-type: none"> <li>• Referencing</li> <li>• Digital Signatures on Noting and DFA</li> <li>• File to File and Receipt Attachment</li> <li>• Linking of File</li> <li>• Closing of File</li> <li>• Advanced Search on metadata</li> </ul>
<b>Dispatch</b>	<b>Reports</b>
<ul style="list-style-type: none"> <li>• <b>Templates Selection</b></li> <li>• <b>Digital Signatures</b></li> <li>• <b>Advanced Search on metadata</b></li> <li>• <b>Reminders and Follow-ups</b></li> <li>• <b>Dispatch sent through email and post</b></li> </ul>	<ul style="list-style-type: none"> <li>• MIS Reports</li> <li>• File/Diary Register Report</li> <li>• File/Diary Movement Report</li> <li>• File/Diary Pendency Reports</li> <li>..... many more</li> </ul>

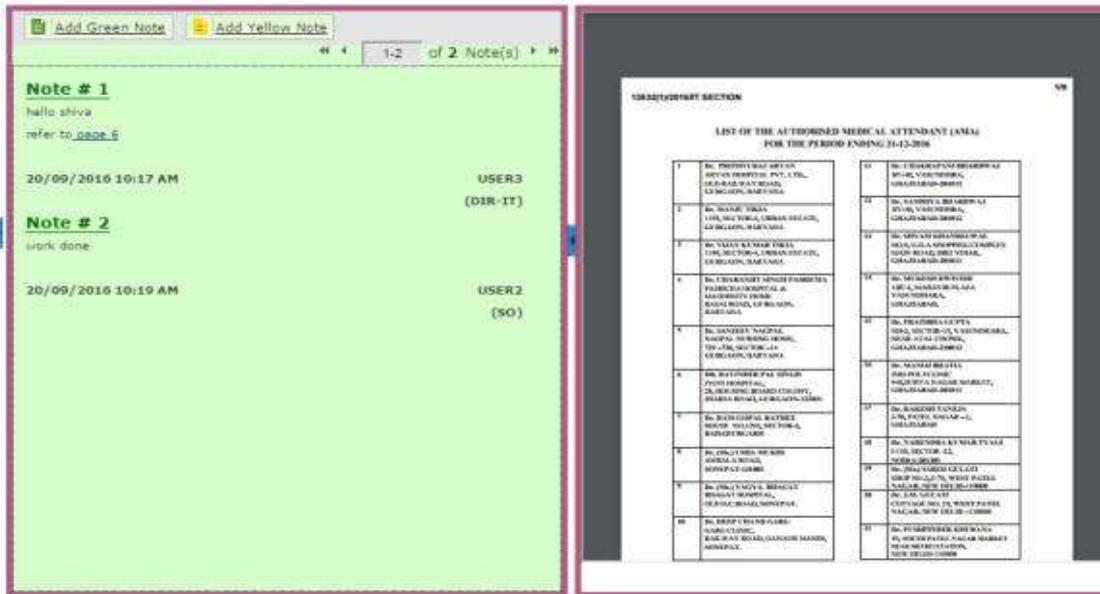
### e-File Introduction:

- eFile is one of the most important component that constitute the eOffice application.
- It is a workflow based product for enabling an end to end electronic file movement across the Government.
- Using eFile, user can create electronic files, add contents in the files, create draft for approvals and attach correspondences in an easy and user friendly way.

### e-File - Main Modules:

- Electronic diarization of inward letters and files
- Electronic movement of receipts and files with digital signature
- Creation of drafts for approval and final issue
- Dispatch of letters
- Setting due dates and reminders
- Queries and reports
- Migration module





- Bringing in transparency in the system
- Improved efficiency in working
- Viewing of files based on roles
- Search and view at any point in time (Based on hierarchy)
- File can be retrieved anytime
- Alerts on urgent files where action is required

## Chapter:4

# Leave at ICAR

Mrs. Prabha Kumari

AAO, ICAR-RCER, Patna

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### General:-

- Leave cannot be claimed as a matter of right.
- No leave of any kind can be granted for a continuous period exceeding 5 years.
- Any kind of leave may be granted in combination with or in continuation of any other kind of leave except casual leave.
- If leave is applied on medical grounds, the employee should produce Medical Certificate of sickness on proceeding on leave and fitness when return to office after availing medical leave.
- Wilful absence from duty after the expiry of the leave may entail disciplinary action against the employee.

### *There are main following types of leave in ICAR:-*

1. Earned Leave (EL)
2. Half Pay Leave (HPL)
3. Leave not Due (LND)
4. Extra Ordinary Leave (EOL)
5. Maternity Leave
6. Special Maternity Leave
7. Paternity Leave
8. Child Care Leave (CCL)
9. Study Leave
10. Casual Leave
11. Special Casual Leave

### *1. Earned Leave (EL):-*

- On entering the service, 2.5 days per month for each completed calendar month.
- Thereafter, 15 days EL is credited on each 1<sup>st</sup> January and 1<sup>st</sup> July every year
- Whenever joining time is not fully utilised, the balance will be added in EL.
- The EL will be carry forwarded to the next half yearly period and accumulated upto a maximum of 300 days.
- EL account of the employee will be debited by 1/10<sup>th</sup> of the EOL availed or period of dies non during the previous half year subject to a maximum of 15 days.

## 2. Half Pay Leave (HPL):-

- On entering the service, 5/3 days per month for each completed calendar month.
- Thereafter, 10 days EL is credited on each 1<sup>st</sup> January and 1<sup>st</sup> July every year
- When half pay leave is availed the number of days availed will be debited from HPL account.
- When the commuted leave is availed double the number of days so availed will be debited from HPL account.
- HPL account of the employee will be debited by 1/18<sup>th</sup> of the period of dies non during the previous half year subject to a maximum of 10 days.
- HPL can be availed with or without medical certificate.
- Converted into full pay leave as “commuted leave” if leave applied for is on medical ground
- Converted into full pay leave as “commuted leave” upto a maximum of 180 days during the entire service, to be utilised for an approved study course.

## 3. Leave not Due (LND):-

- Leave not due is normally granted to permanent employees.
- LND can be granted to temporary employees with a minimum of one year service and suffering from TB, Leprosy, Cancer or Mental illness.
- It is granted only if leave sanctioning authority is satisfied that there is reasonable prospect of the employee returning to duty after the leave.
- LND is granted only on production of medical certificate except to female employees applying for LND in continuation of maternity leave or on adoption of a child less than one year.
- LND shall be limited to 360 days in the entire service.
- Leave salary for LND will be half of the amount of leave salary on EL.
- If an employee, on LND resigns/retires voluntarily without returning to duty the LND should be cancelled. The resignation or retirement will take effect from the date on which such leave had commenced and the leave salary should be recovered.
- Leave salary will not be recovered if the retirement is due to ill-health, incapacitating the government servant for further service or in the event of death or is retired prematurely under 56(j) or rule 48, CCS (Pension) Rules.

## 4. Extraordinary Leave (EOL):-

- EOL cannot be availed concurrently during the notice period, when going on voluntary retirement.
- EOL may be granted to regularize periods of absence without leave retrospectively.
- No Leave salary is admissible for EOL.
- For temporary employees:
  - (i) 3 months- with or without medical certificate

- (ii) 6 months- minimum one year continuous service against medical certificate for common ailments.
- (iii) 18 months- one year continuous service for treatment TB, leprosy, cancer or mental illness.
- (iv) 24 months. For an employee with minimum three years' continuous service, for study. If the employee undertakes to return to duty after leave and work for at least another 3 years.

**5. Maternity Leave:-**

- Admissible to female employees who has less than two surviving children for 180 days w.e.f.01.09.2008.
- Total 45 days during entire service for miscarriage/Abortion (induced or otherwise).
- It is granted on full pay, the leave is not debited to the leave account.
- Counts as service for increments and pension.
- Not admissible for “threatened abortion”, admissible for induced abortion.

**6. Special Maternity Leave:-**

- Admissible to female employees in case of death of a child soon after birth/stillbirth, who has less than 2 surviving children and for child delivery only in a authorized hospital.
- Total 60 days if maternity leave has not been availed, if availed, the relevant period of Maternity Leave will be converted into other kind of leave available in her leave account.
- Date of death means 28 days after birth, and if a baby born with no signs of life at or after 28 weeks of gestation may be defined as stillbirth.

**7. Paternity Leave:-**

- Admissible to male employees during confinement of his wife or adoption of a child below the age of one year.
- To be applied upto 15 days before or upto 6 months from date of delivery or from the date of valid adoption. If not availed, within this period, the same will be lapsed.
- It is granted on full pay.

**8. Child Care Leave:-**

- Admissible to female employees and single male employees (unmarried or widower or divorcee) for two eldest surviving minor children.
- Maximum 300 days in three spells in a calendar year, in case of a single female in six spells in a calendar year.

**9. Study Leave:-**

- Admissible to Government servants who have satisfactorily completed probation and rendered atleast 5 years, continuous service. Employees who are due to retire on superannuation within 3 years from the expected return after study leave are not eligible, 5 years in case of CHS officers granted 36 months' study leave.

- Admissible for higher studies or specialised training in a professional or technical subject having a direct and close connection with his sphere of duties.
- Maximum period is 36 months for CHS officers and 24 months for others in the entire service.
- Requisite Bonds in the prescribed forms are required to be executed by the officer.

#### **10. Casual Leave:-**

- This is not a recognised form of leave at all.
- A person on CL is considered to be on duty.
- CL can be combined with special CL.
- CL cannot be combined with any other kind of leave.
- CL can be taken on tour but no DA for the days of LC will be allowed.
- CL can be taken for half a day also.
- CL can be taken 5 days at a time.
- LTC can be availed during CL.
- 8 days those entitled for 17 Gazetted Holidays.
- 10 days for those not entitled for 17 Gazetted Holidays.

#### **11. Special Casual Leave(SCL):-**

- In the ICAR, Special Casual Leave (SCL) is a type of leave granted to employees under specific circumstance, such as participation in sports, cultural activities, scientific meetings, or for reasons like blood donation, family planning, and natural calamities.
- SCL is generally limited to 10-15 days in a calendar year, depending on the specific reason for which is granted.

#### **Leave Travel Concession (LTC)**

Good morning, everyone, today, we are going to discuss a very important benefit provided to government employees in India-the Leave Travel Concession (LTC). This provision allows government employees to travel with their families to various parts of the country and claim reimbursement for the travel expenses. It's a great facility that promotes tourism and helps employees explore India while offering financial support.

#### **What is LTC?**

The Leave Travel Concession is a benefit given to central government employees that allows them to travel to their home town or any place in India, along with their family members, during a specific period. The expenses incurred for the journey are reimbursed, subject to certain rules and conditions.

The main objective of LTC is to provide relaxation to employees and allow them time to spend with their families, while exploring the culture, heritage and geography of India. It is also helps in maintaining a healthy work-life balance by encouraging employees to take breaks from work and refresh themselves.

**Eligibility for LTC**

- **Who can avail?** The government employees who have completed one year of continuous service are eligible to avail LTC.
- **Family members covered:** The benefit extends to the employee's spouse, dependent children, and dependent parents or step-parents. In some case, dependent siblings may also be covered if they are living with the employee and are dependent on them.
- **Frequency of LTC:**
- **Home Town LTC:** This can be availed once in four years.
- **All India LTC:** This can be availed once in four years.
- **The block of four years is divided into two parts-**two years for Home Town LTC and one journey for All India LTC.
- The persons who have joined after 01.09.2008 is eligible for different LTC for first eight years of service, after their eligibility of one year. 3 Home Town and 1 All India for first four years then three Home Town and one All India.

**Conditions for Availing LTC**

- Before proceeding on leave, employees are required to apply for LTC with necessary details, such as dates of journey, family members accompanying, and mode of travel.
- **Mode of Travel:** Travel expenses are reimbursed for journeys made by air, rail, road or ship, depending on the entitlements of the employee's pay grade. For air travel, employees in specific grades can book tickets through government authorized agencies.
- **Class of Travel:** Depending on the pay level of the employee, reimbursement is made based on the class of travel (e.g., Air India Economy Class, AC-II Tier by Rail).
- **Travel Restrictions:** In some cases, there may be restrictions on the choice of destination for LTC. For instance, for travel under All India LTC, specific guidelines may need to be followed, such as choosing government-approved travel circuits or visiting specified regions like the North-East or Andaman & Nicobar Islands under special LTC schemes.

**LTC Claim Process**

- **Application for Leave:** The first step is applying for leave and LTC simultaneously. The employee must provide the details of the journey and family members involved.
- **Advance Claim:** Employee can claim an LTC advance, which covers up to 90% of the estimated fare. This advance must be used strictly for the journey and needs to be settled after the return.
- **Post-journey Reimbursement:** After completing the journey the employee must submit a detailed LTC claim, attaching relevant travel documents (tickets, boarding passes, etc.). The expenses will be processed.

**Exclusions and Special Rules**

- Private vehicles: The cost of traveling in a privately owned vehicle is not reimbursed under LTC.
- Non-entitled modes of travel: If an employee travels in a mode of transport higher than their entitled class, reimbursement will be restricted to the entitled class of fare.
- Misuse of LTC: Misuse of the LTC facility, such as submitting false claims or availing unauthorized journeys, can lead to disciplinary action, including recovery of the amount claimed and potential penalties.

### **Significance of LTC**

- LTC is a unique benefit that offers government employees an opportunity to travel with their families and rejuvenate themselves. It promotes tourism in India, helps employees take necessary breaks from work, and fosters family bonding. It is not just a financial benefit but also contributes to the overall well-being of employees, ensuring they remain productive and motivated.

### **Conclusion**

- In conclusion, LTC is a beneficial scheme that allows government employees to take time off and travel across India with financial assistance. By providing these opportunities, the government ensures that its employees maintain a healthy work-life balance while exploring the beauty and diversity of the country. It's important for employees to understand the guidelines and avail LTC responsibly to maximize the benefits of this concession.

## Chapter: 5

# Advances in Government Financial Procedures

Mr. Ravi Shankar

AAO & DDO ICAR-RCER, Patna

### Introduction

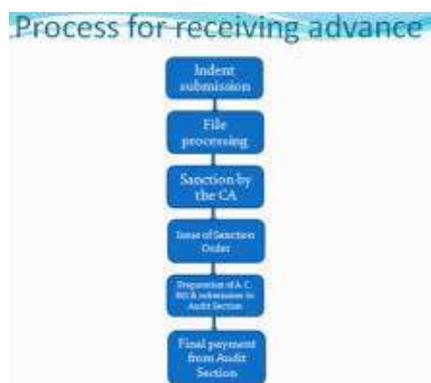
- Overview of Advances in Government Financial Systems
- Definition of advances
- Purpose in government operations

### Abstract Contingent Advance (ACA)

**Definition:** As per rule 323 of GFR 2017, the Head of the office may sanction advances to Govt. Servant for purchase of Goods or services or any other purpose needed for the management of the office with certain conditions. In this context, it is advised that certain guidelines may please be kept in mind for advances for contingent and miscellaneous purposes.

### Guidelines for A.C Advance

- It is expected from all the concerned to exercise the same vigilance in respect of expenditure incurred from public money as a person of ordinary prudence would exercise in respect of expenditure of his own money.
- The person drawing the advance from the institute is personally responsible:
- for incurring the entire expenditure within a limited time frame.
- for keeping the amount in his safe custody
- for procuring bills in support of the expenditure complete in all respect
- for utilising for the purpose for which it was sanctioned with due regard to the canons of financial propriety.
- No second advance or subsequent advance will be granted for the same purpose unless the first advance is settled. However, in the urgent circumstances, the second advance may be granted with the specific approval of the competent authority.
- Purchase of Capital items shall not allowed through AC advance. (Fig. No. 7.1 Process for receiving advance)



- After the sanction from CA, the Sanction order will be issued by the Administration (Purchase & Store) and it will send to the Cash and bill section for the preparation of bill in various modes such as **ERP&PFMS. Process of making bills on ERP and PFMS.**
- Finally, bill will be send to the Audit & Accounts section for further payment to the concerned officers.

### Settlement of AC Advance

The Adjustment bill, along with balance if any, shall be submitted by the employees within 15 days of the drawl of Advance, failing which the advance or balance is liable to be recovered from the employees with 2% of interest over and above the current prevailing GPF rate.

#### Check points:

- Genuine Voucher/bills
- GST No. On invoice
- Serial No. On invoice
- Stock Entry
- Verification/ relevant certificate

### TA Advance (Travel Allowance)

**Definition:** Advance provided for official travel expenses. Travel allowance consists Fare & Daily allowance.

**Types of Travel:** Domestic and international.

**Process:** Application before travel, settlement post-travel with receipts.

**Key Points:** Entitlement depends on grade, adjustments based on actual expenses.

### Entitlement

Pay level	Travel Entitlement (Air)	Travel Entitlement (Train)
14 and above	Business Class/Club Class	AC-I
12 and 13	Economy Class	AC-I
6 to 11	Economy Class	AC-II
Below 6	Not entitled	AC-III

### Daily Allowance on Tour

Pay level	Accommodation	Food bill	Reimbursement of Local Taxi
14 and above	up to 7500/ day	Rs.1200/- per day	Actual expenditure
12 & 13	Up to 4500/day	Rs.1000/- per day	Up to 50 Km
9 to 11	Up to 2250/day	Rs.900/- per day	Rs.338/-
6 to 8	Up to 750/day	Rs.800/-per day	Rs.225/-
5 & below	Up to 450/day	Rs.500/- per day	Rs.113/ per day

### Key Points

- Reimbursement of Hotel Charges for level 8 and below the amount of claim may be paid without production of vouchers against self certified claim only.

- For stay in Class X cities, the ceiling would be Rs.1000/-day but it will only be in the form of reimbursement upon production of relevant vouchers.
- For level 9 and above voucher is necessary.
- Whenever DA increases by 50% allowance will be increased by 25%.
- GST on the prescribed entitlement of Hotel accommodation is exclusive and it will be reimbursed over and above the prescribed entitlement.
- Booking of Tickets only by three authorized travel agents.: Balmer Lawrie, IRCTC and Ashoka Travels.

#### Regulation of Daily Allowance

Length of absence	Amount payable on tour	Amount payable on local journey (50% of amount payable on tour)
Less than 6 hours	30% of lump sum	15% of lump sum
Between 6-12 hours	70% lump sum	35% of lump sum
Greater than 12 hours	100% of lump sum	50% of lump sum

#### Process for obtaining TA Advance

- Tour programme duly approved by Competent Authority
- Submit TA Advance in duly filled Performa to the Competent Authority for Sanction of Advance.
- Preparation of TA Advance bill by the Cash and bill section and submitted to the Audit and Accounts for final payment on account of TA Advance

#### Adjustment of TA Advance

- If advance has been taken, it should be adjusted within 15 days after the return of tour /joining of duty.
- If advance has not been taken, claim may be submitted within 02 months after the return of tour /joining of duty.
- To scrutinize the necessity, frequency and duration of journey and halts.
- Satisfy himself that mileage and DA have been charges correctly.
- Tickets purchased from authorised travel agents
- Attach tickets/ boarding pass also at the time of settlement
- Self certificate clearly indicating time and date of stay.
- If, settlement has not been done within prescribed time limit it whole amount will be recovered with penal interest.

#### LTC Advance (Leave Travel Concession)

- *Definition:* Advance granted for travel under Leave Travel Concession.
- *Eligibility:* Based on service tenure.
- *Process:* Advance claim before travel, settlement after journey.
- *Key Points:* Documentation needed for settlement, travel restrictions.

## Entitlement of air and rail

Level	Air	Rail	Sea/river
14 and above	Business class	Executive Class/AC-I	High class/Deluxe
12,13	Economy class	Executive Class/AC-I	High class/Deluxe
9 to 11	Economy Class	AC-II	High class/Deluxe
6 to 8	.....	AC-II	Lower class/First
4 and 5	.....	AC-III	Lower/Second
3 and below	.....	AC-III	Lowest class/bunk class

**Grant of LTC Advance**

- Advances are granted to Govt. Servant to enable them to avail themselves of the concession. The amount of such advance in each case will be limited to 90% of the estimated amount.
- If the family travels separately from the Govt. Servant, the advance may also be drawn separately to the extent admissible.
- Normally, the advance should be refunded in full if the outward journey is not commenced within 30 days of the grant of Advance. In case of journey by rail, advance can be drawn 125 days before the proposed date of outward journey. In all cases Govt. Servant should make tickets within 10 days of drawl of advance. In case of journey by Air/Bus time limit for drawing advance is 65 days only.

**Check list for determining amount of LTC Advance**

- 1.Rail fare for to and fro by the entitled class or the class by which the official proposes to travel which is less.
- 2.No. of entitled persons for whom advance is claimed
- 3.Amount reimbursable to the official- 1 multiplied by 2
- Amount of Advance Admissible= 90% of 3.

