Agriculture Mission Mode Project under National e-Governance Plan

Service 3 - Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Department of Agriculture & Cooperation
Ministry of Agriculture
Government of India

Software Development Agency
Agricultural Informatics Division
National Informatics Centre (NIC)
Ministry of Communications & Information Technology
Government of India

Presentation will cover

NeGP-A : MMP

Service 3 - Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

I. Aim
II. Objectives
III. Components
IV. Implementing Strategy
V. Stakeholders
VI. System Characteristics
   - ❖ As-Is
   - ❖ To-Be
VII. Deliverables
VIII. Questions & Answers

Objectives

NeGP-A : MMP

AIMs at

Service 3 - Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Benefits:

Improve accessibility of farmers to timely & relevant information & services

- By providing multiple channels to access information
- By reducing time lag between generation & dissemination of information
- By providing information to the farmer through a uniform platform

To develop, test and operationalise Application Software (Apps) and Portlet, for this Service, using ICT Technology :

1. Content Management System (CSM) – Service Portlet development
2. Database Development Applications
   a. Transaction based (Database Tools)
   b. Work-flow based (Workflow engine)
3. GIS and Data Analysis (Spatial and Non-Spatial);
4. Alert and Expert Advisory System;
5. Information Service through Delivery Channels (using end-user computing facilities etc)

Objectives

Service 3 - Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Enhancing Knowledge by providing Information and guidance on Agro-climatic zone wise Crop management information & Good Agricultural Practices (GAPs); Farm Machinery; Training -

- Good Agriculture Practices (GAPs) - location specific, crop specific, season specific
  - Textual, Audio, Video and e-learning materials
- Advisory services on Crop management
- Advisory service on use of Farm Machinery & Implements
  - Disbursement of Input Subsidy in procurement (Workflow)
- Extension & Training Programme details for Trainers, Farmers and other stakeholders
- e-Resources Management (Strategic – SREP, CDAP, Agriculture Contingency Plans, Farmer's Friendly Handbooks etc, and resources from CeRA, CABI, AALDI repositories)
- Grievance Redressal & Management (linkage to Kisan Call Centre and Kisan Knowledge Management System – KKMS and FAQs)

System Characteristics

Service 3 - Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Content Based Component:

A. Crops & Good Agriculture Practices (GAPs)

1. State Specific Crop Details
2. Package of Practices (Crop-wise Agronomic Practices)
3. Crop Disease
4. Pest Infestation Status
5. Pest Prevention & Cure
6. Crop Cycle Management
7. District-wise APY Data; Crop-wise MSP Data
8. Details of Front Line Demonstrations
9. FASAL Information (In G2G)
10. Farm Level Planning
11. Agriculture Contingency Plan

B. Farm Machinery

1. Farm Machinery Details
2. Dealer Details

C. Training

1. Training Tool Kits & E-learning Materials
2. Training Institutions
3. Training Calendar
4. Details of FS, FFS, FF, FIGs and Progressive Farmer

System Characteristics

Service 3 - Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Content Based Component:

D. Resource Repository

1. SREP
2. CDAP
3. SEWP
4. A Farmer's Friendly Hand Book
5. Mass Media Content-Audio & Videos on GAPs
6. List of Scientific Institutions
7. List of Owner of Expert Information
8. Success Stories
9. Standards

Transaction Based Component:

1. Expert Advisory- KKMS, Crops Directorate, State Deptt. of Agriculture, SAUs, ICAR, KVKs.....
2. Grievance Management (through SMS, e-Mail, IVRS, Kisan Call Centre, CSCs, Service Portal, e-Post , PIFCs, Farmers Training Centre, Farmers Club, etc)

Workflow Based Component:

1. Input Subsidy on Farm Machinery

Components

- Crops Details
- Agronomic Practices- POPs, GAPs
- Crop (Cycle) Management
- Plant Health Management (e-Pest Surveillance, CROPSAP)
- Frontline Demonstration Results
- Expert Advice

- Cropping system based Farm Machinery Recommendations
- Dealers, Prices, Availability
- Disbursement of Subsidy

Information on Crops & Good Agricultural Practices (GAPs) , Farm Machinery, Training

- Institutes Details, Faculty Details…
- Training Calendar
- E-learning Materials
- Success Stories

- Mass Media Contents (Audio-Videos)
- Resource Repository
  - FASAL, SREP, CDAP, Agriculture Contingency ..
  - Farm Level Planning
  - Farmer's Friendly Handbooks

Implementation Strategy

Service 3 - Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

- ✓ **Formulation of System Requirements Specifications (SRS);**
  - **Design of solution components;**
  - **Development of Application Software (Apps) of Service;**
  - **Installation, Integration and Testing of Apps;**
  - **Security Audit, Testing and Certification of Apps.**
  - **Pilot Run, User Acceptance, Testing and Stabilization of Apps;**
  - **Documentation of Apps (Software and Services)**
  - **Handholding and Maintenance Support of Apps;**
  - **Capacity Building (through Training) for Operationalisation of Apps;**