**Key points**

Where no advance is drawn by the Govt. Servant, the right of a Govt. Servant for reimbursement of LTC stands forfeited or deemed to have been relinquished, if the claim for it is not preferred within three months of the date of completion of journey. If advance is drawn the final bill should be preferred within one month of the return of journey. If, that is not done, the entire advance should be recovered with penal interest.

**Adjustment of LTC Advance**

Advance should be adjusted within one month after the return of journey.

LTC claim preformed duly filled by the employee with Tickets/ Boarding Pass/ any other relevant vouchers submitted to the officer for adjustment.

**While availed LTC keep in mind:**

- whether, the claims are for the right block years.

- Whether the claim has been submitted in prescribed time frame.
- 3.If the journey was preferred by Road or steamer whether such services are recognised.
- Relationship with family members availed LTC
- 5.Journey performed in entitled class
- Whether the claim is by shortest route.
- Whether booking of tickets is done by the authorised travel agents.

\*Disciplinary action for fraudulent Claim\*

### **DOPT OM dated 29.08.2022 & 20.10.2023**

- In all cases of air travel in respect of LTC, air tickets shall be purchased only from the three Authorized Travel Agents (ATAs), namely:
  - M/s Balmer Lawrie & Company Limited (BLCL),
  - M/s Ashok Travels & Tours (ATT) and
  - Indian Railways Catering and Tourism Corporation Ltd. (IRCTC)
- All the above authorized travel agents are to display the details of the flight having the cheapest fare and the flight(s) having the fare 10% more than the cheapest fare only, in the desired time slot, at the time of booking the air tickets by the Government employees for the purpose of LTC journey. Therefore, the booking of air ticket for the purpose of LTC on the website of these three authorized travel agents shall itself be a proof that the ticket booked by the individual government employee was of the cheapest fare as provided under the guidelines.
- All three authorized agents shall indicate the word 'LTC' on tickets issued for the LTC journey.
- In all cases wherein the non-entitled Government employees are to travel by air under Special Dispensation Scheme directly from their Headquarters/place of posting to the place of visit in NER/J&K/A&N/Ladakh, the Government employees shall take the print-out of the concerned webpage having flight and fare details of the flight for relevant railhead viz. Kolkata/ Guwahati/ Delhi/Amritsar/ Chennai/ Vishakhapatnam to the place of visit viz. NER or UT of J&K or UT of Ladakh or UT of A&N within the same time-slot where the direct flight has been booked for the purpose of reimbursement. In case the flight tickets are not available in the same slot, the print out of the details of the flights available in the next slot may be retained for the purpose of settlement of claims.

### **Medical Advance**

Head of office grant advances to Govt. Servant to enable them initially to meet expenditure on medical attendance and treatment for themselves and the family members on the terms and conditions mentioned below:

- The advance would be admissible( a) as in patient in a hospital under the provision of CS(MA) rules. (b) as an out patient.

- The application of advance should be supported by a certificate that the patient is being treated, and estimated cost of treatment
- All employees irrespective of their pay are eligible.
- Submit application with doctor's recommendation/ Estimate from Hospital
- Detailed documentation required, some treatments need pre-approval.

### **Grant of 90% Medical Advance**

- Serving CS(MA) and CGHS beneficiaries may be granted 90% medical advance of the approved CGHS package rates for all indoor treatment.
- For outdoor treatment advance may be limited to 90% of the total estimated expenditure of the treatment, subject to the condition that the advance for the OPD treatment may only be granted when the total estimated expenditure for OPD is more than Rs.10000/-
- The advance will be paid direct to the hospital concerned on receipt of an estimate from treating physician/Medical Superintendent of the hospital.
- Advance admissible to all without any pay limit: Govt. Servant covered under CS (MA) rules,1944, irrespective of their pay are eligible for grant of Medical Advance.

### **Adjustment**

- For settlement of Advance, the employees may be required to submit the adjustment bills within a period of one month from the date of his discharge from the hospital.
- All bills/voucher along with duly signed Medical Performa may be submitted to the office for settlement. In case the entire advance has not been utilised for the treatment, the Head of office will correspond with hospital for the refund of unutilised balance of Medical Advance.

### **Cash Imprest/Permanent Advance**

- Normally granted to officers who have to make payments before they can obtain funds by drawing bills for meeting urgent and unforeseen expenditure of contingent and miscellaneous nature.
- The amount of imprest is required to be kept as low as possible and it can be varied from time to time.
- The amount sanctioned does not exceed the limit fixed by ICAR for any office or for the sanctioning authority.
- The advance sanctioned is not larger than is absolutely necessary and is based on average monthly contingent expenditure for twelve months
- The advances are not multiplied unnecessarily.

### **Regulation of Expenditure from Cash Imprest/Permanent Advance**

- The Director of an Institute is authorized to sanction in consultation with the F&AO a suitable cash imprest to the 'Head of Office' or 'Administrative Officer' functioning

as Drawing and Disbursing Officer and Heads of various Regional and Sub-stations for meeting day to day contingent & emergent expenditure.

- Subject to sufficient justification, suitable Imprest may also be sanctioned to other selected officers for specific purpose.
- The imprest is to be kept to the minimum required for smooth functioning and allowed to be utilized for the following purposes:-
- Petty items of expenditure of contingent and miscellaneous nature up to Rs.2,000/-
- Urgent contingent expenditure of recurring nature e.g. telephone rental bills, electricity charges bills, water charges bills, even if the amount exceeds Rs.2,000/- in each case.
- Obligatory charges such as Railway freights, customs duty etc.
- Payments to labourers on muster-rolls provided the rates charged for are not in excess of the approved rates.
- Advance of T.A. on tour to class III/IV staff (employed at Sub-Stations/Regional Stations, other than those which have their own bank accounts) who are required to proceed on tour at short notice. The payment from Imprest is subject to recoupment immediately through regular T.A. bills.
- In respect of expenditure of Rs. 2000/- and above formal sanction will be necessary. A copy of such sanction should invariably be endorsed to the Finance & Accounts Officer.

### **Common Issues and Challenges**

- In government financial procedures, advances like Abstract Contingent (AC) Advance, Travel Allowance (TA) Advance, Leave Travel Concession (LTC) Advance, and Medical Advance often encounter several common issues and challenges during their settlement process.
- Delayed Submission of Detailed Bills
- Lack of Proper Documentation
- Misuse of Funds
- Lack of Clarity on Guidelines
- Misunderstanding of Rules
- Failure to Submit Relevant Documents
- Non utilization of Advance
- Mismatch in claimed amount and eligible expenses

### **Conclusion**

- Importance of timely advances for smooth government operations.
- Efficient management of advance helps in maintaining financial discipline.

### **Other Interest Bearing Advances**

- House Building Advance (HBA)
- Computer Advance.

## Chapter:6

# WATER MANAGEMENT PRACTICES FOR HIGH VALUE CROP PRODUCTION

Dr. Ashutosh Upadhyaya

Head, DLWM, ICAR- RCER, Patna

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### Introduction:

- Excess water in agricultural areas raises the risk of nutrient runoff, while water shortage can have a devastating effect on crop yields.
- Employing practices that control water movement can help retain water and capture nutrients, forming areas for flood water and storage for irrigation.
- These practices also support climate adaptation by preventing large fluctuations between water excess and dry periods.
- When it comes to water in agriculture, both too much and too little is undesirable.
- Too much water in agricultural areas can affect how the soil functions, hinder plant growth, and increase the risk of nutrient runoff.
- Too little water, on the other hand, can have devastating effects on crops and their ability to take up nutrients from the soil.
- Nutrient loading from agriculture is tied to the movement of water.
- Nutrients either run off from fields along the surface during rain and snowmelt or they leach through the surface— in some cases, even reaching the groundwater.
- In addition to taking measures to maintain healthy soil and prevent erosion, controlling water movement and the amount of water in agricultural areas is a key solution that can do a lot to help retain water and nutrients.
- Water management practices and their objectives are diverse.
- Practices include leading excess water away from fields, slowing down water flow with natural stream beds, forming buffer areas for flood water, and storing water for irrigation.
- By ensuring the correct amount of water on the fields, water management helps to achieve good yields, which also contributes to good nutrient balances.
- Furthermore, these practices support climate adaptation by preventing large fluctuations between water excess and dry periods.
- Effective water management helps ensure good yields, nutrient balance, and water protection.
- Measures such as controlled subsurface drainage, two-stage ditches, flood meadows, natural stream beds, and irrigation water storage help solids settle on the banks of ditches or streams and slow down water flow during high peaks.

- They also help create space for water, which prevents over-flooding and increases availability during dry periods.
- Vegetation further enhances this effect while also reducing erosion along banks.

### **Water conservation technologies in agriculture:**

Water conservation in agriculture can be achieved by adopting

- a) Rainwater management,
- b) Ground water management,
- c) Canal water management, and
- d) On-farm water management practices

### **Rainwater Management:**

- Rainfall is one of the natural inputs for agriculture.
- In irrigated agriculture, rainfall conservation helps in reducing irrigation water demand and runoff as well as inducing groundwater recharge.
- The storage of rainfall in rice fields and imposition of cultural practices concerned with water management can help to control declining water table.
- The amount of storage depends upon the quantum of rainfall and its distribution, height of bund around the rice field, and the soil and varietal characteristics.
- The bund height should be so planned that it stores maximum rainfall in the field to avoid moisture deficiency during dry spells and minimize irrigation water requirement without affecting the crop yield.
- Mishra et al., (1997) studied the effect of bund height on water, soil and nutrient conservation and rice yield under the agro-climatic conditions of Bhubaneswar.
- No reduction in crop yield was observed even at rainfall storage depth of 20 cm.
- Khepar et al., (1999) have shown that increase in rainfall storage depth from 10 to 15 cm significantly reduces the depth of irrigation water applied, runoff (excess rainfall) and increase in deep percolation.
- The crop yield did not differ significantly under different storage depths.
- At Patna 20 to 25 cm bund height is sufficient to arrest most of the rainwater. If bunds are raised to this height, following benefits can be observed:
- Rainwater is captured in the fields during monsoon. It allows rice crop to utilize maximum rainwater and reduces the irrigation requirement through other source of irrigation.
- Soil and nutrients loss in the fields is arrested by minimizing the runoff. This practice does not allow soil deposition in drains, which results in increase in the bed level of drain and thus more water spillage and spread in the area.
- Bunds help in storing the rainwater on the land surface and replenishing the ground water below the land. This causes ground water to rise and it can be utilized for irrigation during non-monsoon period.
- Farmers increased bund height from 7.5-10 cm to 20-25 cm around rice fields and stored rainwater in field for its utilization

- Moisture remained for longer duration in Riced fields.
- Saving of 1-2 irrigation from canal.
- 15-20% saving of water
- 15-20% increase in yield



### **Water Harvesting:**

- It is estimated that even after development of full irrigation potential of 139.9 M ha as against the total cultivable land of 184 M ha about 44 M ha will be left as rainfed.

- Therefore, our strategy should be to conserve every drop of rainfall.
- This can be done by rain water harvesting which consist of in-situ and ex-situ harvesting.

### **In-situ rain water harvesting:**

- In-situ rain water harvesting can be achieved by increasing infiltration rate with the help of deep ploughing, profile modification, vertical mulching and by keeping soil surface rough.
- The in-situ rain water harvesting techniques are location specific and depend on the rainfall intensity, slope and texture of the soil.
- On lands having slope up to 1 to 2 per cent, water conservation could be ensured by field bunding, land leveling, contour ditching, and cultivation along contour.
- On lands having 2 to 6 per cent slope, graded contour bunds and on lands with slopes ranging from 6 to 33 per cent bench terraces can be made.

### **Ex-situ rain water harvesting:**

- ❖ In arid and semi-arid areas, the low and erratic rainfall normally occurs with high intensity of short duration resulting in high runoff and poor soil moisture storage. As a result, the country loses about 50 to 60 per cent of rain water.
- ❖ This surface runoff, if harvested, over a large area can yield considerable amount of water for storage and providing life saving irrigation to the crop during the dry spells in the monsoon season and also for growing a second crop in rabi season.
- ❖ The surface runoff from an area can also be increased by reducing the infiltration capacity of the soil through vegetation management, cleaning, sloping surface vegetation and reducing soil permeability by application of chemicals.
- ❖ The ex-situ rain water harvesting technologies include roof top collection, dug out ponds/ storage tanks, nala bunding, gully control structures/check dams/bandharas (weirs), water harvesting dams, percolation tanks/ponds, subsurface dams/ barriers etc.
- ❖ The ex-situ rainfall harvesting technology is highly location specific and practices evolved in a given region have a limited application in other regions. For example, roof top harvesting is recommended only in areas of high rainfall intensity spread over the large part of the year e.g. the Himalayan areas, north-eastern states, Andaman & Nicobar islands and southern parts of Kerala and Tamil Nadu.



Rainwater harvesting in polylined tanks at Palampur

### Recycling of harvested water and its productivity:

- ❖ Harvested rainwater builds up the underground recharge, which can be tapped from various water harvesting/runoff management structures, farm ponds, etc.
- ❖ Efficient use of water harvesting system depends on proper budgeting of harvested/recharged rainwater, storage and recycling of water.
- ❖ The harvested water being scarce especially in low rainfall areas (e.g. arid and semi-arid tropics) need to be judiciously used for providing life-saving supplemental irrigation to crops and avoid crop failure, increase cropping intensity and improve productivity.
- ❖ Prolonged storage of water may be avoided to overcome water loss due to seepage, evaporation etc.
- ❖ Water harvesting is an ideal solution of solving water problem in areas having inadequate water resources.
- ❖ Center for Science and Environment (CSE) estimated that even if half of the average annual rainfall of 1190 mm is captured on 1.12 ha of land in each of the country's 5,87,226 villages, 6.57 million liters of rainwater thus collected in each village can meet the annual cooking and drinking needs of average population of 1200 per village.

### Jalkunds and dugout ponds for water harvesting:

- ❖ At Dapoli, because of highly porous nature of red and lateritic soils, attempts were made to harvest rain water in small 1x1x1m pits to support establishment of cashew and mango grafts on high slopes upto 20 per cent.
- ❖ The pits are dug between every two adjacent mango/cashew grafts and are staggered with the adjacent downstream rows.
- ❖ The pits are dug, smoothed and plastered with mud and cushioned with paddy straw. BHC/Lindane was spread below the rice straw cushion.
- ❖ After straw cushioning the pits are lined with 200 GSM Silpaulin plastic sheet by pressing against the pit walls and bottom.
- ❖ No runoff is allowed to enter the pits to prevent silting. The pits are covered with a paddy straw frame to prevent evaporation.
- ❖ Further studies were also carried out to determine the optimum size of pits for storage of rain water. It was observed that optimum size of pit is of 4m<sup>3</sup> capacity.
- ❖ A pit size of 2x1x2 m stored 9.5 per cent more water than 4x1x1m pit of the same capacity.

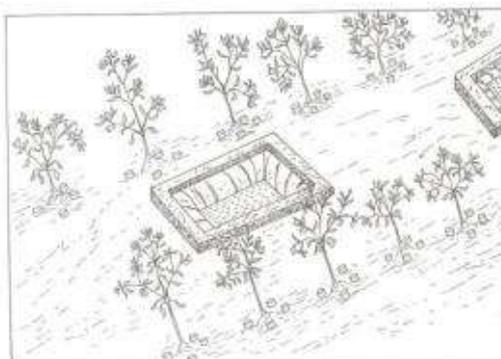


Fig. 1. Jalkund technique for water harvesting. one pitland for a set of 20 mango, cashew grafts.

### Ground Water Management:

- ❖ Ground water is an assured source of water supply. If one owns a tube well, one can irrigate as per crop requirement.
- ❖ It is well established that the best period for nursery is between 25th May and 15th June, but rainwater is not available.
- ❖ Under such situation tube well water may be efficiently utilized. Since nursery is taken generally in 1/10th area, so those farmers who own tubewell may have timely nursery in the tubewell command and can sell it to the farmers of canal command for transplanting in their fields.
- ❖ Development of rigid PVC tubewells, improved propeller pumps, improved foot valve, chain pumps for water lifting in tribal areas, efficient reflux valve, safety device against overheating of diesel engines, low cost well screens for shallow tubewells are some of the water use efficient technologies developed under AICRP on optimization of ground water utilization through wells and pumps.
- ❖ Many types of pumps like centrifugal pump, turbine pump, submersible pump, propeller pump and mixed flow pumps are available in the market for irrigation.
- ❖ Centrifugal pump is the most commonly used pump.
- ❖ It works efficiently when total head is more than 4 m. Turbine and submersible pumps are used when water is lifted from more depths.
- ❖ Propeller pumps are suitable when water is lifted from the depth less than 4 m.
- ❖ Proper selection and timely maintenance of pump, motor or engine, suction and delivery pipes and other accessories/ attachments (foot valve, bends etc.) not only improves the efficiency of the system but life of the system also increases.
- ❖ Since, it is not always possible to irrigate whole area through canal water, efforts should be made to optimally utilize ground water and conjunctive use of rain, surface and ground waters should be promoted in the project area because it not only helps in reducing the pressure on one particular source of water but also irrigate more area economically and efficiently.



Diesel Pump



Electric Pump



Solar Pump

**Canal Water Management:**

- ❖ Earlier canal irrigation systems were scientifically planned considering irrigation as a protective measure against drought.
- ❖ Now the thinking has changed and irrigation is being considered as a productive measure.
- ❖ A major shift has taken place in cropping pattern, groundwater development, cropping intensity, irrigation intensity etc.
- ❖ In the absence of revised estimates of crop water demand and operation schedule of canal considering other water sources, water is not being released as and when required by the farmers and wastage of water is more.
- ❖ This further widens the gap between supply and demand.
- ❖ Staggering of paddy transplantation period, crop diversification, crop planning from head to tail reach and conjunctive use possibilities should be explored and suitable measures should be adopted in the canal command depending upon availability of water in the canal.
- ❖ Irrigation/ Water Resources Department should devise a canal water delivery schedule in consultation with Water Users' Association according to crop water requirement in the canal command.
- ❖ One of the possible ways to reduce gap between supply and demand may be that during rainy days or lean crop water requirement, the irrigation requirement may be less as compared to releases. The surplus canal water in excess of irrigation requirement goes waste. This water could be stored by providing auxiliary storage at watercourse level during peak supply period. This stored water can be used for rearing fish as well as to provide irrigation during peak demand period.
- ❖ Communication facilities in the canal command should be improved so that water users get information from Irrigation /Water Resources Department about water availability and release pattern in advance and water distribution rules should be in accordance with predetermined water delivery pattern.
- ❖ Training to the farmers through communication material and field trials about recent agronomic, soil and water management practices should be imparted more frequently in the beginning of Kharif and Rabi seasons.
- ❖ Awareness campaign among water users about conveyance, distribution and application of canal water more efficiently and judiciously and adoption of complete package of agricultural practices in their fields should be accelerated.
- ❖ Canal managers/Water Resources Department & CADA should be imparted training about improved agricultural and on farm water management practices so that they can revise their estimates of crop water requirement time to time and deliver water more efficiently as per requirement.



**Seasonal waterlogging**



**Excessive weed growth**



**Weed growth at outlet head and spill**



**Gate at the distributary**



**Gate removed after few days**



**Unauthorized cuts or outlets**



**Creating obstruction in canal**



**Created obstruction to build head**

**On-Farm Water Management:**

- ❖ The efficiency of irrigation water can be increased by its judicious use on the farm.
- ❖ The on-farm water management including improving the conveyance efficiency of irrigation channels, application efficiency, scheduling of irrigation, change in crop

establishment and other management practices, and multiple use of irrigation water increases the water use efficiency and crop productivity.

### **Reducing conveyance losses:**

- Water is lost during conveyance through seepage from main canals, branches, distributaries, minors, watercourses and field channels.
- Conveyance loss accounts for 40 to 50 per cent of the water delivered into a canal.
- Almost half of these losses occur in field channels. While the seepage is a net loss of water in areas with poor quality groundwater, it can be retrieved for irrigation in areas having good quality ground water.
- The farmers at their convenience may withdraw this water as and when needed.
- In order to reduce these losses lining of canal network should be done selectively based on these factors together with economic considerations.
- However, watercourses, which contribute very little to groundwater, should be lined for efficient conveyance and distribution of water.



### **Plastic Mulching**

- ❖ Moisture conservation in soil
- ❖ Reduces evaporation
- ❖ Reduces weed growth through smothering action
- ❖ Increase water availability in root zone of plant for better access through roots

### **Reducing application losses:**

- ❖ Most of the area in the country is irrigated by surface application methods such as check basin, border strip and furrow irrigation.
- ❖ The application efficiency of these methods have been found to be only 30 to 50 per cent as compared to attainable level of 60 to 80 per cent.

- ❖ This is due to the fact that these methods are not designed to match the stream size, soil type, slope etc. by adopting efficient irrigation practices, deep percolation losses can be reduced.
- ❖ Considerable savings in water can also be achieved by adoption of sprinkler, drip/micro-sprinkler irrigation in water scarcity areas, having conditions conducive to their application.
- ❖ Actual field studies indicated water saving of 25 to 33 per cent and increased yield up to 35 per cent with sprinkler system compared with surface irrigation method.
- ❖ Drip irrigation saved 25 to 60 per cent water and increase of crops 5 to 60 per cent compared with surface irrigation methods.
- ❖ One of the recent water application device developed at ICAR Research Complex for Eastern Region, Patna is Low Energy Water Application (LEWA) device, which operates at 0.4 kg/cm<sup>2</sup> pressure.
- ❖ It can be used for irrigating rice, wheat and other close growing crops.
- ❖ The developed device has resulted in reduced overall energy requirements and high water and nutrient-use efficiency of the system as compared to other pressurized irrigation systems.



**Sprinkler**



**Drip**



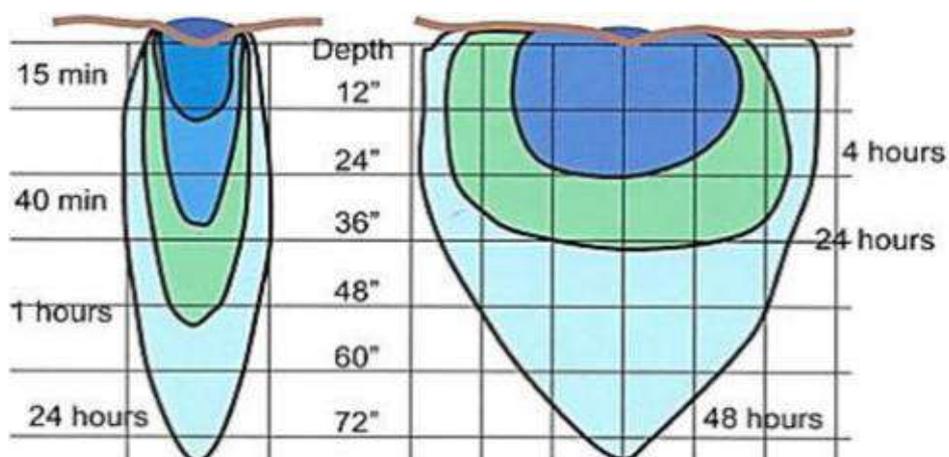
**Low Energy Water Application Device**

### **Irrigation scheduling:**

- ❖ Scheduling of irrigation in relation to water availability is an important aspect of on-farm water management for optimizing production.
- ❖ Where irrigation water supplies are plentiful irrigation must be repeated before a yield or quality reducing water stress develops in the fields.
- ❖ Several criteria have been used to find out proper timings of irrigation to different crops.
- ❖ Efficient irrigation schedules for important crops of different regions have been developed

Sandy soil

Clayey soil



### Multiple Use of Irrigation Water:

- ❖ The productivity of canal/ground water can be increased by routing it through a fish pond-cum-secondary reservoir and planting vegetable or fruit plants on the bunds.
- ❖ By weekly exchange of water, fish harvest upto 10 t/ha as additional income can be obtained.
- ❖ If an integrated farming system is followed in which output of one system (like excreta of animals and birds) is input to other system (fish in the pond), the nutritional value of water for fish, crops, fruits and vegetables increases resulting in increase in production and income many folds.



**Banana, Lemon, Guava , Tomato Brinjal and Capsicum around Pond**



**Water recycling in pond helpful in enhancement of fish production**



### Laser Land Leveling

- ❖ Reduces loss of water
- ❖ Equal opportunity to each plant to use water
- ❖ Increases crop yield
- ❖ Saves water

### Some Selected Climate Smart Technologies

Technology	Adaptation/mitigation potential
<b>1. Water smart</b>	<b>Interventions that improve water use efficiency.</b>
Rain water harvesting	Collection of rainwater not allowing to run-off and use for agricultural in rainfed/dry areas.
Drip Irrigation	Application of water directly to the root zone of crops and minimize water loss as well as increase nutrient use efficiency.
Laser Land Levelling	Levelling the field ensures uniform distribution of water in the field and reduces water loss improves nutrient use efficiency.
Furrow Irrigated Bed Planting	This method offers more effective control over irrigation and drainage as well as rainwater management during monsoon.
Drainage Management	Removal of excess water through water control structure
Cover Crops Method	Reduces evaporation loss of soil water and adds nutrients

Technology	Adaptation/mitigation potential
<b>4. Carbon smart</b>	<b>Interventions that reduce GHG emissions</b>
Agro Forestry	Promote carbon sequestration including sustainable land use management
Concentrate Feeding for Livestock	Reduces nutrient losses and livestock requires low amount of feed
Fodder Management	Promote carbon sequestration including sustainable land use management
Integrated Pest Management	Reduces use of chemicals
<b>5. Weather smart</b>	<b>Interventions that provide services related to income security and weather advisories to farmers</b>
Climate Smart Housing for Livestock	Protection of livestock from extreme climatic events (e.g. heat/cold stresses)
Weather based Crop Agro-advisory	Climate information based value added agro-advisories to the farmers
Crop Insurance	Crop-specific insurance to compensate income loss due vagaries of weather
Technology	Adaptation/mitigation potential
<b>6. Knowledge smart</b>	<b>Use of combination of science and local knowledge</b>
Contingent Crop Planning	Climatic risk management plan to cope with major weather related contingencies like drought, flood, heat/cold stresses during the crop season
Improved Crop Varieties	Crop varieties that are tolerant to drought, flood and heat/cold stresses
Seed and Fodder Banks	Conservation of seeds of crops and fodders to manage climatic risks

- ❖ These technologies, practices and services directly or indirectly contribute to improve productivity, enhance resilience and reduce GHG emission.
- ❖ Technologies/practices that help to improve at least one component can be considered as CSA. Same technology can help to improve all three elements of CSA.

#### **Mitigation measures specially against Drought:**

- ❖ Creation of water storages through appropriate water resources development
- ❖ Inter-basin transfer of surface waters from surplus water areas to drought prone areas
- ❖ Development and management of groundwater potential
- ❖ Development of appropriate water harvesting practices

- ❖ In situ soil moisture conservation measures
- ❖ Economic use of water in irrigation through practices such as drip irrigation, sprinkler irrigation, etc.
- ❖ Reduction of evaporation from soil and water surfaces
- ❖ Development of afforestation, agro-forestry and agro-horticulture practices
- ❖ Development of fuel wood and fodder
- ❖ Information received from Early Warning System as well as crop water requirement in the command area should be effectively utilized in operation of reservoirs, barrages and whole network of canals.
- ❖ Maintenance of reservoirs, barrage and canal network is a continuous process. It should be performed timely and there should not be any scarcity of funds for maintenance of whole irrigation system network. So monitoring of whole irrigation system network should not be neglected at any cost.
- ❖ Participation of local public in whole process, their valuable experiences and suggestions should be considered because they deal with system and know better than anyone.
- ❖ Develop Flood and Drought Insurance Policy and Emergency Advance Plan to protect people, livestock and other natural resources. It should essentially include cope up mechanism to repair and maintain degraded resources, rescue operations, awareness plans, management policy under adverse situations, in order to minimize the adverse impact of these events on whole ecosystem.
- ❖ Many low-lying areas of small size having dykes around should be identified in advance, so that excess runoff as a result of high intensity rainfall of less duration can be captured and stored for future use. Similarly, during floods first preference should be given to capture and store water in low lying areas having dykes around or ground water storage, where infiltration rate is high so that runoff is minimum. When runoff is essential, safe disposal of excess runoff through well connected drainage network into the river needs to be assured.
- ❖ Water quality is another important issue, because climate change will influence amount, intensity, duration and distribution of precipitation, runoff and temperature, leading to generation of sediments, pollutants, pathogens and pesticides etc. and sea level rise affecting ground water aquifers and more sea water intrusion ultimately resulting in availability and accessibility of less fresh water for drinking and domestic purpose. This issue needs special attention and should be effectively addressed.
- ❖ Opportunities for reuse and recycling of water should be explored to the extent possible because this promotes multiple uses of water and improves water productivity. This is also effective in combating floods and droughts.
- ❖ Conjunctive use of poor-quality water with good quality water in different proportions reduces adverse impact on crop growth and production. Similarly, conjunctive use of rain, surface and ground water and application of water at different crop growth stages when it is essentially required is also very effective in increasing crop yield and reducing adverse impact of floods and droughts.

**Some other important issues to be addressed are:**

- ❖ In order to efficiently and effectively utilize land and water resources our research efforts should focus on the following issues.
- ❖ Increase land use and land cover as well as soil organic carbon leading to increased land productivity and reduced land degradation.
- ❖ Development of cost effective and energy efficient pressurized irrigation systems to be operated by solar energy, wherever possible and their promotion.
- ❖ Development of Decision Support Tool for optimal release, allocation, distribution and utilization of water to improve water use efficiency and decision making process.
- ❖ Minimizing gap between water supply and water demand by establishing linkage between water suppliers and water users.
- ❖ Water budgeting and water auditing in order to know the loopholes or hotspots having high water loss and promote efficient use of water.
- ❖ Review of Irrigation water price and its revision so that farmers may realize its value and utilize it efficiently.
- ❖ Minimize the gap between water availability, water accessibility and water affordability.
- ❖ Revival of old indigenous water storage or use technologies and their integration with latest technologies.
- ❖ Decision making about water harvesting structures or soil and water conservation measures in a watershed employing modern techniques like GIS, remote sensing, Artificial Neural Network (ANN), Fuzzy Logic or Internet of Things (IOT).
- ❖ Development of cost-effective water use efficient and management technologies/practices suitable for small landholders.
- ❖ Crop water productivity enhancement, which can be achieved either by improving yields without increasing water consumption or sustaining yield and reducing water consumption.
- ❖ Capacity building and training of water users and water suppliers to create awareness about use of this precious resource.
- ❖ Development and transfer of socially acceptable and economically viable self sustaining water conservation and management technologies in farmers field for effective implementation and upscaling in participatory mode.

In addition to mentioned Agricultural technologies some other important aspects to be addressed for improvement in high value crop production on sustainable basis are:

- ❖ Crop, Commodity and Human Insurance Policy against flood hazards.
- ❖ Management strategy for conservation, cultivation, production, storage, value addition transport, marketing should be developed and strong linkage should be established.
- ❖ Gene bank, seed bank, grain bank, water bank, fodder bank and knowledge/information/Technology bank in each village/ Panchayat or block level.
- ❖ Integrated and multidisciplinary approach to flood/drought is the need of hour.
- ❖ Creation of small and many water harvesting/storage structures and priority for regular maintenance of already existing water storage structures by making provision of special budget for this activity.

## Chapter:7

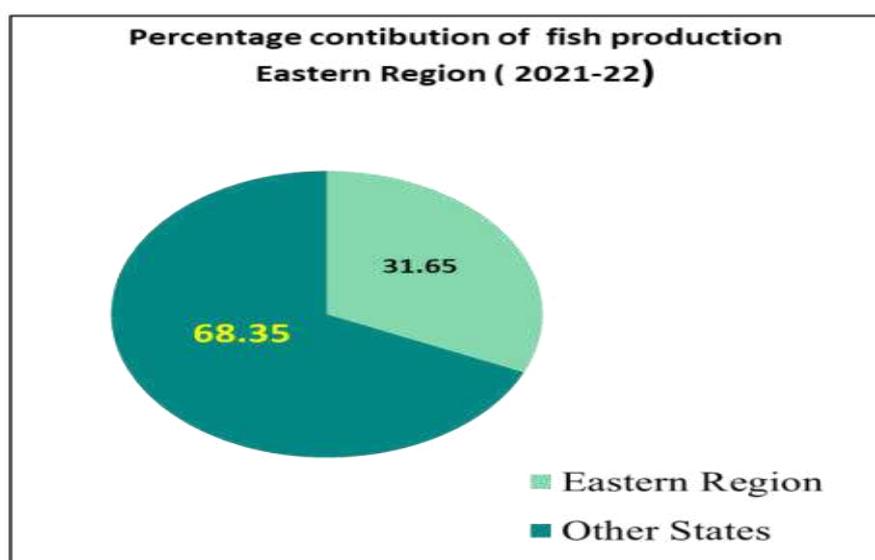
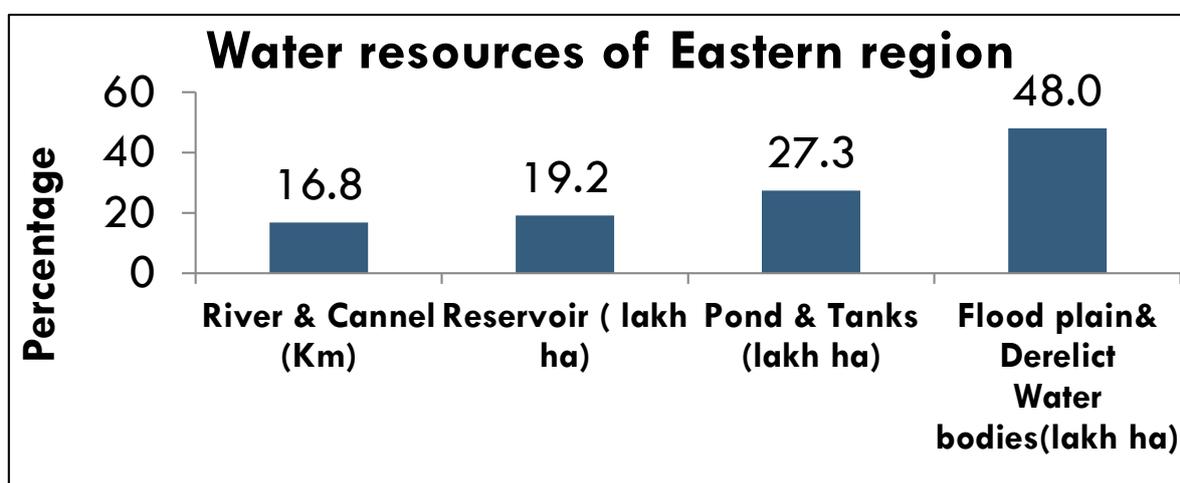
### Orientation towards DLFM Research Activities

Dr. Kamal Sharma

P.S. & Head Division of Livestock and Fisheries Management

India is the third-largest fish-producing country and the second-largest aquaculture fish producer globally. It contributes about 7% to global fish production. The country is also home to more than 10% of global fish biodiversity and is one of the 17 mega biodiversity-rich countries. Around 14 million people are engaged in fisheries and its allied activities. In fish production, the Eastern region contributes around 31.65% of total India.

Contributions of Eastern Region in fish production:



### **Our Present Team:**

Dr. Amitava Dey, Dr. Shanker Dayal, Dr Pankaj Kumar, Dr. P.C. Chandran, Dr. Rajni Kumari, Dr. P.K. Ray, Dr Jyoti Kumar, Dr. Manoj Tripathi, Dr. Rakesh Kumar Dr Kamal Sarma, Dr. Tarkeshwar Kumar, Sh. Surendra Kumar Ahirwal, Dr. Vivekanand Bharti

### **Technical staff:**

Technical officer: 1

Technical staff : 3

Anand Ranu, Usha Kiran, Tarun Kumar, Amitesh Kumar

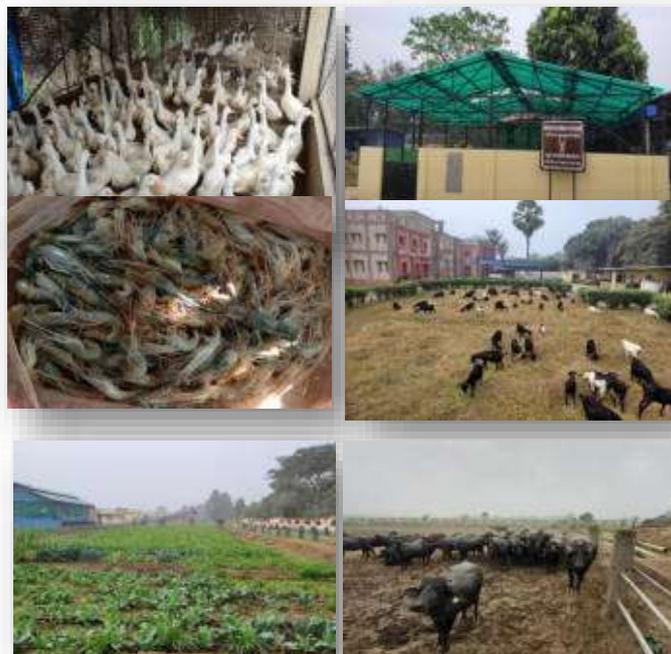
### **Our facilities/ infrastructure:**

#### ***Laboratory***

- Nutrition laboratory
- Biotechnology lab
- Fishery production and health-lab
- Animal health Laboratory

#### ***Farm***

- Experimental Cattle Unit
- Experimental Buffalo Unit
- Experimental Goat Unit
- Backyard poultry & Duck Unit
- Poultry and Fish Hatchery unit
- Veterinary clinic
- Fish farm
- Farm for fodder production
- Wet lab cum Magur hatchery
- Biofloc unit



### **Thematic Area:**

1. Appraisal and Inventorization of Natural Resources
2. Improvement of Livestock and Poultry Production
3. Feed Resources and Feeding System

*Training manual for newly recruited technical and administrative personnel*

4. Stress Management in Fisheries and Livestock
5. Integrated Farming System and Water Productivity
6. Aquaculture Production and Management
7. Disease Surveillance and Monitoring
8. Livelihood Improvement

**Total Projects: 19 and Externally Funded: 3**

### **Ongoing Projects:**

#### **Details of ongoing projects (2024-25)**

<b>Theme</b>	<b>Area of Research</b>
<b>Appraisal and Inventorization of Natural Resources</b>	Resource assessment and management framework for sustainable fisheries in selected wetland Evaluation of Diara Ecosystem for sustainable food Production Assessment of ecosystem services rendered by Indigenous livestock species and breeds Network Project on Animal Genetic Resources
<b>Integrated Fish-Livestock Farming system</b>	Effect of different manures on fish productivity
<b>Aquaculture Production, Protection and Management</b>	Standardization of culture technique of Ompok bimaculatus (Pabda) for eastern India.
<b>Improvement of Livestock and Poultry Production (6 Nos projects)</b>	Network Project on Buffalo improvement (External Funded) AICRP on Goat Improvement (External Funded) Development of meat and egg strains of duck suitable for backyard farming Transcriptome and metagenome approach to characterize genetic basis of prolificacy in goat Study of genetic polymorphism of candidate genes associated with production traits in goats in eastern region
<b>Crop-Fodder-Livestock-Water-environment Interactions (3 project)</b>	Assessing genetic variability in ducks of eastern states Effect of environmental exposure of arsenic in animals and fisheries Geo-spatial distribution and characteristics of microplastics in the riverine ecosystem of Eastern Region of India Status of fluorosis in livestock of Bihar and its amelioration on affected cattle population
<b>Disease Surveillance and Monitoring (4 projects)</b>	Reproductive abnormalities and associated common pathogens in special reference to Leptospirosis Exploring genetic basis of Mastitis resistance in livestock Assessment of antimicrobial drug resistance in bacteria of animal origin Identification and characterization of common Zoonotic pathogens in domestic animals

**External funding:**

1. AICRP on Goat Improvement
2. Network Project on Buffalo Improvement
3. Network Project on Animal Genetic Resources
4. Appraisal and Inventorization of Natural Resources



**Appraisal and Inventorization of Natural Resources:**

***Submitted for Registration:***



Jharkhandi cattle



Palamu Goat

**Works in progress:**

*Training manual for newly recruited technical and administrative personnel*



**Diara buffalo**



**Tirhuti goat**



**Champaran pig**



**Kaimur chicken**



**Kosi buffalo**



**Ara goat**

**Champaran pigs of Bihar:**

- Champaran pigs were medium-sized animals with black coats coloured throughout the body
- Body was long and slender with a dorsal line of black hair from the thoracic region and coccygeal region
- Possessed characteristics in between Ghungroo and wild pigs
- Reported to give birth to 8 to 12 piglets at birth with two parturitions per annum. Piglet mortality was found very minimum
- Head was small and conical in shape
- Ears were erect; small and eyelashes were black in colour
- There were 8-12 mammary glands in the sows and they were small in sizes



Champaran pig

**Indigenous chicken from Kaimur district:**

- Native Kaimur chicken has unique characteristics with the plumage pattern varied from golden colour to varied colour pattern
- 63.8% of birds have golden plumage patterns while the rest has varying coloured plumage patterns
- The birds were smaller in size but were possessing a large earlobe
- The single comb combs and wattles were found to be in pink colour whereas the colour of the shank was yellow in 91.6 %
- Egg laying in 7 months of age and the total eggs laid was around 100 per year.
- The color of eggshell was the brown and the average weight of the egg - was  $42.38 \pm 0.32$  gm
- The study shall continue to bring more information about this chicken which may pave the way for necessary documentation and registration



Indigenous poultry birds of Kaimur district

#### **Indigenous chicken from Chottanagpur plateau:**

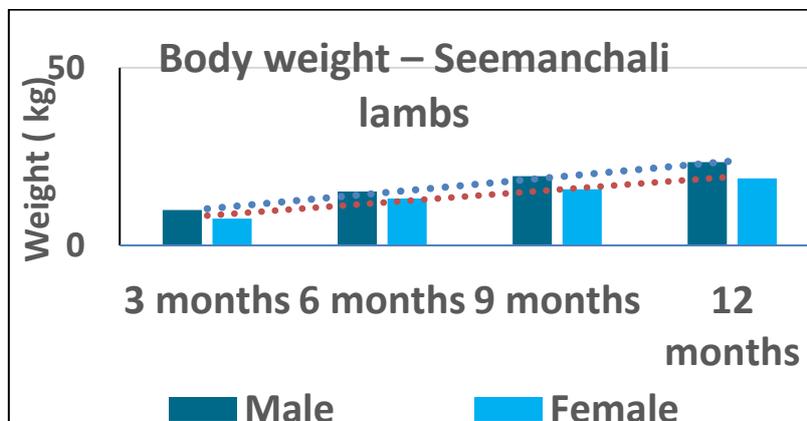
- A total of 736 adult chicken from Namkum, Bundu and Tamad blocks of Ranchi district were sampled and characterized for 17 quantitative traits
- The average flock size ranged from 11 to 17
- Majority of male with black & golden mix (38.9%) of plumage colour & female white & black (34.6%)
- Single comb followed by pea comb was the dominant comb type in all localities
- Hackle and saddle feathers of males are rich golden yellow forming mala (garland) like shape with lacing plumage pattern
- The mean body weights male and female chickens were  $1.86 \pm 0.04$  kg and  $1.09 \pm 0.02$  kg, respectively
- The result of the present study provides a baseline data on phenotypic and performance traits of native chicken germplasms of Jharkhand.