Stakeholders

Service 3 - Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

A. National Level

1. Ministry of Agriculture
2. Ministry of Communications & Information Technology
3. DE&IT, Deptt of Post-e-Post, NIC, NKN, NeGP, SWAN,
4. Deptt. Of Telecommunication-BSNL, MTNL, PTI
5. ICAR Institutions including NRCs (20), PDs (20), CRI (50), NRBs(04), AICRP
6. Directorate of Extension (DoE) and Other Crop Directorates under DAC
7. National Institute of Agricultural Extension Management (MANAGE)
8. Directorate of Medicinal and Aromatic Plants Research (DMAPR)
9. Central Institute of Medicinal and Aromatic Plants (CIMAP)
10. Central Institute Agriculture Engineering (CIAE)
11. Indian Institute of Crop Processing Technology (IICPT)
12. Farm Machinery Training & Testing Institute (FMTTI)
13. Central Institutes of Post Harvest Engineering & Technology (CIPHET)
14. National Institute of Plant Health Management (NIPHM)
15. Central Integrated Pest Management Centres (CIPMC)
16. National Crop Forecasting Centre (NCFC)
17. Agricultural Technology Information Centre (ATIC)
18. Zonal Coordination Units, Trainers Training Centre
19. National Bureau of Agriculturally Important Insects (NBAII)
20. Indian Space Research Organization (ISRO)
21. Space Application Centre (SAC)

Stakeholders

Service 3 - Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

B. State Level

1. State Agriculture Department /Extension
2. State Agricultural Management & Extension Training Institute (SAMETI)
3. State Agriculture Universities (SAUs) & State Agriculture Colleges
4. Extension Education Institutes (EEIs)
5. Zonal Research & Extension Coordination Committee
6. Tamil Nadu Agricultural University (TNAU) – For Farm Level Planning Component
7. State Remote Sensing Applications Centres
8. Rural Development and Self Employment Training Institute (RUDSETI) Centres
9. Consortium of e-Resources in Agriculture (CeRA)
10. Regional Training Institutions

B. District Level

1. Krishi Vigyan Kendras (KVKs)
2. Agriculture Technology Management Agency (ATMA)
3. AgriClinics & AgriBusiness Centres (ACABC)

C. Non-Governmental Organisations

1. Farmers Field School, Progressive Farmers, Farmer's Club (75000)
2. Association of Agricultural Librarians and Documentalists of India (AALDI)
3. CAB-India (CABI)
4. Agriculture Department of Public Sector Banks
5. Regional Rural Bank and Other Financial Institutions
6. Primary Agriculture Cooperative Societies

Stakeholders – Information Providers (Component wise)

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- **Agronomic Practices** – ICAR Institutes, SAUs, State Ag. Deptt., KVKs, AICRP etc. recommend cropping practices
- **Package of Practices, Good Agriculture Practices** (Documents, Presentation, Audio- Videos etc.) – Extension Institutions (DoE, State Ag. Deptt., KVKs, ATMA, SAMETI, Zonal Research & Extension Coordination Committee)
- **Crops, Soil Resources** – DAC, State Ag. Deptt., ICAR, SAUs, KVKs
- **Crop Disease, Pest Prevention & Cure, CROPSAP** – CIPMC, NCIPM, NIPHM
- Post Harvest Management - CIPHET
- Agriculture Contingency Plan – DAC, State Ag. Deptt., CRIDA
- Results of Frontline Demonstrations – KVKs, SAUs, ICAR Institutes, FFS, FS
- SREP, CDAP - DAC, State Ag. Deptt., ATMA, MANAGE/NAARM/SAMETI
- **Expert advice on different aspects of Crop Management** - ICAR Institutes, SAUs, Crop Directorates, State Ag. Deptt., KVKs, NIPHM, Agriclinics & Agribusiness Centres
- **Farm Machinery details**- DAC, FMTTI, CIAE, State Agri. Engineering Department, KVKs
- **Training** – Details on Training Institutions e.g. DoE, MANAGE, EEIs, KVKs, SAMETI, ATMA, IICPT, RUDSETI, Regional Training Institutes & Banks and their Training Calendar
- **Progressive Farmer and success story** – FS, FFS, FF, FIG, SHG, KVKs
- **Digital tool kit** – FFS, KVKs, ATICs
- Indian Society of Agribusiness Professionals (ISAP)
- **Farm Level Planning** – TNAU, TN Agriculture Engineering Department (AED), NBSS&LUP
- **E-Resources** - AALDI, CABI, CeRA, IPKM
- **FASAL** – DAC, NCFC