Black & golden male with single comb and yellow shank colour



White & Black mix male with single comb and yellow shank colour



- Medium sized sheep
- Distributed in Madhubani and Supaul districts of Bihar
- Coat colour is almost black
- Brown coated sheep are also found (17.2%) in the flocks
- Average flock size - 74.3 with 2.2 rams, 42.1 ewes, and 11.6 male and 18.4 female lambs.
- Possessing a long tail



Present Herd strength of livestock & Poultry

Species	31.03.2024
Cattle	38
Buffalo	90
Goat	130
Duck	99
Chicken	550



**Network Project on Buffalo Improvement:**

**Salient features in buffalo improvement programme:**

- Maintains around 90 buffaloes since last few years with the breedable population around 50.
- Due to land constraints, number of breedable population cannot be increased further
- Number of calvings, production and reproduction parameters progressively improved over the last three years.
- Herd mortality and calf mortality are almost within the limits

- Lost fodder lands are getting managed partially from the lands available with other divisions to some extent



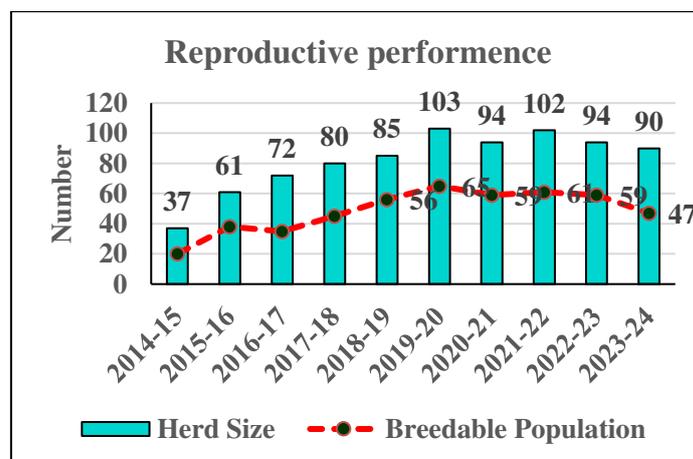
### Herd size and production performance over the years:

- Breedable population is maintained around 50
- Mortality of buffalo calf is restricted to 5%
- SLMY and TLMY improving significantly in the last three years
- TLMY attained peak during 4th parity whereas the lactation length was high in older animals.

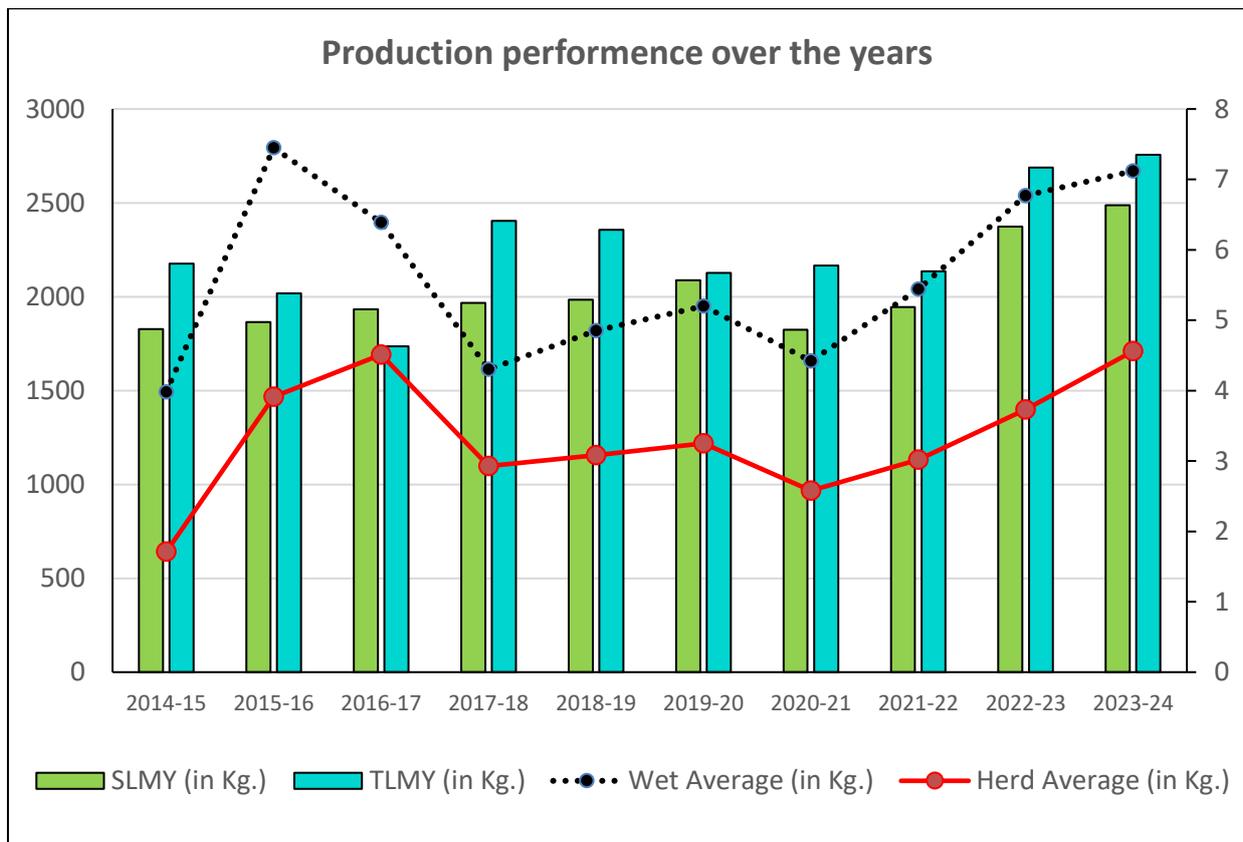
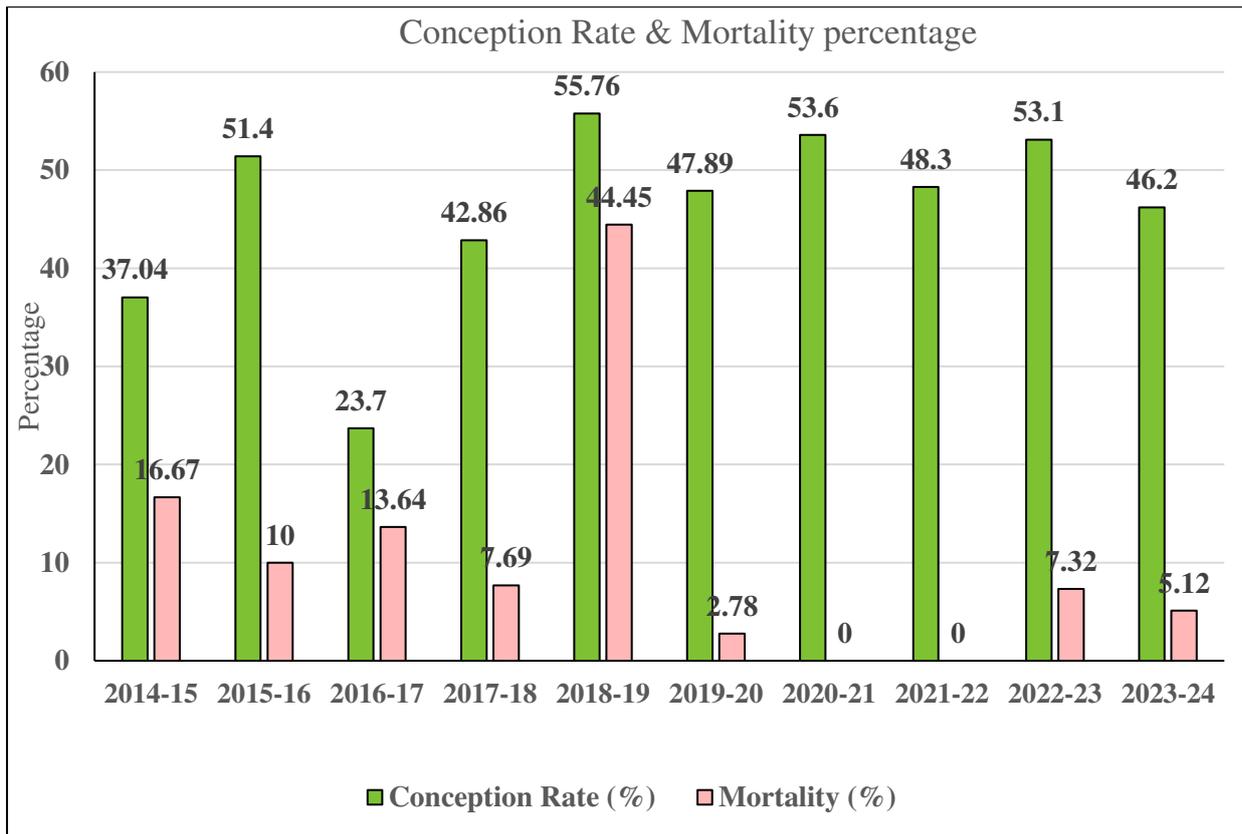
Herd size and production performance over the years

#### Closing Strength (31.03.2024)

Calves < 1 year	:	26
Females 1 – 2 years	:	13
> 2 years	:	18
Buffalo in-milk	:	25
Dry Buffalo	:	4
Males (1 to 2 years)	:	2
Males (≥ 2 years)	:	1



Conception Rate & production performance

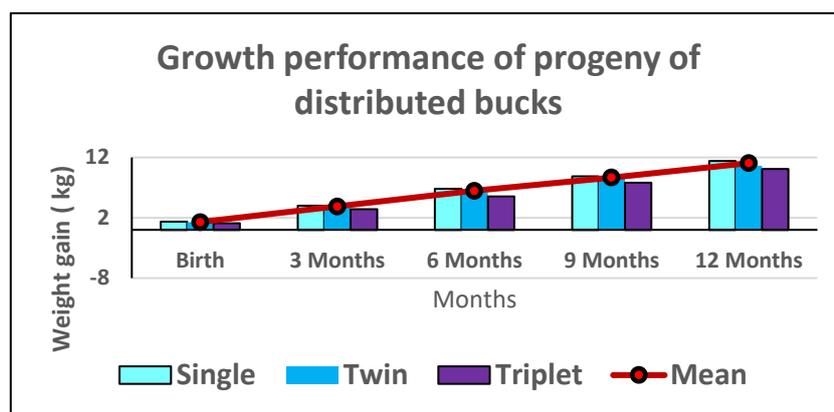


Conception Rate & production performance

Traits	2018-29	2019-20	2020-2021	2021-22	2022-23	2023-24
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305 day or less* LMY (kg)	1984.85	2088.45	1824.42	1944.40	2373.76	2488.3
TLMY (kg)	2356.17	2127.44	2166.04	2287.15	2688.62	2756.8
Wet Av. (kg)	4.85	5.12	4.42	5.44	6.77	7.12
Herd Av. (kg)	3.08	3.25	2.58	3.02	3.73	4.56

### AICRP on Goat Improvement (Black Bengal Field Unit, Patna)

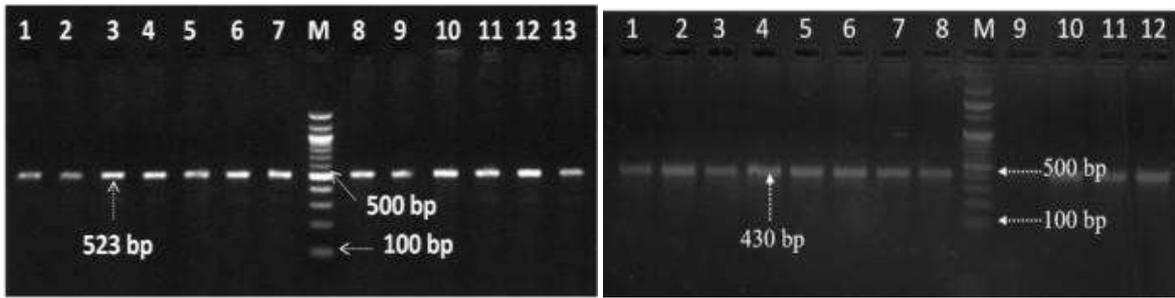


**All India Coordinated Research Project on Goat Improvement continued its activities in five clusters in Bihar**

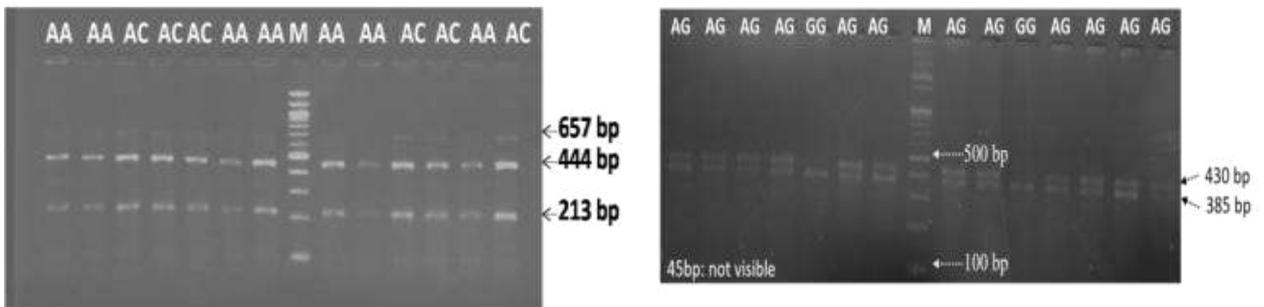
No of does available for breeding	No. of does kidded	Kidding (%)	No. of kids born	Weight at 1st kidding (kg)
2625	2348	166.30	3933	12.59±0.05

### Study of genetic polymorphism of candidate genes associated with production traits in Goats of Eastern Region

**Exploring Genetic Polymorphisms of STAT3 Gene in Black Bengal Goat (BBG)**



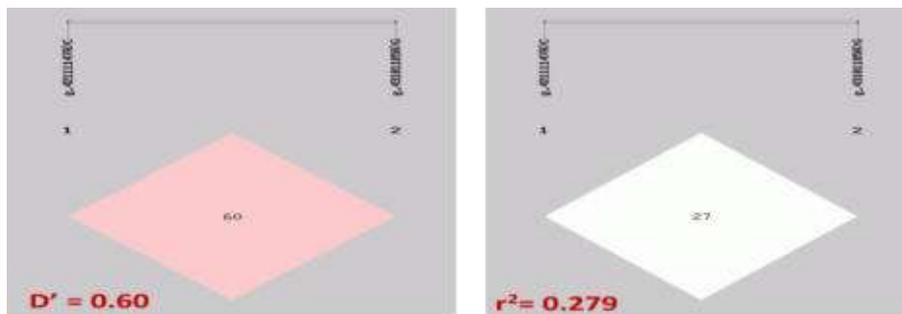
(Resolution of PCR product of STAT3 gene)



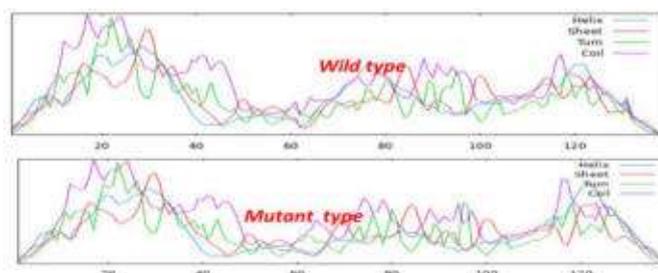
(PCR-RFLP Genotyping of SNP1 & SNP3 locus)

Gene	SNPs	Genotypes	Genotype frequencies
STAT3	Intron 5(SNP1)	AA	0.75
		AC	0.25
	Exon7 (SNP2)	TT	-
		AA	1.00
	Exon 9(SNP3)	AG	0.62
		GG	0.38

(Genotypic frequency at each SNP locus of STAT3 gene)



(Linkage disequilibrium (LD) plot of STAT3 gene)



(The prediction of the secondary structure of SNP3 in STAT3 Gene)

- Genomic DNA of BBG were isolated
- A total 3 SNPs were found in BBG
- Prediction of the protein structure of SNP3 in the STAT3 gene was done due to the presence of a missense mutation

#### Development of egg and meat strains of ducks suitable for backyard system of farming:

- ❖ Around 65 percent of the total ducks of India is in the Eastern region
- ❖ To enhance the production and reproduction performances of ducks crossbreeding programme with native ducks and White Pekin has been undertaken
- ❖ The results indicate that there was a 64.2% increase in the body weight of crossbred ducks over the native non-descript ducks
- ❖ Initial response in terms of body wt. in crossbreds is encouraging

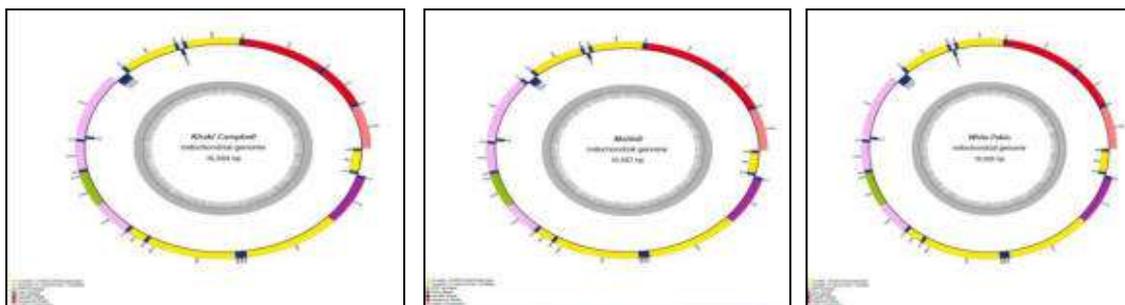
#### Performance of f1 gen at 6 months

##### PERFORMANCE OF F1 GEN AT 6 MONTHS (KG)

<b>BODY WEIGHT OF BIHAR DESI</b>	1.05±0.28
<b>BODY WEIGHT OF WHITE PEKIN</b>	1.53±0.27
<b>BODY WEIGHT OF F1 DUCKLINGS</b>	1.38±0.41
<b>BODY WEIGHT OF F2 DUCKLINGS</b>	1.25±0.38
<b>BODY WEIGHT OF F3 DUCKLINGS</b>	1.29±0.31