System Characteristics– Crops and GAPs

Crops Details	Location Specific, Crops & Variety-wise; Season-wise (Framework - Origin, Production Practices (Production and Protection Technology), Post Production Practices)
Crop Cycle Management	Week-by-Week Calendar of Activities (Crop/Season/Duration/Period) **Pre-Sowing** – Climate Suitability, Soil Suitability, Land development (Need & Preparation), In-situ Moisture Conservation, Soil treatment, Crop Varieties/Hybrids **Cultivation Practices** - Seed Treatment, Sowing, Manuring, IPM , Irrigation Schedule **Intercultural Practices -** Weed Control Measures, Intercropping, Crop rotation, **Harvest Technology** – Time, Methods **Post Harvest Technology** -Cooling, Cleaning, Sorting, Storage, Grading, Packaging, Practice for maintaining good quality, Processing, Marketing , Equipments
Crop Disease	Pest & Diseases, Damage Symptoms, Photos and Management Pest Infestation Status (Pest Roving Survey; http://ppqs.gov.in) e-Pest Surveillance (Pest Prevention & Cure (CROPSAP) with SMS advisory)

System Characteristics– Crops and GAPs

Crop-wise Agronomic Practices : (Package of Practices ; Good Agricultural Practices; Standards)	*Pre-Sowing Practices* ➢Preparation of Soil – Climate Suitability, Soil Suitability, Land development (Need & Preparation), In-situ Moisture Conservation, Soil treatment ➢Preparing the seed bed and care of the seedlings ➢Seed recommendation- Crop Varieties/Hybrids, Seed Selection *Post -Sowing Practices* ➢Sowing/ Transplanting- Seed Treatment, Method of Sowing ➢Fertilizers recommendation ➢Use of Plant growth regulators ➢Irrigation advisory ➢IPM packages of Practices; Pesticide recommendation ➢Weed Control Measurers ➢Harvest advisory– Time, Methodology ➢Post-Harvest Practices- Cooling, Cleaning, Sorting, Storage, Grading, Packaging *Rotation of Crops Advisory; Multiple Cropping*
Information on ..	➢ Best Farming Practices in Implementation
	➢ APY data (Only District-wise data is available with E&S, DAC) ➢ Crop-wise MSP data
	Forecasting Agricultural Outputs using Space, Agro-meteorology and Land based observation (FASAL) – Advance Crop Production Estimates (State/District/Season) [G2G]
	Farm level Planning – Guidance to farmer for optimum utilization of available resources
Front line Demonstration Details	➢FFS/FS/FIG's/Farmers Organization / Farmer Friend ❑ Demonstration Details- Subject Area details, Participants details ❑ Location of Demonstration ❑ Date of Demonstration

System Characteristics– Farm Machinery

Machinery & Implements	➢ Category wise Details including specification as per BIS ➢ Dealers & Manufacturer Directory ➢ Availability ➢ Prices ➢ Quality ➢ Guidance
Recommendations to Farmers	Agro-Climatic zone-wise ➢ Soil Type ➢ Cropping System etc.
Disbursement of Input Subsidy (Workflow)	Procurement of Farm Machinery ➢ Subsidy given to Farmer while procuring ➢ Subsidy is claimed by Farmer after procuring
SMS based alerts	➢ Dealers details ➢ Dealer wise Farm Machinery Details (Type, Stock, etc) ➢ Prices ➢ Alerts to Dealers for supply of Farm Machinery ➢ Under Input subsidy direct price quote by Dealers to Farmer

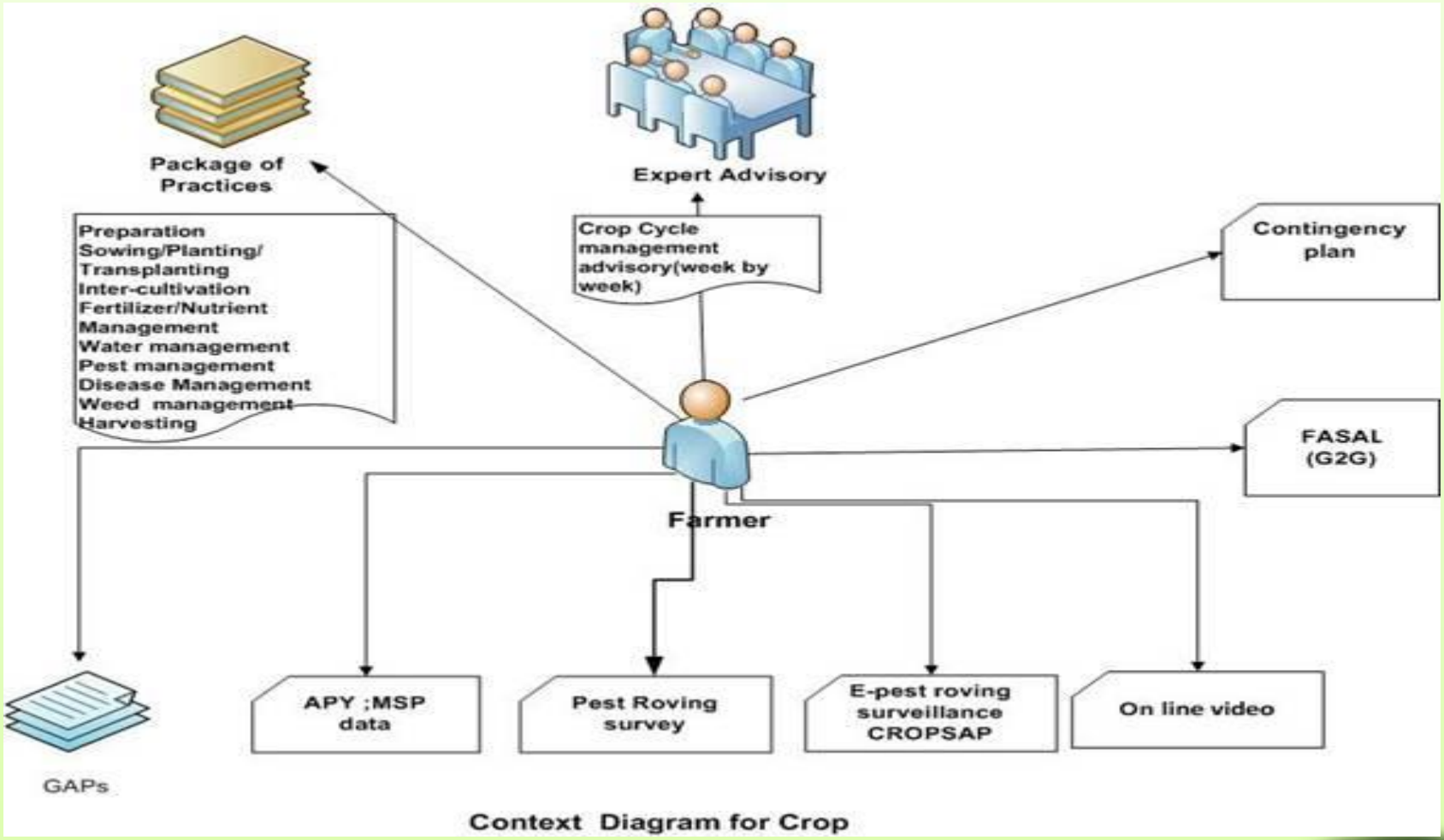
System Characteristics– Training

Training Institutions	➢ Institutes/Organization/Bank/FFS /PPP- (Trainer's Training ; Farmer's Training, Short Term Skill Development Program, Management & Entrepreneurship Development Programme viz. Diploma in Agricultural Services for Input Dealers) • Name, Address • Resource availability (Rooms/Halls/Meeting rooms, Visuals Aid, Power Backup, Library, Trained Faculty Member – Extension/IT)
Training Calendars	➢ Institute/Organization/Banks/FFS/FS; Farmer's Club (NABARD)/SHGs/Through PPP Model ➢ Topics – Sector, Title, Objectives, Contents ➢ Locations details (Venue), Distance ➢ Eligibility Criteria (Participants) ➢ Duration (Start Date – End Date) ➢ Methodology – Lecture, Group Discussion, Case Studies, Demo, Field visit ➢ Resource Person (Name, Address, Phone, Email) ➢ Coordinator (Name, Address, Phone, Email) ➢ Funding Pattern – Sponsored Scheme/ Paid/Non-Paid
Post Training Details	➢ Details on Participants attended training ➢ Impact Analysis ➢ Feedbacks
FLD	➢ Details on Front line Demonstration (FLD)
Training Tool kit; Success Stories	➢ e-Learning Materials –Lecture Series, Brochures/Booklets/Pamphlets/Kits ➢ Success Stories ; Innovations ➢ Categories - Textual; Videos; Audios ➢ Repository of Expert Trainer's
Alerts	➢ Registered Farmers/ Trainers; ➢ SMS – Pull & Push on Topics, Location, Dates etc. ➢ Auto email to intended end-users

System Characteristics– Repository

Repository Details	➢ Strategic Research and Extension Plan (SREP) ➢ Comprehensive District Agriculture Plan (CDAP) ➢ State Extension Work Plan (SEWP) ➢ Contingency Plan (Drought, Flood, Late Rainfall etc.) ➢ State-wise 'A Farmer Friendly Handbook'…. ➢ Resources available with CeRA, CABI, AALDI.. ➢ Resources repository (Reports, Innovative Practices & Videos on GAPs) available with Media Houses
	➢ Package of Practices (POPs) ➢ Success Stories ➢ Standards (GAPs) ➢ Directory of Subject Matter Expert
Mass Media Contents on Good Agricultural Practices (GAPs)	➢ Audios ➢ Online-Videos