Annotation of mitochondrial genome has been completed

1	Khaki Campbell duck	NCBI Accession No- OQ561755
2	White Pekin duck	NCBI Accession No- OQ561757
3	Maithili duck	NCBI Accession No- OQ561760
4	Chhattisgarh duck	NCBI Accession No- OQ561756
5	Bihar duck	NCBI Accession No- OQ561758



Khaki Campbell duck

White Pekin duck

Maithili duck

## Identification and Characterization of Common Zoonotic Pathogens in Domestic Animals:

### Virulence factors in isolated E.coli

Virulence factors	Cattle (59 isolates)	Ducks (48 isolates)
Shiga toxin	37 (62.71%)	2 (4.16%)
Shiga toxin 1	30 (50.84%)	1 (2.08%)
Shiga toxin 2	10 (16.94%)	2 (4.16%)
STX 1 and STX 2	3 (5.71%)	1 (2.08%)
eae (Intimin)	22 (37.28%)	5 (10.41%)

### *Cryptosporidium*:

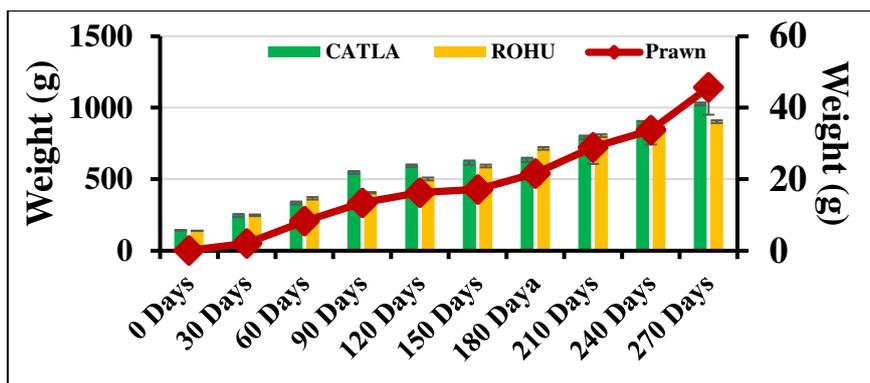
- 45 fecal samples were examined by direct smear examination method and by modified Acid fast Ziehl Neelsen staining method.
- 2 samples from poultry were positive by acid-fast staining method
- A total of 107 *E. coli* isolates were identified – 39 isolates were STEC
- Duck-origin *E. coli* have less zoonotic potential (<5% are STEC)
- Cattle (62.71%) were Shiga toxin-producing isolates- high zoonotic potential.
- Considering the potential of STEC to cross species barrier, it is imperative to take steps to prevent zoonotic infections with Shiga toxin-producing *E. coli*
- Monitoring and surveillance must be in place in the animal production system

**Disease Incidence of LIVESTOCK in Bihar and Jharkhand**

<b>Health Issues in bovine</b>	<b>Bihar (%)</b>	<b>Jharkhand (%)</b>	<b>Health Issues in Goat</b>	<b>Bihar (%)</b>	<b>Jharkhand (%)</b>
Infertility and Repeat Breeding	60	22	PPR	12	21
Mastitis	35	18	Endoparasitism	28	36
Ticks	32	66	Respiratory distress	3	2
FMD	4	16	Bloat	5	6
Fever	5	19	Diarrhoea	4	4
Wound	6	2	Anaemia and weakness	16	15
Poor body weight	7	3	Abortion	7	7
Worm infestation	8	15	Mange infestation	8	18

**Economic Feasibility of Integrated Prawn cum Fish Farming in Polyculture System in Eastern Region:**

<b>Year (2019-23)</b>	<b>Production (kg /ha)</b>	<b>Net profit/ha</b>	<b>Benefit-Cost Ratio (BCR)</b>
Average	3612	286996.7	1.65



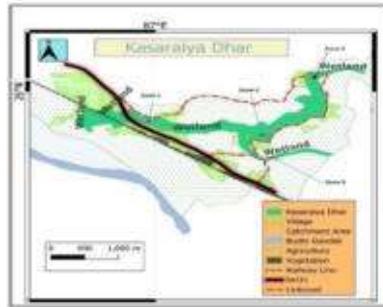
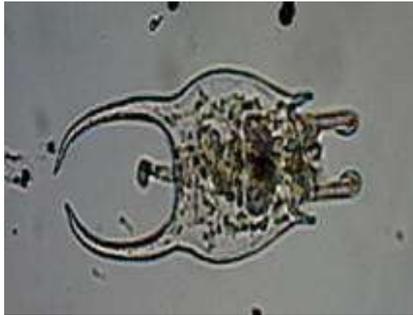
- Giant freshwater prawn (*Macrobrachium rosenbergii*) showed a good growth rate in the polyculture system. Male prawns grew faster than female prawns
- In IMC, Catla showed a better growth rate compared to Rohu
- Economic analysis of composite fish culture showed a profit of ₹ 2.15 lakh/ha (without prawn) and ₹ 2.87 lakh/ha (with prawn in polyculture)
- Therefore, ₹71892.66 could be an additional income by introducing high-value fish in the polyculture system



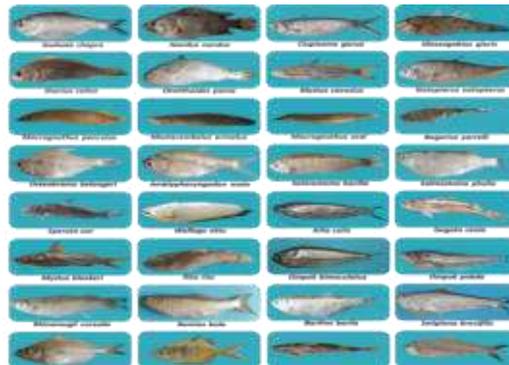
### Indigenous Fish Species: River Ganga system in Bihar:

#### Kasraiya maun

- 63 species of fish have been identified in 4 sites)
- 2 prawn and 3 mollusk species under 26 families and 14 orders were identified from the Kasraiya Dhar
- 20 species belonged to the Cyprinidae family.
- Higher species diversities (35 fish species) were found in the post-monsoon season compared to monsoon

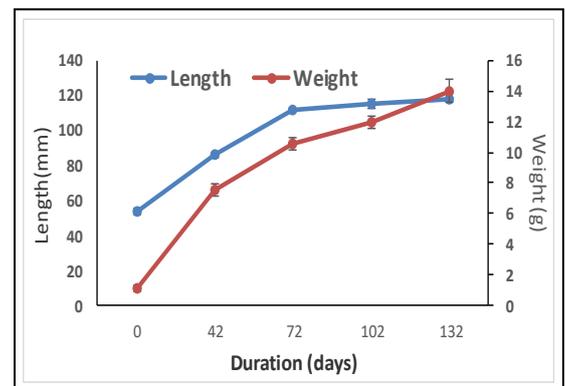


**Species Composition:**



**Performance of the Channa striata (striped snakehead) fry in cement tanks:**

- Channa striata (striped snakehead) brood stock was collected from nature and was maintained in the institute earthen pond.
- Natural breeding was stimulated by manipulating fertilization and feeding
- During the rainy season (July) fish were bred naturally.
- A total of 300 advanced fry ( $53.6 \pm 1.57$  mm &  $1.17 \pm 0.20$  gm) were collected from the pond in August 2023 and stocked in the cemented tanks
- The experimental fish fries were fed daily in the morning at 5% body weight with formulated feed (20% crude protein) along with chopped chicken waste and trashed fish up to ad-libitum level.
- The monthly weight gain and mortality percentage of fish during the cultured period were recorded. Fish attained a weight of  $124.36 \pm 1.94$  mm after 132 days of rearing with 78% survival



**Morphometric relationship of fish and sagittal otolith of a few commercial important fish species from the Ganga River:**

- Morphometric relationships between fish and otoliths of three economically and nutritionally significant freshwater species
- A total number of 297 of *J. coitor*, 183 of *G. chapra*, and 205 of *M. cavasius* were collected monthly
- An analysis was carried out on otolith, including length-weight relationships (LWRs), length frequency distribution etc.
- A strong positive association was found between many morphometric parameters of fish and otolith, including LWRs, length frequency distributions, condition factors, and otolith aspect ratios.
- These links are crucial for managing fisheries and can be utilised in future time series research on food, stock structure, environmental changes, and conservation initiatives.



### Important and potential minor carp for aquaculture:

#### *Standardisation of breeding protocol of Labeo gonius*

- Supplementary feed with 32% protein level and feeding at 10% body weight of fingerling showed better specific growth rate and survival percentage compared to another feeding regime



- Average daily gain, percentage weight gain and specific growth rate of *L. gonius* brood fish were better when



- reared in low stocking (1 no per m sq.)
- Hormone Wova-FH was used for the experiment at the rate of 0.7-0.8ml/kg and 0.3-0.4 ml/kg for female and male respectively.
- Fecundity was 80-90 no/ g of body weight
- Successfully completed breeding trial of *Labeo gonius* Fertilization rate 79.09% & hatching percentage 70.03%

### Important and potential minor carp for aquaculture:

- Natural collection of spawn of two species of minor carp viz. *Cirrhinus reba* and *L. calbasu* were done and both were

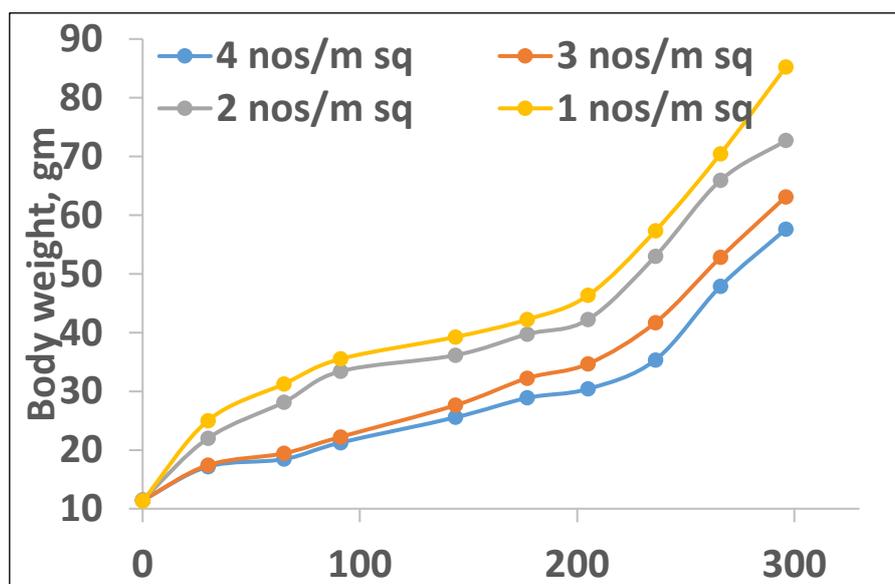


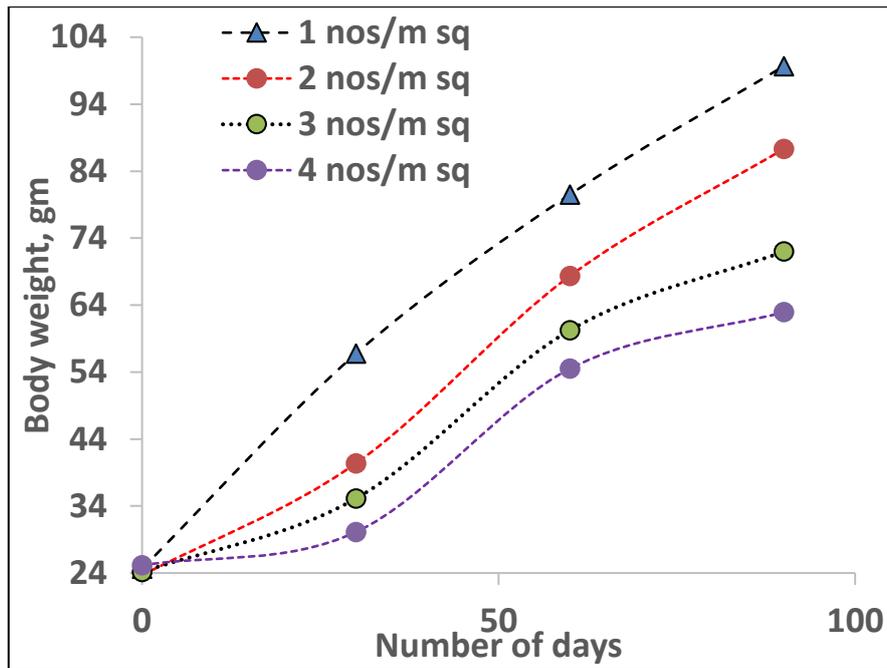
maintained in the institute ponds for production of potential breeding stock.

- Spawn was collected from the Gaighat of river Ganga
- Spawn was stocked in the circular tank, to assess the growth pattern for 150 days
- Pelleted Feed was provided in the morning and evening.
- Studies related to their weight gain under different stocking densities, maturity, breeding behavior under different conditions are going on

#### Standardization techniques of minor carps:

- Broodstock development of *C. reba* has been completed
- Body weight gain, specific growth, and FCR were best when raised in the 1 no/m sq. followed by 2 no/m sq.
- Average body weight and length of matured females were 104.40 g and 19.52 cm, whereas for male 60.89 g and 17.89 cm, respectively.
- Fingerling rearing of the *L. calbasu* was attempted.
- Final body weight at 1, 2, 3, & 4 m<sup>2</sup> were 99.67, 87.32, 72.00, and 62.94 g, respectively after 90day
- Specific growth rate was best at 1 number per square meter, and it was decreasing with the increasing stocking densities





#### Nutritional quality of freshwater mussel, *Lamellidens marginalis*:

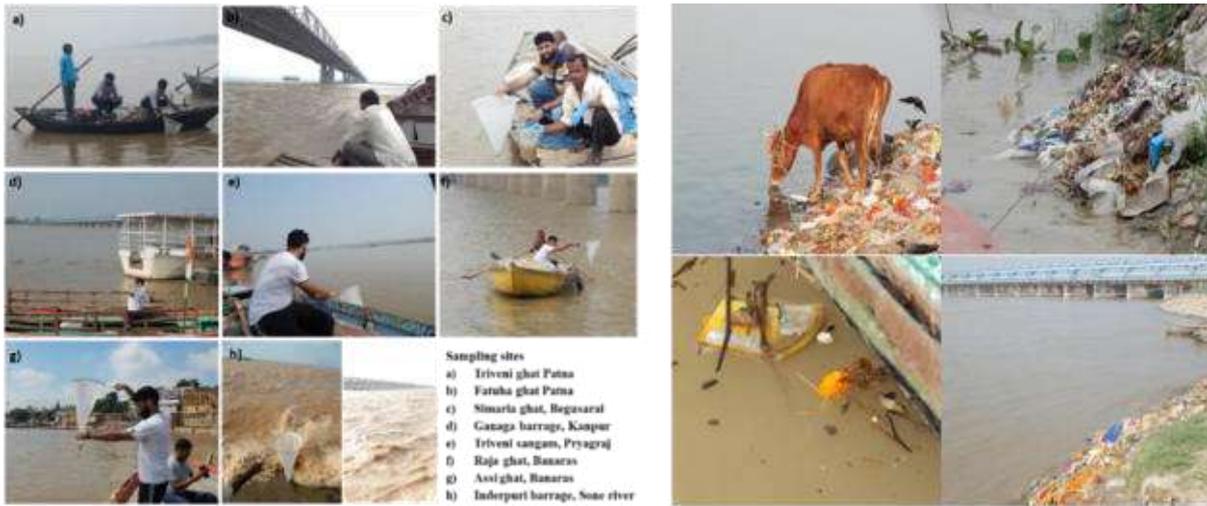
- Length-frequency distribution of mussel was represented by a single cohort with a sample size varied from 23 mm to 103 mm.
- The dominant size of mussel was found to be within 60-65 mm (22.6%), followed by 40-45 mm size group (13.5%) & 58-78 gm group
- List of fatty acid composition of the flesh of *L. marginalis* identified using Gas Chromatographic analysis



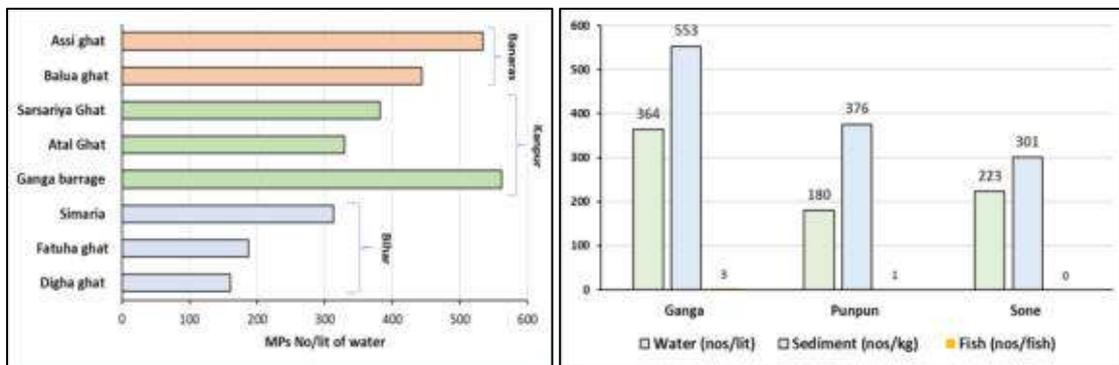
#### New Initiatives in Research:

##### *Spatio-temporal distribution of microplastics in different rivers (Ganga, Punpun & Sone) of Eastern region:*

- The sediment samples collected from the Ganga River exhibited high concentrations of microplastics, with an average of 553 particles/ km
- In comparison, the Punpun and Sone rivers recorded 376 and 301 particles per kilogram, respectively.