System Characteristics– Crops and GAPs



Context Diagram for Crop

Business Process: - Crops and GAPs- As Is & To Be

Component	Sub-Component	As-Is	To-Be
Crops Details	Variety-wise; State specific Crops (Framework - Origin, Images, Production Practices (Production and Protection Technology), Post Production Practices)	Directory of State Specific Ag. Crops – SDA	• Content Creation, Approval, Upload by SDA, SAUs, KVKs
Crop Cycle Management	Week-by-Week Calendar of Activities (Crop/Season/Duration /Period) **Pre-Sowing** – Climate Suitability, Soil Suitability, Land development (Need & Preparation), In-situ Moisture Conservation, Soil treatment, Crop Varieties/Hybrids **Cultivation Practices**- Seed Treatment, Sowing, Manuring, IPM , Irrigation Schedule **Intercultural Practices**- Weed Control measurers, Crop rotation, Intercropping **Harvest Technology** – Time, Methods **Post Harvest Technology** – Cooling, Cleaning, Sorting, Storage, Grading, Packaging , Practice for maintaining good quality, Processing, Marketing, Equipments	Package of Practices booklet given by VLEW/ DAO/SDAO /BAO /RAEO, KVKs, SAUs.	• Content Creation, Approval, Upload by SDA, SAUs, KVKs, Zonal Research Extension Advisory Committee

Business Process: - Crops and GAPs-As Is & To Be

Component	Sub-Component	As-Is	To-Be
Crop Disease	Pest & Diseases, Damage Symptoms, Photos and Management Pest Infestation Status (Pest Roving Survey; http://ppqs.gov.in) e-Pest Surveillance (Pest Prevention & Cure (CROPSAP) with SMS advisory) http://www.ncipm.org.in/cropsap/login.aspx	➢Pest & Disease symptoms and advisory booklet is published by SDA, SAUs, NIPHM, NCIPM,NBAII ➢Pest Roving Survey results are published by DPPQS ➢CROPSAP releases advisory on pest prevention and cure through web and mobile	➢Content Creation, Approval, Upload on Web ➢Dissemination of Pest Roving Survey through web-service from http://ppqs.gov.in ➢Dissemination of advisory from CROPSAP through web-services
Crop-wise Agronomic Practices : (Package of Practices ; Good Agricultural Practices; Standards)	***Pre-Sowing Practices*** Preparation of Soil, Preparing the seed bed and care of the seedlings, Seed recommendation ***Post -Sowing Practices*** Sowing/ Transplanting, Fertilizers recommendation, Plant growth regulators, Irrigation advisory, IPM POP; Harvest advisory & Post-Harvest Practices, Rotation of Crops Advisory; Multiple Cropping	➢POP booklet - SDA , SAUs ➢SAUs, KVKs releases advisory on POP	➢Content Creation, Approval, Upload on Web -Document Management System by SDAO/DAO/ SAUs/Zonal Research and Extension Coordination Committee ….

Business Process: - Crops and GAPs-As Is & To Be

Component	Sub-Component	As-Is	To-Be
Crops related Information	District-wise data on APY, Crop-wise MSP data	Data disseminated through DES website http://eands.dacnet.nic.in	Content Creation, Approval, Upload on Web E&S, DAC Dissemination on Web through SAP
	Forecasting Agricultural Outputs using Space, Agro-meteorology and Land based observation (FASAL)	Estimated Crop production forecasted data on Crops are disseminated in G2G	Content Creation, Approval, Upload on Web NCFC, DAC Dissemination of data through SAP
Front line Demonstration Details	➢ FFS/FS/FF ➢ Location of Demonstration ➢ Date of Demonstration	➢ On Field/Off Field demo by Progressive Farmer, DAO	➢ Audio/Video/ Presentation ➢ Web
Farm Level Planning	Farm Level Planning	➢ Proposal submitted by TNAU to DAC ➢ Document received from KAU ➢ Document received from NBSS&LUP, Bangalore	Documents as mentioned in the As-Is were studied A study report on the As-Is process is prepared, which states Specific Farm level Planning based advisory is to be provided to the Farmer. Actor, Process and identification of Stakeholder are to be done by DAC.

Business Process: Farm Level Planning -As Is & To Be

Description

Guidance to the farmer to utilize the available resources of the farm optimally so as to increase the resource use efficiently and the income of the farmer. Farm level planning and farmer empowerment aims to increase the Agricultural Production and Productivity thereby Farmer's income by farm level interventions and farmers empowerment through access to information.

Objective of Farm Planning is:

- To maximize the annual net income sustained over a long period of time.
- To fully utilize all the resources.
- To improve Standard of living of the farmer

As-Is

Following documents have been studied:-

- Pilot project proposal for Farm Level Planning and farmer empowerment in Erode and Trichy districts, Tamil Nadu (Submitted to DAC by TNAU)

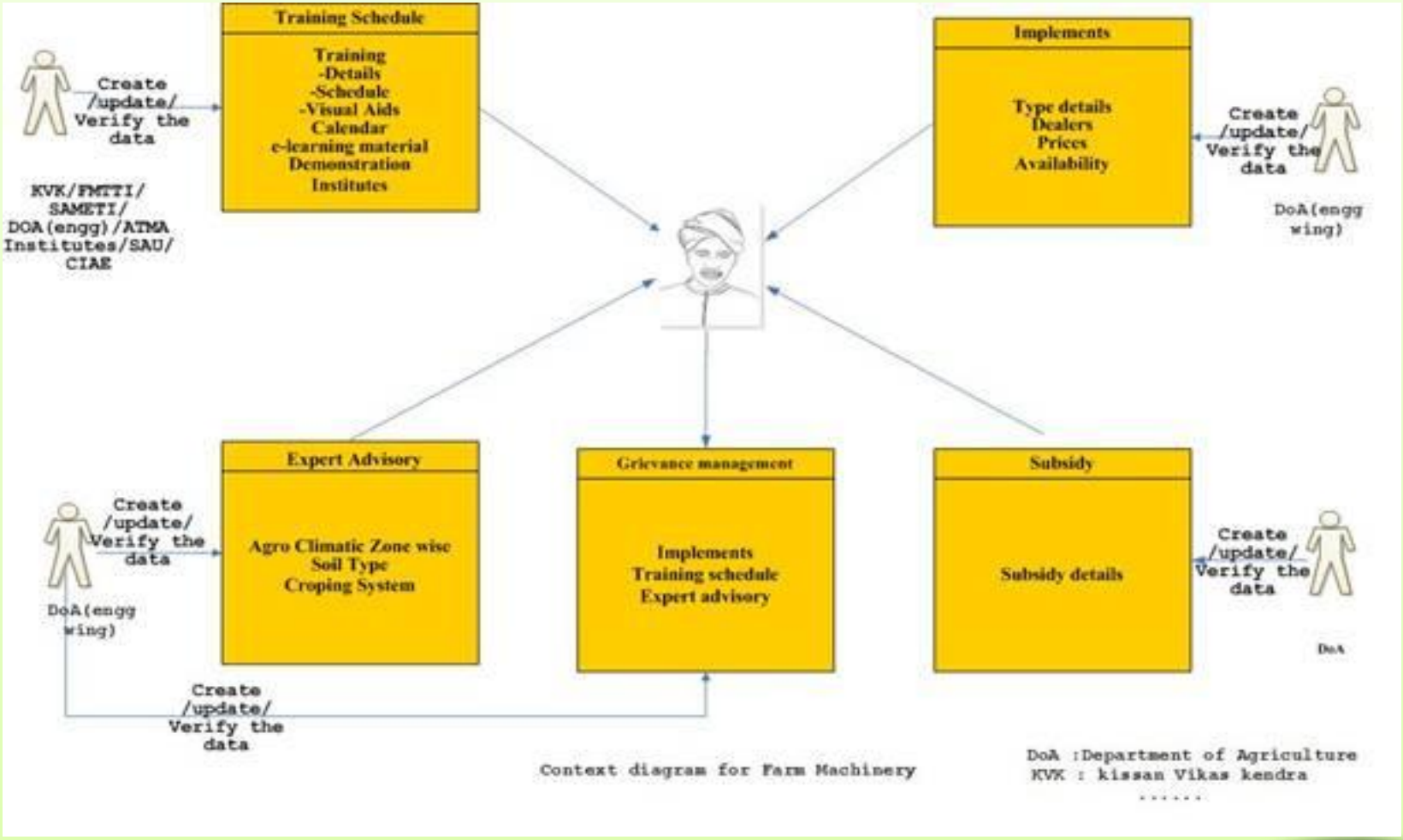
- National Mission on Sustainable Agriculture by NBSS&LUP (ICAR)
  - Development of National Portal on Soils
  - Soil Resource Mapping for Farm Planning in India
- Details of Farm Level Planning document received from Kerala Agriculture University.