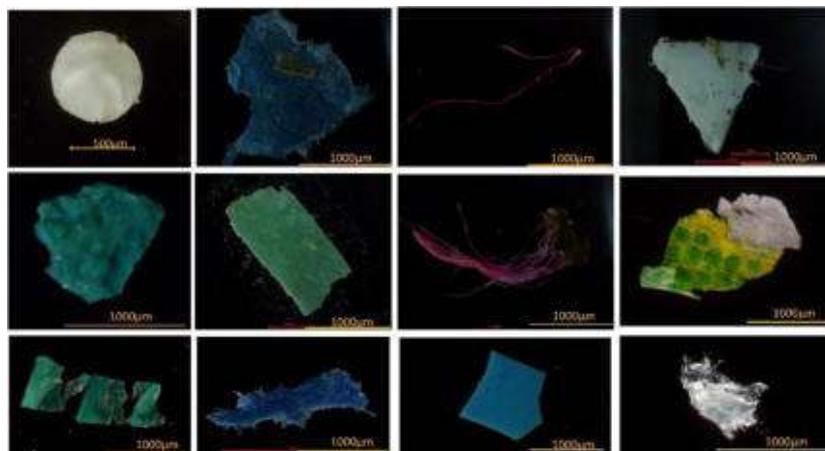


**Spatio-temporal distribution of microplastics in different rivers (Ganga, Punpun & Sone) of Eastern region:**



**Water samples**

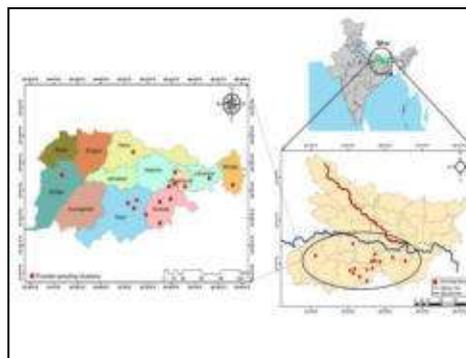
- Ganga river 364 MP/ L
- Sone and Punpun Rivers had concentrations of 223 and 180MP/L
- Most of the microplastics were classified as films, pellets, beads, and fibres



**Fluoride concentration in different districts of Bihar:**

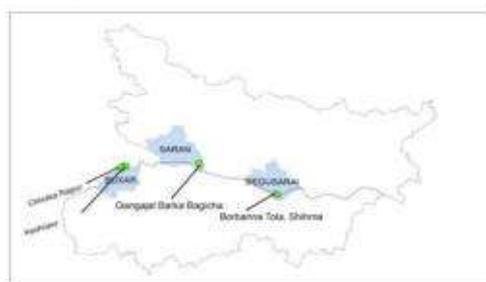
Preliminary results indicated that fluoride concentration in water samples from many places were beyond the permissible limit

	Place	Sample collected	Estimated fluoride (ppm)	Normal Fluoride
Water	Udaipur	Hand pump	2.31	Maximum permissible limit 1.5 ppm (WHO 2006)
	Hardia	Hand pump	2.72	
	Fulma	Hand pump	0.91	
	Patna	Normal Tap water	0.2	
Serum	Udaipur	Cattle	0.393	Normal serum conc. = 0.04 - 0.05 ppm
		Goat	0.074	
		Fish (bone)	9.9 ppm	
	Hardia	Cattle	0.21	Normal fish bone = 1.35 - 2.55 ppm
		Goat	0.09	
	Kashichak (Non contaminated area)	Cattle	0.23	
		Goat	0.11	



### Ganga diara sites

### Condition Gandak diara sites during monsoon



### Training programme (Total 6 nos)

Sl. No.	Name of the program organized	Sponsoring agency	District	Period		Participant nos
				From	To	
1.	Recent Advances in Integrated fish farming	Department of fisheries, Govern of Bihar	Saran	24/07/23	28/07/23	30

2.	Recent Advances in Integrated fish farming	Department of fisheries, Govern of Bihar	Lakhisarai	08/05/23	12/05/23	30
3.	Recent Advances in Integrated fish farming	Department of fisheries, Govern of Bihar	Darbhanga	21/08/23	25/08/23	30
4.	Recent Advances in Integrated fish farming	Department of fisheries, Govern of Bihar	Bhagalpur	25/09/23	29/09/23	30
5.	Management of Goat ( SC farmers)	Institute	ICAR RCER, Patna	4/10/23	06/10/23	28
6.	Diversified farming for Enhanced food and income security	SCSP fund of institute	KVK, Bettiah district	06/03/24	08/03/24	30

***Glimpse of Training programme (Total 6 nos)***





**Animal Health Camp organized (12 Nos.):**



Detail of animal vaccination from different places

Date	Place	No. of animals treated/ vaccinated
14.02.2023	E. Champaran	432
14.03.2023	E. Champaran	455
07.06.2023	E. Champaran	280
16.06.2023	Jamui	454
22.06.2023	Araria	1046
23.06.2023	Katihar	1334
14.07.2023	Samastipur	426
23.08.2023	Jamui	841
06.12.2023	Katihar	788
07.12.2023	Araria	699
28.12.2023	Jamui	331
06.03.2024	Dhaikaich, Buxar	224
<b>Total</b>		<b>7310</b>



### Awareness cum field day programme:

- Under SCSP component of Network Project on Buffalo Improvement, an Awareness Programme conducted for 75 farmers of Dhipuji Jan Pam, Kamrup (M), Guwahati on 27th February '24.
- Under PRAYAS, awareness programme on “Integrated Farming System For Livelihood Improvement” was conducted on 12th March '24 at Rewa Maheswar, Kamrup (M), Assam under TSP programme. 65 farmers participated.
- One day awareness programme under TSP was conducted for 50 tribal farmers of West Champaran district on “Enhancing the prosperity of tribal farmers through animal and fisheries based farming system” on 15 March



### Detail of Publications

SN	Type		
1	Research Publication ( 16 nos)	<6	2
		6-8	11
		>8	3
2	Paper presented in conference/ Abstracts		4
3	Conference attended		7
4	Popular Article ( Indian Farming 2)		9
5	Training Manual/ Technical Bulletin/Extension folder/ leaf let		3
6	Book/Book chapter/E Publication		6
7	Gene Accession no registered by NCBI		9
8	Award and recognition		4
9	Technology accepted		2

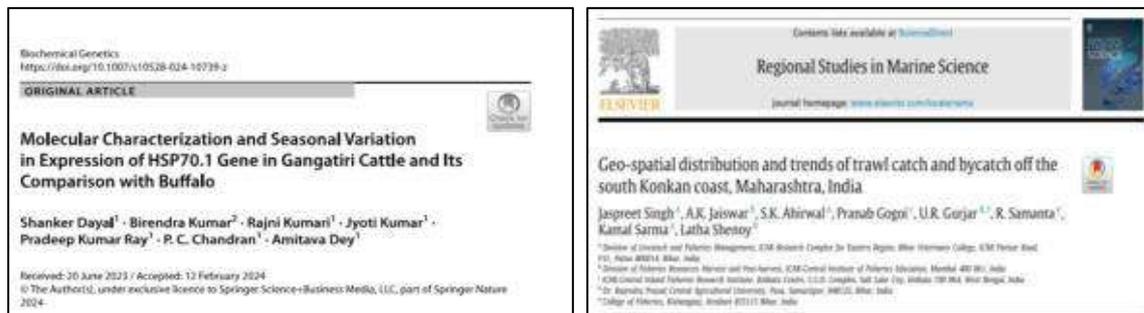
**Technologies developed / Publications:**

**ICAR Approved technologies:**

1. Development of Multiplex PCR for simultaneous detection of haemoparasites in bovine blood.
2. Identification of CCL8 and CXCL10 as early pregnancy biomarker in buffaloes



**Publications:**

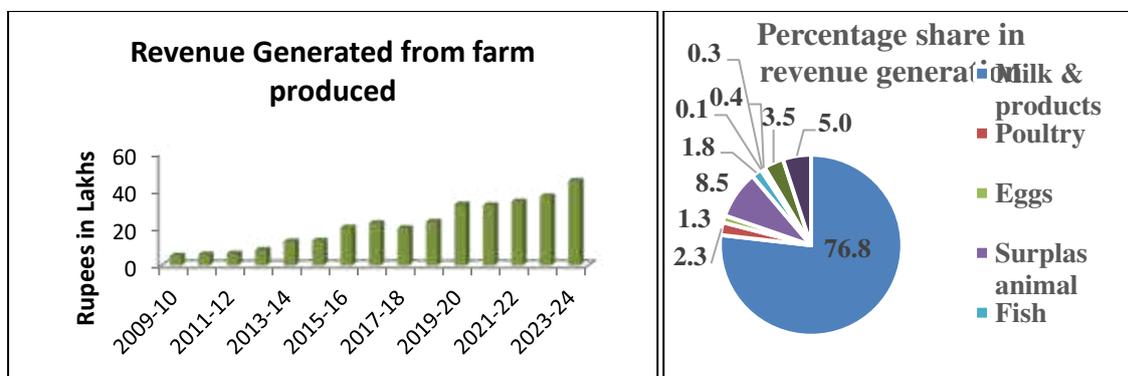




**Award and recognitions:**

- Dr. S. P. Singh best paper award for research paper – Dr Shanker Dayal
- Best oral presentation Award – Dr Rajni Kumari
- Dr. Vivekanand Bharti received Best PhD Thesis Award from Kalash Research and Welfare Society

**Revenue Generation:**



Deferent heads for revenue generation

Milk and milk products	Rs. 34.88 lakhs
Surplus animals	Rs. 3.87 lakhs
Internship	Rs. 1.60 lakh
Training	Rs. 2.27 lakh
<b>Total</b>	<b>Rs 45.41 lakhs</b>

## Chapter: 8

### Orientation towards FSRCHPR Research Activities

Dr. Arun Kumar Singh

Head, FSRC for Hill and Plateau Region, Ranchi

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#### Stepping stone of the Centre:

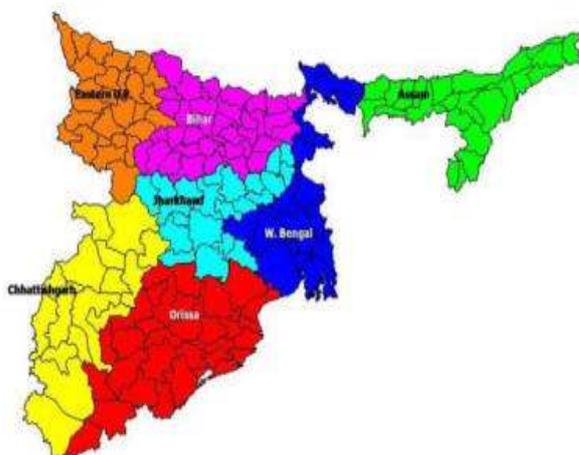
- Established during 1979 as a Regional Station of IIHR under the Tribal Sub-Plan.
- Merged with ICAR-Research Complex for Eastern Region, Patna in April 2001
- It is a premier Centre for farming system research in Eastern plateau and hill agro-climatic zone

#### Major Challenges:

- Rainfed monocropping (Rice-Fallow)
- Low productivity: 1.6-2.3 t/ha (Rice)
- Small scattered land holdings
- Low cropping intensity: 114.0-132%
- Acidic soils: pH 4.5 - 5.5

#### Mandate:

- Integrated farming system models for rainfed ecosystem
- Water productivity in agriculture production system
- Horticulture and agro-forestry based production systems
- Quality seed and planting material of fruits and vegetables



- States: Eastern UP, Bihar, Jharkhand, WB, Assam, Orissa and Chhattisgarh
- Geographical area covered: 22.5% of India
- Population of the region: 35% of India

*Training manual for newly recruited technical and administrative personnel*

**Our Strength –Manpower and Farms:**

Scientist: 15 Technical: 11, Administrative: 4 and Skilled Supporting: 28

S. No	Discipline	Number of scientists
1	Horticulture (Fruit Science)	1
2	Horticulture (Vegetable Science)	4
3	Plant Breeding and Genetics	1
4	Soil Science	2
5	Plant Pathology	1
6	Agricultural Entomology	1
7	Soil and Water Conservation Engineering	1
8	Agriculture Extension	1
9	Livestock Production and Management	1
10	Food Technology	1
11	Agroforestry	1
	<b>Total</b>	<b>15</b>

**Our Farms:**

**Farm-I**  
164.10 acre



**Farm-II**  
236.54 acre



**Residential Complex**  
7.43 acre



**Livestock Unit**  
18.73 acre

**Total Land 426.8 acre**

**On-going Research Projects:****Funding agency wise projects**

Sponsoring agency	No. of projects
<b>Institute projects</b>	<b>18</b>
Farmer FIRST Project	1
NAIF	2
RKVY	1
NHM	1
GT Bharat (Consultancy)	1
NABARD (Consultancy)	1
AICRP on Fruits	1
AICRP on Vegetable Crops	1
AICRP on Mushroom	1
AICRP on Agroforestry	1
<b>Total</b>	<b>29 (18+11)</b>

**Theme wise grouping of projects**

Theme areas	No. of projects
Genetic Resource Management and Crop Improvement	6
Integrated Farming System	2
Production Technologies	5
Land & Water Management	2
Protection Technologies	2
Livestock & Fisheries Management	2
Socio-Economics, Extension and Policy Research	4
AICRPs and Consultancy projects	6
<b>Total</b>	<b>29</b>

**Salient Achievements:****Release of Varieties/Hybrids:**

Vegetable Crop	OP	Hybrids	Fruit crop	Variety
Brinjal	7	4	Litchi	2
Tomato	4	6	Jackfruit	2
Chilli	4		Bael	1
Capsicum	1		<b>Total (Fruits)</b>	<b>5</b>
Bittergourd	1			
Bottlegourd	1			
Cucumber	3			
Sponge gourd	1			
Ridge gourd	3			
Garden pea + snow pea	4			
French bean	2			
Dolichos bean	2			
Cow pea	4			
Pointed gourd	3			
Vegetable soyabean	1			
Pumpkin	1			
Leaf Amaranth	1			
Lima bean	1			
Faba bean	1			
<b>Total (vegetables)</b>	<b>55</b>			



**SWARNA LALIMA**  
Resistant BW  
50-55t/ha



**SWARNA NAVEEN**  
Resistant BW  
60t/ha



**SWARNA ANMOL**  
For protected  
cultivation  
160-180t/ha  
Resistant BW



**SWARNA DEEPTI**  
BW and early blight  
100-105 t/ha



**SWARNA SHYAMLI**  
Resistant to BW  
50 -60 t/ha



**SWARNA SHAKTI**  
65-75 t/ha



**SWARNA SURUCHI**



**SWARNA PRABHA**



**SWARNA YAMINI**



**SWARNA SAWANI**

**Improved varieties at  
farmers' field:**



**Promising Vegetable Soybean Variety for Yield and Quality traits:**

Variety	Yield traits	Nutritional traits
Swarna Vasundhara	<ul style="list-style-type: none"> <li>• Maturity: 70-75 DAS</li> <li>• Green pod yield: 14-15t/ha</li> <li>• Green seed yield: 6-7 t/ha</li> </ul>	<ul style="list-style-type: none"> <li>• Protein (10.19%);</li> <li>• Total sugar (9.48%);</li> <li>• Vitamin C (24.55 mg/100g);</li> <li>• Oil (17.47%)</li> </ul>



Plant, pod and shelled seed of vegetable soybean variety Swarna Vasundhara



Plant, pod and shelled seed of promising vegetable soybean line AGS-458

**Vegetable soybean – Processed products and outreach:**



Products developed from Veg Soybean

**Protected cultivation of tomato:**

- **Tomato varieties:**
  - **Swarna Kanchan:**
    - Yield : 50-55t/ha
    - TSS : 4.0-4.5 °brix
    - Acidity : 0.30-0.35 %
  - **Swarna Anmol**
    - Yield : 160-180 t/ha
    - TSS : 4.5-5.0 °brix
    - Acidity : 0.30-0.35 %
- **Economics (1 acre):**
  - Cost of infrastructure: Rs 37.4 lakh
  - Repairing cost after 4 years: Rs 11.2 lakh
  - Cost of cultivation: Rs 1.79 lakh/year
  - Net profit: Rs 7.25 lakh/year



**Potential underutilized leafy vegetables of Jharkhand:**

**Fresh Leafy vegetables**



Amaranthus sp.  
(Gandhari)



Ipomea aquatica  
(Kalmi)



Basella alba  
(Poi)



Chenopodium album  
(Bathua)

**Dried leafy vegetables**



Cassia tora  
(Chakor)



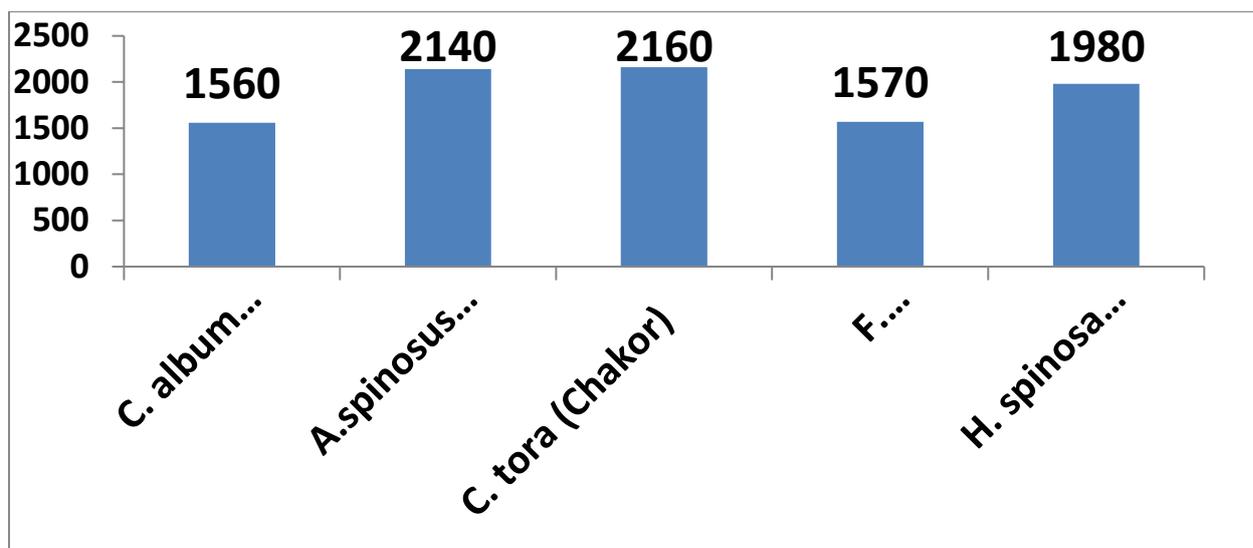
Antidesma diandrum



Ipomea batata  
(Kanda)



Vangueria spinosa  
(Katai/sarla)

**Antioxidant Activity (mg/100g) of some underutilized leafy vegetables:**

Cassia tora (Chakor) showed the highest antioxidant activity followed by Amaranthus spinosus (Kantili gandhari) and Hygrophylla spinosa (Muchari).

**Evaluation of potential wild tuber crops:**

232 germplasm of tuber/wild edible crops [Dioscorea spp. (62), Ipomoea batatas (10), Maranta arundinacea (1), Colocasia spp. (81), Amorphophallus spp. (48), Alocasia spp. (18), Manihot spp. (7) and Cucumis melo var agrestis (5)] conserved in the field gene bank.

**Process development for production of dried products from selected fruits and vegetables:**

- Drying of Mushroom, Tomato, Jackfruit (Unripe) and drumstick
- Dried mushroom instant soup mix



**Dried tomato slices and powder**



**Dried mushroom slices, powder and soup mix**



**Drying of Drumstick**



**Drying of Jackfruit**

## Chapter:9

### STRESS MANAGEMENT

Dr. Ujjwal Kumar

P.S. & Head Division of Socio-Economics and Extension  
ICAR-RCER, Patna

#### STRESS:

- A state of psychological and physiological imbalance resulting from the disparity between situational demand and the individual's ability and motivation to meet those needs
- Stress is a feeling of emotional or physical tension. It can come from any event or thought that makes you feel frustrated, angry, or nervous.
- Stress is an automatic physical, mental and emotional response to a difficult event



Fig. No. 2.1 Major Cause of Stress

#### Types of stress:

##### **Good stress: Eustress**

Eustress is defined as a positive type of stress that enhances our functioning.

It is a healthy form of stress that gives us positive feelings and makes us feel good about ourselves.

Examples of Eustress:

- Thrill experienced while watching a horror movie.
- Accomplishing a challenge.

##### **Bad stress: Distress**

Distress is a negative form of stress- the one that we most commonly associate with stress.

It is defined as persistent stress that does not resolve itself despite our best efforts.

Examples of Distress:

- Death of a loved one.
- Loosing our job.
- Not getting into the college of our

- Joy experienced on a roller-coaster ride.

**Acute Distress**

It is the most common of the types of stress. It comes on quickly and is usually short-lived. It is the most intense stress.

Examples:

- Almost getting into a car/bike accident.
- Giving a speech in front of people.

choice.

**Chronic Distress**

It is the type of stress that arises out of long-lasting events and circumstances beyond your control.

It's only under the circumstances of chronic stress or extreme, severe stress that we suffer negative effects.

Examples:

- Living with a chronic illness.
- Job related stress such as working in a high-pressure job.
- Feeling trapped in a marriage or other relationship.

**Types of Stress:**

- Psychological stressors
- Organizational stress
- Societal stress



**STRESS MANAGEMENT:**

- Stress management is any technique developed to help someone to cope with or lessen physiological and emotional effect of everyday life pressure.
- Stress management is a wide spectrum of techniques and psychotherapies aimed at controlling a person's level of stress, especially chronic stress, usually for the purpose of improving everyday functioning.

**Assessment of stress:**

- Our stress response arises from complex interaction between our environment and our psychological state.
- Stress affects us in many ways cognitively, emotionally, and physically.
- Assessment of stress is therefore not a straightforward matter, and a number of varying approaches have been developed.
- These approaches may be grouped into three categories – environmental, psychological, and biological.



**Unhealthy ways of coping with stress:**

- Smoking
- Drinking too much
- Over eating or under eating

- Zoning out for hours in front of TV or computer
- Withdrawing from friends, family, and activities
- Using pills or drugs to relax
- Sleeping too much
- Procrastinating/delaying task
- Taking out your stress on others (lashing out, angry outbursts, physical violence)

**Dealing with Stressful Situations the Four A's:**

- Change the situation:
  - Avoid the stressor
  - Alter the stressor
- Change your reaction:
  - Adapt to the stressor
  - Accept the stressor



**Stress management strategy #1: Avoid unnecessary stress:**

- Learn how to say “no”
- Avoid people who stress you out
- Take control of your environment
- Avoid hot-button topics



**Stress management strategy #2: Alter the situation:**

- Express your feelings instead of bottling them up.
- Be willing to compromise.
- Be more assertive.
- Manage your time better.



**Stress management strategy #3: Adapt to the stressor:**

- Reframe problems
- Look at the big picture
- Adjust your standards
- Focus on the positive



**Stress management strategy #4: Accept the things you can't change:**

- Don't try to control the uncontrollable.
- Look for the upside.

- Share your feelings.
- Learn to forgive.

**Stress management strategy #5: Make time for fun and relaxation:**

- Go for a walk.
- Spend time in nature.
- Call a good friend.
- Sweat out tension with a good workout.
- Write in your journal.
- Take a long bath.
- Light scented candles.
- Savor a warm cup of coffee or tea.
- Play with a pet.
- Work in your garden.
- Get a massage.
- Curl up with a good book.
- Listen to music.
- Watch a comedy.