To-Be

Digitization of Following data element

- Farmer profile – (Farmer details, Land details, Livestock…)
- Climate (Weather – Temp, Humidity, Rainfall, Wind..)
- Hydrology – Water shed maps …
- Site Characteristics – soil details..
- Agriculture data and practices (Crops grown, Area, production ...)
- Existing infrastructure (Bore well, Tube well...)
- Marketing mechanism
- Socio-economic data
- Development program – Training and capacity building activities
- Input availability
- Credit availability
- Machinery availability
- Market linkage
- History of the farm – Crops cultivated, Seeds and fertilizers used etc
- Estimated harvesting, actual harvesting
- Insurance

Farm Machinery : Context Diagram



Business Process: Farm Machinery : As Is & To Be

Component	Sub-Component	As-Is *	To-Be
Implements	Category wise Details including specification as per BIS, Dealers Directory, Availability, Prices, Quality, Guidance	SDA, Ag. Engineering Department, FMT&TI, SAUs, MoA publishes Farm Machinery Details through Booklets, Website http://farmech.gov.in http://ciae.nic.in	➢ Content Creation, Approval, Upload by SDA, SAE, CIAE, FMT&TI, SAUs ..
Recommendations to Farmers	Agro-Climatic zone-wise Soil Type, Cropping System etc.	SDA, Ag. Engineering Department, FMT&TI, SAUs, MoA publishes advisory through Booklets/ Brochure/ Pamphlets, Website/ On-field Demonstration	➢ Content Creation, Approval, Upload by SDA, SAE, CIAE, FMT&TI,SAUs ..
SMS based alerts	➢ Dealers details ➢ Farm Machinery stock ➢ Prices ➢ Alerts to Dealer for supply of Machinery ➢ Under Input subsidy direct price quote by Dealers to Farmer	➢ Manual	➢ On Web ➢ Mobile based alerts

* The Agriculture Census Division of DAC, Ministry of Agriculture collects data on Number of Operational Holders using various Farm Machineries as part of Input Survey data collection (Schedule 2.4), to provides information on the coverage of utilization of Farm Machineries by the Operational Holders. http://inputsurvey.dacnet.nic.in

Business Process: Farm Machinery –Input Subsidy:

As Is & To Be

- **Apply for Subsidy** - BAO/DAO office
- **Consultation**
  - Application Verification
  - Briefing on the financial assistance can be given through various schemes.
- **Processing of Application** for issuing POs to vendors/farmer to deliver/procure the sanctioned item
  - **Case – 1: PO is issued to Vendor** – Vendor delivers the sanctioned item to farmer and submits the proof of delivery at DAO to claim the subsidized amount.
  - **Case -2: PO is issued to farmer** - Purchases the implement from the Govt. authorized dealer by paying 100% amount and submits the bills to DAO to claim the subsidy amount. After verification, the subsidized amount is released to farmer through Cheque.

Service 3- Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Business Process: Farm Machinery –Input Subsidy:

As Is Process in Pilot & Non-Pilot State

State Name	GAP	Existing application
Assam	➢The DAO/EE/SDAO/ADO/VLEW brief farmer about the subsidy provided under schemes for a desired implements. ➢Process are manual and Farmer is required to be called/visit the deptt/ agencies to advisory/get the subsidy. ➢Implements are given to Farmer and Subsidy amount goes to dealer account ➢No system to check, whether availed subsidy through schemes previously	Manual
Himachal Pradesh	➢Process are manual and Farmer is required to be called/visit the deptt/ agencies to advisory/get the subsidy. ➢After farmer receives Implements, Subsidy amount given to him after verification ➢No system to check, whether availed subsidy through schemes previously	Manual
Jharkhand	➢Process manual; No further information is shared	Manual
Karnataka	➢Part Process is computerized ; ➢On-line farm submission, and workflow is incomplete.	Farm Mechanization Process System
Kerala	➢Process is manual; AOs shall do most of the process, till the delivery is made and subsidy is made to farmer	Manual
Madhya Pradesh	➢Process manual; No further information is shared	Manual

Service 3- Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Business Process: Farm Machinery –Input Subsidy:

As Is Process in Pilot & Non-Pilot State

State Name	GAP	Existing application
Maharashtra	Process is manual; It is based on the Budget Distribution system	Manual
Non-Pilot State & Other Project		
Chhattisgarh	System starts from district and partially workflow process is computerized ; Farmer is called for schemes and benefits, no On-line guidance	Application system is in use
Orissa	System starts from district and partially workflow process is computerized ; Farmer is called for schemes and benefits, no On-line guidance;	Application system is in use in Orissa state. JS(IT), DAC advised to study the Orissa system. The system is in line and need enhancement to make it more user-friendly
Hortnet	The HORTNET system http://nhmworkflow.ap.nic.in provides details on assistance and applying module to avail NHM & RKVY assistance benefits. The System starts from block and farmer is called for guidance on schemes and their other requirements.	Application system is in use. The workflow of the application starts at block/district level. It is in implementation in A.P. and Karnataka

After study of the manual process and present application system in the above states, it is proposed to develop a user-friendly On-line Application system, where farmer can get all the scheme and beneficiary details. The system should provide end-to-end solution and shall work in workflow system.