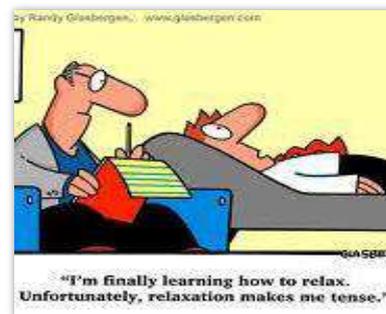
**Stress management strategy #6: Adopt a healthy lifestyle:**

- Exercise regularly
- Eat a healthy diet
- Reduce caffeine and sugar.
- Avoid alcohol, cigarettes, and drugs.
- Get enough sleep.



**STRESS MANAGEMNT:**

- Open Up to People and Express Your Feelings
- Try to Get Some Regular Exercise Every Day
- Give Yourself a Break to Relax and Recharge
- List Some Solutions and Come Up With a Plan
- Accept Those Things Beyond Your Control



**STRESS MANAGEMNT:**

- Set Reasonable Expectations in Your Daily Life
- Focusing on distributed study over time, adopting effective study methods, and maintaining strict preparation can help alleviate stress and improve academic performance.
- Seek support from family, friends and professionals.

**Conclusion:**

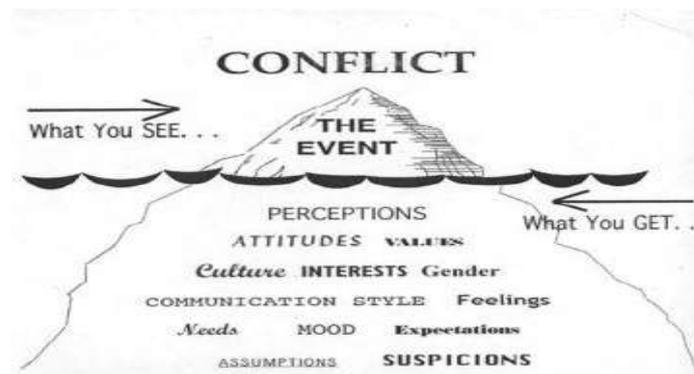
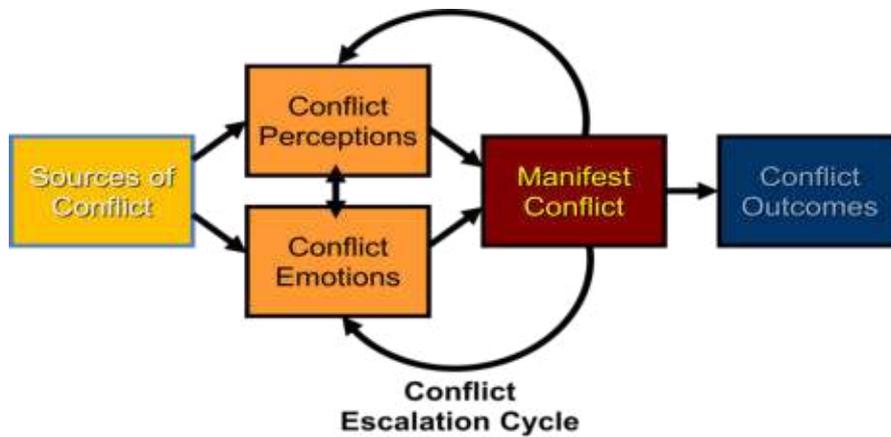
“Stress is not what happens to us. It's our response to what happens And response is something we can choose.” Maureen Killoran.

**CONFLICT:**

A process that begins when one party perceives that another party has negatively affected, or is about to negatively affect, something that the first party cares about.



**The Conflict Process:**



**Is Conflict Good or Bad?: 1970s-1990s View:**

1970s to 1990s – belief in an optimal level of conflict

*Some level of conflict is good because:*

- Energizes debate
- Reexamine assumptions
- Improves responsiveness to external environment
- Increases team cohesion

### Is Conflict Good or Bad?: Emerging View:

- Goal: encourage constructive conflict, minimize relationship conflict
- Problem: difficult to separate constructive from relationship conflict
- Drive to defend activated when ideas are critiqued

### Minimizing Relationship Conflict:

Three conditions that minimize relationship conflict while engaging in constructive conflict

- Emotional intelligence
- Cohesive team
- Supportive team norms



### Conflict is destructive when it:

- Takes attention away from other important activities
- Undermines morale or self-concept
- Polarizes people and groups, reducing cooperation
- Increases or sharpens difference
- Leads to irresponsible and harmful behavior, such as fighting, name-calling

### Positive views of conflict:

#### Conflict and Productivity

*Performance improves when conflict is more frequent.*

- When members with different interests exist, higher-quality solutions are more likely.

#### Conflict and Group Diversity

- Heterogeneity also increases productivity.
- Studies have shown that when groups are less compatible, they are more productive, therefore conflict produces strengths rather than weaknesses.



### Positive views of conflict:

#### Encouraging Conflict

- Creating functional conflict is a tough job.
- How do you create functional Conflict???
- Reward dissent and punish conflict avoiders.

## **Functional Vs Dysfunctional Conflict:**

### ***Functional:***

- Conflict leads to an improvement in the group's performance.
- Can improve the quality of decisions
- Constructive
- Stimulates creativity and innovation.
- Encourages interest and curiosity.
- Tensions can be released
- Conflict challenges the status quo

### ***Dysfunctional:***

- Conflict hinders the group's performance.
- There are reductions in the group cohesiveness.
- Subordination of group goals.
- At an extreme, it can bring group functioning to a halt

## **Conflict Indicators:**

- Body language
- Disagreements, regardless of issue
- Withholding bad news
- Surprises
- Strong public statements
- Airing disagreements through media
- Conflicts in value system
- Desire for power
- Increasing lack of respect
- Open disagreement
- Lack of openness on budget problems or other sensitive issues
- Lack of clear goals
- No discussion of progress, failure relative to goals, failure to evaluate the superintendent fairly, thoroughly or at all.

## **Five basic Conflict Management Styles / Approaches:**

- Assertiveness = Degree to which one tries to meet their own needs in conflict
- Cooperation = Degree to which one tries to help the other party meet their needs



**Five Interactive Approaches to conflict:**

- High Assertiveness/High Cooperativeness-Intention: a Collaborative Interaction(Win-Win)
- High Assertiveness/Low Cooperativeness-Intention: a Competitive Interaction(Win-Lose)
- Low Assertiveness/High Cooperativeness-Intention: a Accommodating Interaction
- Low Assertiveness/Low Cooperativeness-Intention: a Avoiding Interaction
- Mild Assertiveness/Mild Cooperativeness-Intention: a Compromising Interaction

**Summary of conflict resolution style**

	<b>STYLE</b>	<b>ME</b>	<b>You</b>
1	AVOIDANCE	0	0
2	SUBMISSION	0	100
3	COMPROMISE	50	50
4	FIGHT/AGGRESSIVE	100	0
5	COLLABORATION	100	100

Table No. 2.3 Styles of Conflict Management

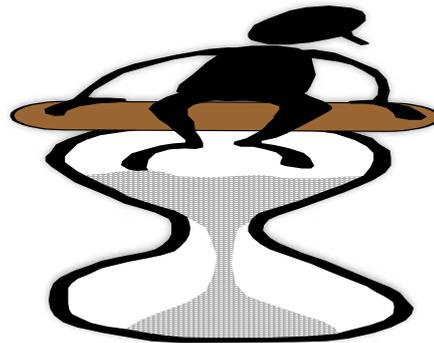
<b>Approach</b>	<b>Objective</b>	<b>Your Posture</b>	<b>Supporting Rationale</b>	<b>Likely Outcome</b>
Forcing	Get your way.	“I know what’s right. Don’t question my judgment or authority.”	It is better to risk causing a few hard feelings than to abandon a position you are committed to	You feel vindicated, but other party feels defeated and possibly humiliated.
Avoiding	Avoid having to deal with conflict	“I’m neutral on that issue. Let me think about it.”	Disagreements are inherently bad because they create tension.	Interpersonal problems don’t get resolved, causing long-term frustration manifested in a variety of ways.
Accommodating	Don’t upset the other person.	“How can I help you feel good about this encounter? My position isn’t so important that it is worth risking bad feelings between us.”	Maintaining harmonious relationships should be our top priority.	Other person is likely to take advantage of you.
<b>Approach</b>	<b>Objective</b>	<b>Your Posture</b>	<b>Supporting Rationale</b>	<b>Likely Outcome</b>
Compromising	Reach an	“Let’s search for	Prolonged	Participants

	agreement quickly.	a mutually agreeable solution”	conflicts distract people from their work and engender bitter feelings	become conditioned to seek an expedient, rather than effective solution
Collaborating	Solve the problem together	“This is my position. What is yours? I’m committed to finding the best possible solution”	The positions of both parties are equally important (though not necessarily equally valid). Equality emphasis should be placed on the quality of the outcome and the fairness of the decision-making	Participants find an effective solution.

**Conflict Resolution:**

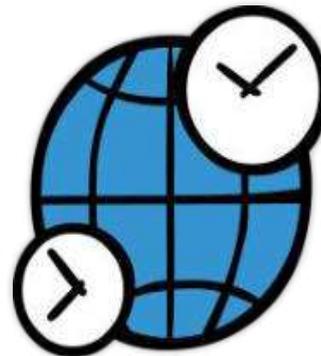
- Mediate – diffusion/confrontation
- Arbitrate – judgment
- Control – cool down period
- Accept – unmanageable
- Eliminate – transfer

*Conflict is often evidence of progress!*



**Steps to managing your time well:**

- Prioritize tasks
- Get Organized
- Overcome procrastination
- Let go of perfectionism
- Manage disruptions
- Avoid taking on too much



**Pareto’s Principle (80/20 Rule):**

- 80% of Work gives 20% Results & 20% of Work gives 80% Results
- One Rs.500/- v/s Hundred Rs.5/-
- Effective v/s Efficient
- Smart work v/s Hard work

**ABCs to Prioritizing:**

- Write to-do list
- Review list: Break large tasks into smaller tasks
- Prioritize by ABCs
- Delegate those tasks more appropriate for someone else
- Schedule your day (week). Assign a deadline for each task.
- Consider your daily cycle (most demanding tasks when you are most focused/ energized)

#### **A Priorities:**

- Urgent AND important
- Support a long term goal
- Support others you work with
- Ask: What terrible thing would happen if I didn't do this today?
- Only top priorities get A category

#### **B Priorities:**

- Important but not urgent
- Mild consequences for not doing this (e.g. some may be unhappy or inconvenienced)
- Time (waiting period) usually elevates to A or drops to C
- Never do a B task when there is an A task the needs to be finished

#### **C Priorities:**

- Not important or urgent
- Sometimes are not important but are urgent
- No consequences for not doing this
- Nice to do

Table No. 2.4 Prioritization Grid

	<b>URGENT</b>	<b>NOT URGENT</b>
<b>Important</b>	<b>A</b> Deadline Presentation tomorrow Scheduled at work Pick child up at daycare	<b>B</b> Paper due next month Planning Some calls or requests Rejuvenation time
<b>Not important</b>	<b>C</b> Interruptions Disruptions Some calls Friend asks favor	<b>C</b> Trivia Busy work Time wasters Gaming, Facebook

#### **Organizing: schedules:**

- Get the big picture ( work cycle, vacations)

- Know your schedule (weekly calendar)
- Determine how much time it takes to complete various tasks (double your estimates)
- Plan a balanced schedule (fixed and flexible tasks)
- Identify odd hours and small bits of time – plan how you can use them
- Schedule time for prioritizing
- Schedule breaks and time for rejuvenation
- Enter all this somewhere (paper, outlook, phone app)

**Procrastination busting tips:**

- Create the Right Environment
- Set Up the Task
- Post Your Deadlines
- Do the Fun Stuff First
- Start Somewhere, Start Anywhere
- Beware of Multitasking
- Know That You Can't Do Everything Perfectly

**Perfectionism:**

- Be aware of your tendencies
- Take an honest look at how you spend your time
- Analyze & reframe your self-talk
- Focus on the big picture
- Ask “what’s really needed in this situation?”
- Is perfection necessary or even better?



**Perfectionism:**

- Maintain high but attainable standards
- Be realistic about what you can accomplish
- Seek help when needed
- Don’t throw work away – replant it

**Managing disruptions:**

- Disruptions are often urgent (at least in the mind of the person presenting them) but not important
- Identify recurring interruptions and distractions;
- Learn to say no: Be polite but assertive
- Other tips: Establish available/not available hours, turn off IM Chat; use Outlook to identify uninterrupted time
- Set limits with necessary interruptions
- e.g. I have five minutes, I can do this tomorrow

**Avoid taking on too much:**

- Learn to set limits and say no thank you
- Learn to delegate, share work, and let others help

**Final tips:**

- Use small bits of time, odd hours, waiting time
- Handle paper (email, etc.) only once
- Use automatic systems when possible
- Get enough rest, eat well, exercise
- Ask for advice when needed



**Make a plan today!**

- Managing your time increases your success
- In office, at work, in life
- Managing your time well reduces stress
- Managing your time well enhances work-life balance

**PANCH AMRUT:**

- Step 1 – Define your Role
- Step 2 – Set your Monthly Goal
- Step 3 – Schedule your Weekly Time
- Step 4 – Adopt it Daily - 80/20
- Step 5 – Act on it, now!

## Chapter: 10

# Improving Communication Skills and Personality Development

Dr. Dhiraj Kumar Singh Sr. Scientist (Agricultural Extension)

DSEE, ICAR- RCER, Patna

### Communication: Meaning & Concepts

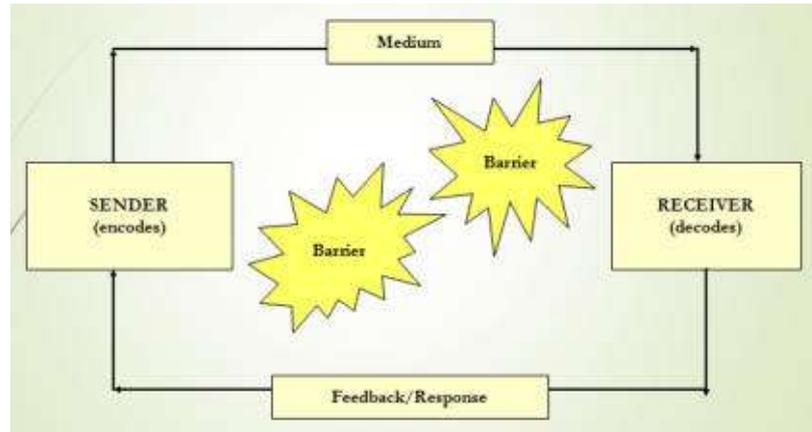
- Originated from Latin word “Communis” meaning Common. “Communication maintains and animates life. It creates a common pool of ideas, strengthens feeling of togetherness through exchange of messages and translates thought into action.” (UNESCO).
- **Meaning:** Communication is a “process of transmitting ideas, information, attitudes (images which we have formulated for ourselves) by the use of symbols, words, pictures, figures from the source (who is the originator of the message) to a receiver, for the purpose of influencing with intent”.
- **Definition by Leagans (1961):** It is a process by which two or more people exchange ideas, facts, feelings, impressions, in ways that each gains a clear understanding of the meaning, intent and use of the message.

### Why Communication is required?

- **PHYSICAL NEEDS:** Help us to voice our physical pains, needs, and requirements. Even babies cry when need food. People with good interpersonal comm. skills are better able to adapt to stress and have fewer depression and anxiety issues. (Hargie, 2011).
- **IDENTITY NEEDS:** include our need to be acknowledged and appreciated by other people. competent communicators can successfully manage how others perceive them by adapting to situations and contexts.
- **SOCIAL NEEDS:** communication helps us maintain relationships. Social needs include needs that help us maintain social bonds and interpersonal relationships.
- **PRACTICAL NEEDS:** It includes needs that help us get things done in our day-to-day lives and achieve short- and long-term goals. Some common practical needs include influencing others, getting the information we need, or getting support (Burluson, Metts, & Kirch, 2000).



### The Process of Communication



Process of Communication

### Organizational Communication

- Communication is an important part of the organization as it can impact its progress and overall success. Concerning organization, and communication includes various levels of interactions.
- Organizational Communication refers to the comm. that takes place between people who are working together towards the achievement of common goals within an organization. It consists of the interactions that take place for the purpose of working together towards these goals or conducting business in general.

#### Contribution of Communication for Effective Managers

- Routine Commn.: 44%
- Human Resource Management: 26%
- Traditional Management: 19%
- Networking: 11%



Structure of Organizational Communication

### Types of Organizational Communication

#### *Downwards Communication:*

Highly Directive, from Senior to subordinates, to assign duties, give instructions, inform to offer feedback, approval to highlight problems, etc.



Types of Organizational Communication)

- *Upwards Communications:* It is nondirective in nature from down below, to give feedback, to inform about progress /problems, seeking approvals.

- **Lateral or Horizontal Communication:** Among colleagues, peers at same level for information level for information sharing for coordination, to save time.

**Barriers to communication**

- Noise
- Inappropriate medium
- Assumptions/Misconceptions
- Emotions
- Language differences
- Poor listening skills
- Distractions



Type of barriers in communication

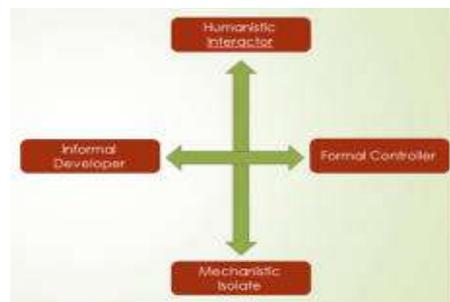
**Hearing and Listening: Importance**

- Listening to others is an elegant art.
- Good listening reflects courtesy and good manners.
- Listening carefully to the instructions of superiors improves competence and performance.
- The result of poor listening skills could be disastrous in business, employment, and social relations.
- Good listening can eliminate several imaginary grievances of employees.
- Good listening skills can improve social relations and conversation.
- Listening is a positive activity rather than a passive or negative activity.



Importance of hearing and listening

**Major Communication Skills and Managerial Communication Model**

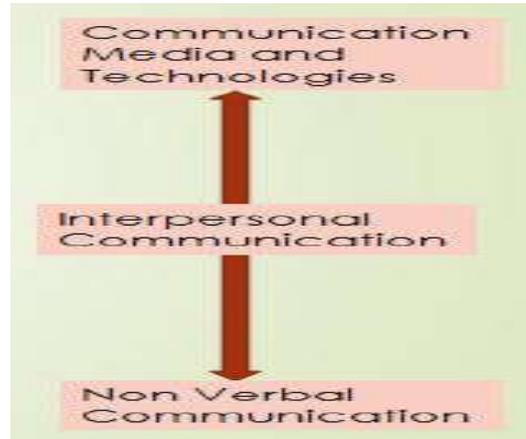


## Continuum of Communication in Organization

### Communication Media and Technologies

Employees use several ICT based tools and media to communicate with others:

- Telephone
- Email
- Voice Mail
- SMSs
- Mobile phones
- Online Meetings for VCs (Zoom, CISCO)
- MIS (e-HRMS)



Technique of communication

### Interpersonal Communication

**Oral communication:** Speedy

Feedback

More effective

**Written Communication:** Tangible

Verifiable

Documented for future use

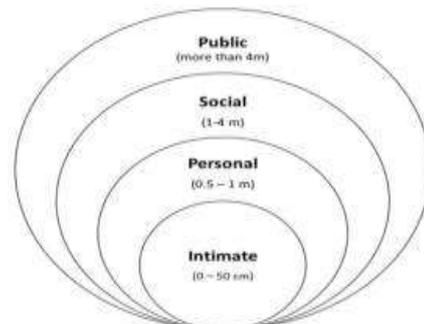
Time consuming and lack feedback

### Non Verbal Communication

- Supports other communication and provide observable expression of emotions and feelings
- Misinterpretation of body language may influence receivers message.

### Non-Verbal Communication

- Sometimes called as “Silent language”. Defined as Non word Human response (gestures, facial expression) and perceived characteristics of environment through which human verbal and non verbal messages are transmitted.
- **Body Language:** Gesture, Posture, Facial expression, Clothing, Physical attractiveness



- *Para Language:* Voice quality, tone, volume, speech rate, Pitch, Nonfluencies (ah, um, uh), laughing, Yawning
- Timing (Early/late comers)
- Spacing (Proxemics) (Intimate -1.5 ft, Personal: 1.5-4 ft,
- Social Space- 4-12 ft, Public space: > 12 ft

### Personality Development

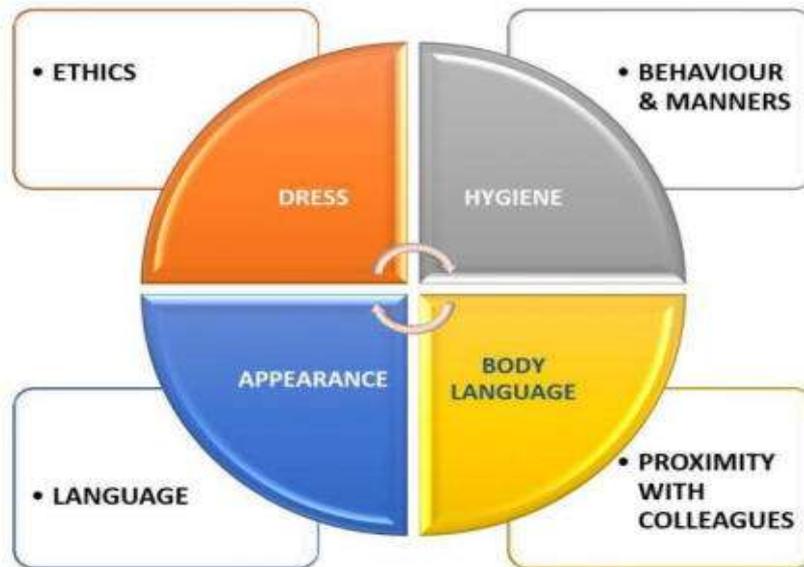
- Origin from Latin word “Persona” means mask used by actors to change their appearance.
- The Personality of a person is a set of all traits or qualities that make him/her distinct from others. It consists of dress, manners, speech, knowledge, intelligence, habits, attitude, aptitude, etc.
- Personality development involves enhancing traits to build the best possible image. It's a continuous process focused on refining good traits and eliminating bad ones to become the best version of oneself.



Type of personality

## Office Etiquettes

- Etiquette is defined as the formal manners and rules that are followed in social or professional settings. One definition of the French word etiquette is "ticket" or "label attached to something for identification."
- In every office, there are rules both written and unwritten that serve as the guidelines for employee behaviour. Collectively, this code of customary behaviour is known as office etiquette.



Etiquette of society

### Do's of office etiquette:

- Reach the office on time
- Discipline must be maintained at the workplace.
- Reply to colleague's messages promptly
- Be mindful of the body language
- Be a team player
- When sick, stay at home
- Show attentiveness in meetings
- Keep smiling
- Praise fellow workers for good work
- Treat others fairly
- Give fellow office workers space and privacy to work
- Be mindful of smells, eat your lunch and snacks away from your desk
- Keep your workstation clean and tidy
- Keep office attire professional
- Pay attention to personal hygiene

### **Don'ts of office etiquette**

- Avoid taking personal calls at your desk
- Don't interrupt colleagues when they are speaking.
- Don't be late to work
- Avoid gossiping about others
- Refrain from getting too personal with others at work
- Avoid cursing in the workplace
- Avoid overdoing the perfume or aftershave
- Never adopt a casual attitude at work
- Don't peep into other's cubicles and workstations
- Never ever drink alcohol and smoke while at work
- Avoid being the first one out the door at the end of the day
- Seek Permission Avoid Policies
- Stay away from nasty politics at the workplace
- Never criticize or make fun of any of colleagues
- Never attend meetings or seminars without a notepad and pen
- In Group lunch, do not start till the others have received their food

## Chapter: 11

### The Importance of Teamwork in Work Efficiency

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#### Introduction

Teamwork is often regarded as the cornerstone of success in modern organizations, playing a pivotal role in enhancing work efficiency and fostering a collaborative work environment. According to a report by the Harvard Business Review (2019), 'The Impact of Effective Team Collaboration on Productivity.', effective teamwork can reduce work time by up to 45%, significantly enhancing productivity and reducing operational costs. Additionally, a McKinsey study (2020). 'Collaborative Workplaces: The Key to High Performance.' found that organizations emphasizing collaboration were five times more likely to achieve high performance and innovation. Studies, such as those by Kozlowski & Ilgen (2006) and Mathieu et al. (2017) highlighted the critical impact of teamwork on organizational outcomes, emphasizing its role in complex problem-solving and innovation.

In an era where challenges are increasingly complex and demand multifaceted solutions, effective teamwork has emerged as a vital mechanism to harness the collective skills, experiences, and perspectives of individuals. Empirical research supports these claims, such as the study by Katzenbach & Smith (1993) emphasizes how teamwork fosters commitment and enhances results, and a meta-analysis by DeChurch, & Mesmer-Magnus (2010) which demonstrates how teamwork positively influences team performance and goal achievement. This chapter delves into the significance of teamwork, exploring its impact on productivity, innovation, decision-making, and organizational culture.

Established models such as Tuckman's stages of group development, which describe the phases of forming, storming, norming, performing, and adjourning, and Lencioni's model of team dysfunctions, which identifies five key dysfunctions that hinder team performance, provide a valuable theoretical foundation for understanding how teams evolve and overcome challenges.

## The Concept of Teamwork

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Teamwork involves a group of individuals working together towards a common goal, leveraging each member's strengths to achieve objectives that would be difficult or impossible for an individual to accomplish alone. It requires clear communication, mutual trust, shared responsibilities, and a commitment to the team's purpose.

### Elements of Effective Teamwork

1. **Clear Objectives:** Teams must have well-defined goals that align with the organization's mission. When team members understand what they are working towards, they can prioritize tasks effectively.
2. **Complementary Skills:** A diverse team with varying skills and expertise enhances the problem-solving process and encourages creativity.
3. **Open Communication:** Transparent and respectful communication ensures that ideas are exchanged freely and conflicts are addressed constructively.
4. **Mutual Accountability:** Each member should take responsibility for their tasks while also being accountable to the team as a whole.
5. **Trust and Respect:** Building trust and respect among team members fosters a supportive environment where individuals feel valued and motivated.
6. **Effective Leadership:** A good leader inspires, guides, and supports the team, ensuring that everyone stays on track.

### The Role of Teamwork in Enhancing Work Efficiency

#### 1. Improved Productivity

Teamwork allows tasks to be divided according to individual expertise, leading to faster completion of work. By collaborating, teams can share the workload, reduce redundancy, and ensure that tasks are handled by those best equipped to manage them. This division of labor enhances overall productivity and ensures that projects are completed on time.

#### 2. Enhanced Problem-Solving and Innovation

When people with different perspectives and skills come together, they bring unique ideas and approaches to the table. This diversity encourages creative thinking and innovation. Brainstorming sessions in a collaborative setting often result in innovative solutions that may not have been conceived by an individual working in isolation.

#### 3. Better Decision-Making

Teams that encourage open dialogue and debate are more likely to make well-informed decisions. By considering multiple viewpoints, teams can analyze situations from different angles, leading to more robust and effective solutions. This collective decision-making process reduces the likelihood of errors and increases the quality of outcomes.

#### **4. Greater Flexibility and Adaptability**

Teams are often better equipped to handle change and uncertainty. In dynamic environments, collaborative teams can quickly adapt to new circumstances by pooling their knowledge and resources. This flexibility ensures that organizations remain resilient in the face of challenges.

#### **5. Increased Employee Morale and Engagement**

Working in teams can boost employee morale and job satisfaction. A supportive team environment provides individuals with a sense of belonging, reducing stress and increasing engagement. When employees feel valued and supported by their peers, they are more likely to stay committed to their work.

#### **6. Knowledge Sharing and Skill Development**

Teamwork facilitates knowledge transfer, as individuals learn from each other through collaboration. This continuous exchange of information helps team members develop new skills and enhances their professional growth. Over time, this shared learning improves the overall competence of the workforce.

### **Challenges in Teamwork**

Despite its numerous benefits, teamwork is not without its challenges. Understanding and addressing these challenges is crucial for building effective teams.

#### **1. Conflict and Miscommunication**

Conflicts can arise due to differences in opinions, work styles, or personalities. Miscommunication can lead to misunderstandings and hinder progress. To mitigate these issues, teams must establish clear communication protocols and foster a culture of respect.

#### **2. Unequal Participation**

In some teams, certain members may dominate discussions, while others may be reluctant to contribute. This imbalance can prevent the team from realizing its full potential. Encouraging equal participation and valuing diverse inputs are essential for effective teamwork.

#### **3. Lack of Trust**

Trust is the foundation of teamwork. Without it, collaboration becomes difficult, and team members may hesitate to share ideas or take risks. Building trust requires time, consistent behavior, and open communication.

#### **4. Poor Leadership**

Ineffective leadership can result in a lack of direction and motivation. A good team leader must be able to set clear goals, resolve conflicts, and inspire the team to perform at its best.

## **5. Coordination Issues**

Coordinating tasks and schedules among team members can be challenging, especially in large or distributed teams. Clear roles, responsibilities, and timelines are essential to avoid confusion and ensure smooth collaboration.

## **Strategies for Building High-Performing Teams**

### **1. Setting Clear Goals and Expectations**

Teams need clear, achievable goals to stay focused and motivated. Defining expectations, roles, and responsibilities at the outset helps prevent misunderstandings and ensures that everyone is aligned.

### **2. Promoting Open Communication**

Encouraging open and honest communication fosters a collaborative atmosphere. Regular meetings, feedback sessions, and communication tools can help keep everyone informed and engaged.

### **3. Building Trust and Respect**

Trust and respect are built through consistent actions, transparency, and empathy. Team leaders should model these behaviors and create an environment where individuals feel safe to express themselves.

### **4. Encouraging Diversity and Inclusion**

Diverse teams bring a wide range of perspectives and experiences, which can enhance creativity and innovation. Promoting inclusion ensures that all members feel valued and can contribute meaningfully.

### **5. Providing Opportunities for Skill Development**

Offering training and development opportunities helps team members improve their skills and stay motivated. Cross-training team members can also increase flexibility and reduce dependency on specific individuals.

### **6. Recognizing and Rewarding Contributions**

Recognizing individual and team achievements boosts morale and encourages continued effort. Rewards can be in the form of verbal recognition, bonuses, or career advancement opportunities.

## Case Studies: Successful Teamwork in Enhancing Work Efficiency

### Case Study 1: Google's Project Aristotle

#### Background

In 2012, Google initiated a research project named Project Aristotle to explore what makes a team successful. The company, renowned for its emphasis on innovation and collaboration, sought to identify patterns or characteristics that distinguish high-performing teams from less effective ones. The project involved extensive data collection and analysis of more than 180 Google teams over two years.

#### Findings

One of the most surprising discoveries was that the composition of a team, in terms of individual skills and expertise, was less critical than previously assumed. Instead, the key factor was **psychological safety**, defined as a shared belief that team members feel safe to take risks and express their opinions without fear of negative consequences.

Other significant factors identified by Project Aristotle include:

1. **Dependability:** Team members reliably complete tasks on time and meet the organization's standards.
2. **Structure and Clarity:** Clear roles, plans, and goals are crucial for a team's success.
3. **Meaning:** Individuals find personal meaning in their work, enhancing motivation.
4. **Impact:** Team members believe that their work matters and contributes to the broader organizational mission.

#### Impact on Work Efficiency

Google applied the findings of Project Aristotle by promoting psychological safety across teams, resulting in measurable improvements in productivity and innovation. For example, teams that fostered an environment of open dialogue and mutual respect were more likely to generate creative solutions and achieve project goals efficiently.

#### Lessons Learned

- **Fostering psychological safety** is essential for team effectiveness.
- **Clear communication and well-defined roles** enhance dependability and performance.
- **Personal meaning and perceived impact** contribute to higher employee engagement and productivity.

## Case Study 2: Toyota's Production System

### Background

The Toyota Production System (TPS) is globally recognized as a model of operational excellence. Central to its success is the emphasis on teamwork and continuous improvement, known as *Kaizen*. Toyota's approach involves empowering employees at all levels to participate in problem-solving and decision-making processes.

### Key Features of Teamwork at Toyota

1. **Cross-Functional Teams:** Teams at Toyota are often composed of members from different departments, ensuring a holistic approach to problem-solving.
2. **Employee Empowerment:** Workers on the production line are encouraged to identify inefficiencies and suggest improvements. Each team member has the authority to stop the production line if they notice a defect or issue.
3. **Continuous Improvement (Kaizen):** Teams are encouraged to regularly review processes and identify areas for incremental improvement.
4. **Standardized Work:** While flexibility is encouraged, standardized processes are established to ensure consistency and efficiency in operations.

### Impact on Work Efficiency

By fostering a collaborative culture and encouraging continuous improvement, Toyota has achieved remarkable operational efficiency. Key outcomes include:

- **Reduced Defects:** Empowering employees to take immediate action on quality issues has significantly reduced defects.
- **Faster Problem Resolution:** Cross-functional teams enable quicker identification and resolution of bottlenecks.
- **Higher Employee Engagement:** Employees feel valued and motivated due to their active participation in decision-making processes.

For instance, after implementing a team-based problem-solving initiative in one of its plants, Toyota reported a **30% reduction in production time** and a **20% increase in overall productivity**.

### Lessons Learned

- **Empowering employees** to take ownership of their work leads to higher engagement and better outcomes.
- **Cross-functional collaboration** fosters diverse perspectives, resulting in more effective problem-solving.
- **A culture of continuous improvement** ensures sustained operational efficiency and innovation.

## Conclusion

Teamwork is a fundamental driver of work efficiency, offering numerous benefits such as improved productivity, enhanced problem-solving, and increased employee engagement. However, building and maintaining effective teams requires deliberate effort, including clear communication, trust-building, and effective leadership. By fostering a collaborative environment, organizations can harness the collective power of their workforce to achieve remarkable outcomes.

In today's rapidly changing world, the ability to work effectively in teams has become a critical factor in organizational success. A 2019 report by Deloitte indicates that organizations emphasizing teamwork are 25% more likely to achieve higher performance and efficiency compared to those that don't. Furthermore, research by McKinsey highlights that collaborative teams can boost innovation by up to 40% and reduce work time by approximately 30%, underscoring the significant advantages of a team-based approach. Whether in small groups or large teams, the principles of teamwork—mutual respect, shared goals, and effective communication—remain constant and essential for fostering a productive work environment.

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## Chapter: 12

### Money Management / Financial Management

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#### Introduction

Financial management is an essential skill for any organization's technical and administrative personnel. The efficient management of funds ensures that resources are allocated and used effectively, leading to improved operational outcomes. In this chapter, we will cover key concepts of money management and financial management, including budgeting, financial planning, cost control, and financial decision-making. The goal is to equip staff with the knowledge necessary to manage the financial resources at their disposal responsibly and effectively.

#### 1. The Importance of Financial Management

Effective financial management is critical in any research institution, where funding may come from diverse sources such as government grants, research funding bodies, and private-sector partners. Financial management allows an organization to achieve its goals while adhering to its budgetary constraints. It involves planning, organizing, controlling, and monitoring financial resources, ensuring that funds are used efficiently and in line with the institution's objectives.

#### Key Objectives of Financial Management

1. Resource Allocation: Ensuring that financial resources are allocated to priority areas.
2. Cost Efficiency: Minimizing wastage and optimizing resource use.
3. Transparency: Ensuring that all financial activities are documented and reported correctly.
4. Financial Accountability: Holding individuals and departments accountable for their financial decisions.

#### 2. Budgeting

A budget is a financial plan that outlines expected income and expenditures for a specific period. It serves as a control mechanism for financial resources and is a crucial component of financial management. The budgeting process helps institutions set priorities and monitor the effectiveness of resource allocation.

## Steps in Budget Preparation

1. **Forecasting Revenue:** Estimating the expected income from various sources, such as grants, contracts, and institutional funds.
2. **Identifying Costs:** Understanding the full spectrum of expenses, including direct and indirect costs. This includes salaries, equipment, research materials, travel, and other operational costs.
3. **Allocating Funds:** Distributing the available resources across departments or projects based on priority.
4. **Monitoring and Revising:** Reviewing the budget periodically to ensure alignment with actual expenditures and making adjustments as necessary.

## Types of Budgets

- **Operational Budget:** Focuses on day-to-day expenses and revenue.
- **Capital Budget:** Concerns long-term investments like infrastructure and equipment.
- **Cash Flow Budget:** Focuses on the timing of income and expenditures to ensure liquidity.

## 3. Financial Planning

Financial planning involves setting long-term and short-term financial goals and identifying strategies to achieve them. For research organizations, financial planning can encompass several facets, including grant management, personnel costs, and the acquisition of equipment.

### Key Components of Financial Planning

- **Goal Setting:** Determining what the institution aims to achieve financially in the short-term (1-2 years) and long-term (5-10 years).
- **Investment Planning:** Ensuring funds are allocated effectively to research projects and operational needs.
- **Risk Management:** Identifying financial risks and taking steps to mitigate them, such as securing insurance or diversifying income streams.
- **Monitoring and Reviewing:** Continuously monitoring financial performance and adjusting strategies based on evolving circumstances.

## 4. Cost Control and Cost Reduction

Cost control is essential to ensure that the organization stays within its financial means, while cost reduction refers to efforts to lower expenses. Both approaches are critical in maintaining a healthy financial position and optimizing the use of funds.

### **Techniques for Cost Control**

1. Activity-Based Costing (ABC): Identifying activities that incur costs and linking them directly to the products or services provided.
2. Variance Analysis: Comparing actual costs against budgeted costs to identify discrepancies and take corrective actions.
3. Lean Management: Focusing on eliminating waste and improving efficiency across processes.

### **Cost Reduction Strategies**

- Negotiate Better Deals: Renegotiate contracts with suppliers and service providers.
- Optimize Resource Usage: Ensure that resources like electricity, water, and office supplies are used efficiently.
- Outsourcing: Considering the outsourcing of non-core activities to reduce personnel costs.

## **5. Financial Decision-Making**

Financial decision-making is central to managing the financial health of an organization. It involves evaluating options and making informed decisions regarding the allocation of funds to various activities or projects.

### **Factors Influencing Financial Decision-Making**

- Risk Assessment: Every decision carries a level of risk, and the institution needs to assess whether the potential benefits justify the risk involved.
- Return on Investment (ROI): Financial decisions should be based on the expected returns. ROI calculations help in evaluating the profitability of various investments.
- Opportunity Cost: Understanding what is foregone when a particular financial decision is made.

### **Types of Financial Decisions**

- Investment Decisions: Whether to invest in new research projects or acquire new technology.

- Financing Decisions: Determining the mix of debt and equity used to fund projects or investments.
- Dividend Decisions: In a business context, deciding whether to reinvest profits or distribute them as dividends.

## **6. Cash Flow Management**

Cash flow refers to the movement of money in and out of the organization. Effective cash flow management ensures that the institution can meet its financial obligations without compromising its operational efficiency.

### **Components of Cash Flow**

1. Cash Inflows: Includes funding from grants, sales, and other income-generating activities.
2. Cash Outflows: Encompasses all payments made by the institution, including salaries, equipment purchases, and operational costs.

### **Techniques for Managing Cash Flow**

- Cash Flow Forecasting: Estimating future cash inflows and outflows to predict potential shortfalls.
- Establishing Credit Lines: Maintaining access to credit lines to manage short-term liquidity needs.
- Prompt Payment Collection: Ensuring timely collection of funds owed to the institution.

## **7. Financial Reporting and Auditing**

Financial reporting and auditing are integral aspects of financial management. Proper financial reporting helps stakeholders understand the institution's financial position, while audits ensure transparency and accountability.

### **Financial Reporting**

- Income Statement: Shows the organization's profitability over a given period.
- Balance Sheet: Provides a snapshot of the institution's assets, liabilities, and equity.
- Cash Flow Statement: Details the flow of cash into and out of the institution.

### **Auditing**

- Regular audits ensure compliance with financial regulations and internal controls. External auditors provide an independent review of financial statements.

## **8. Financial Policies and Compliance**

**Key Financial Policies:**

- Procurement Policies: Guidelines for the purchase of goods and services to ensure transparency and cost-effectiveness.
- Travel Policies: Clear rules on reimbursing travel expenses and maintaining transparency in claiming.
- Asset Management Policies: Procedures for the acquisition, use, and disposal of assets to ensure proper accountability.

**Compliance:**

- Staying compliant with laws like the Income Tax Act, Goods and Services Tax (GST), and government grant guidelines is critical for maintaining financial health and avoiding legal issues.

**9. Conclusion**

Financial management is an essential skill for the technical and administrative personnel at ICAR Research Complex for Eastern Region, Patna, Bihar. Effective budgeting, financial planning, cost control, and decision-making help ensure that financial resources are used efficiently and responsibly. With the right tools and understanding, staff can contribute to the financial success of the institution, ensuring that it can continue to fulfill its research objectives and serve the agricultural community effectively.

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