Business Process: Farm Machinery –Input Subsidy: To Be Process

- **Guidance and Verification Process:** The farmer shall get the details of his credentials (Land holding, Caste and gender details) and the selection of suitable schemes under the guidance of Block Agriculture Extension Officer as per the eligibility criteria to avail the subsidy to purchase an Implement, and get a letter of verification from Panchayat.
- **Apply for Subsidy:**
  - The farmer will view the schemes and input subsidy details and apply through CAP/SAP along with the scanned copy of necessary documents.
  - The Application will be forwarded to the BAO. The farmer receives SMS/alerts on application submission.
- **Application Processing**:
  - The BAO receives alert message. After Verification, the application is forwarded to DAO. The farmer gets SMS/alerts on acceptance/rejection/suggestions for modification with the reason or escalation to the next level forwarding.
  - The DAO receives the alert message. He will examine the application and the availability of funds under the schemes. The District Agriculture Engineering office shall provide the details of farm machineries, its prices and dealers detail to District Agriculture office. DAO allocates funds for subsidy from the scheme. The DAO issues sanction of approval along with the list of the dealer where farmer needs to approach for purchase. The farmer gets SMS/alerts on acceptance/rejection/suggestions for modification with the reason.

Business Process: Farm Machinery –Input Subsidy: To Be Process

- The District Agriculture office shall issue the POs either to Vendor or to Farmer

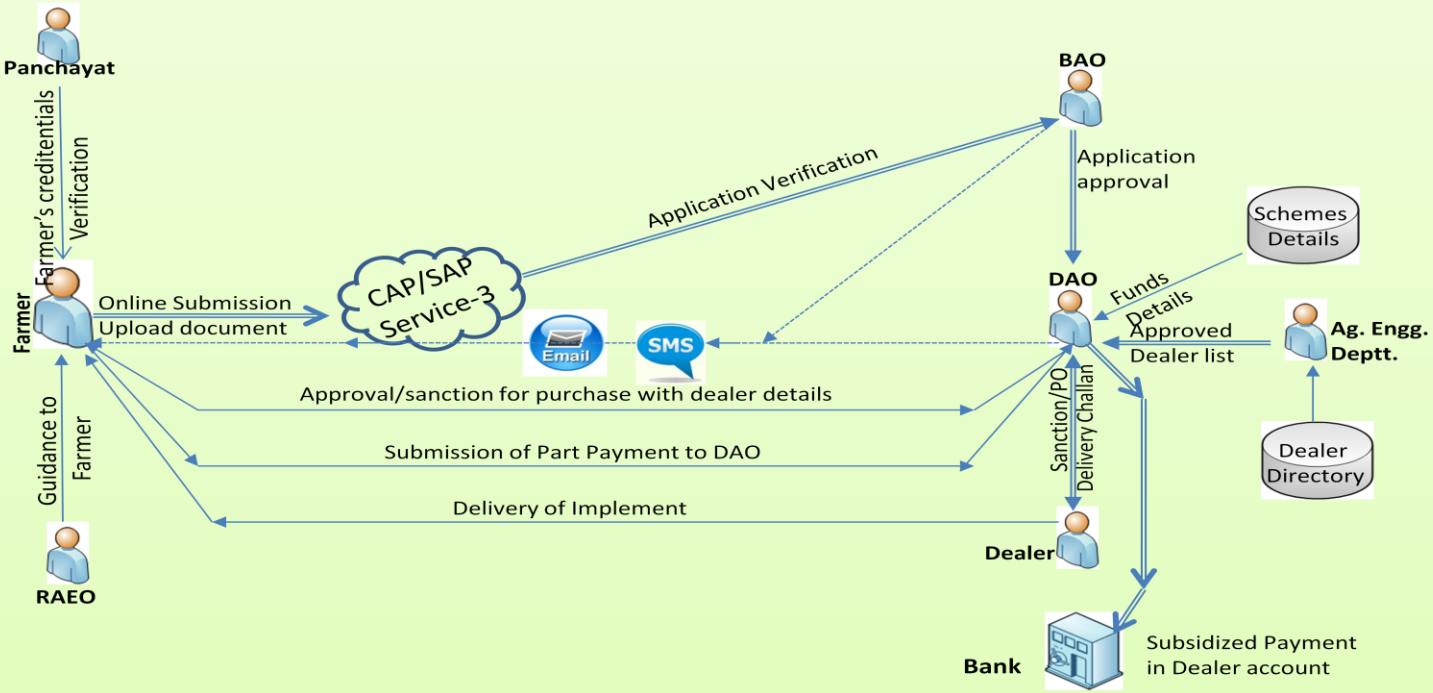
  - **Case 1: PO is issued to Vendor:** The farmer will deposit the subsidized amount to DAO office. Alerts (SMS/Mail) will be sent to vendor to deliver the implement to farmer and the Vendor submits the proof of delivery at DAO to claim the subsidized amount. The verification of machinery to be delivered, should be done by third party and report to be submitted to DAO with necessary feedback document. The DAO verifies the Delivery & verification papers and **releases the amount to Dealer's account**.

  - **Case 2: PO is issued to Farmer:** He purchases the implement from the Govt. authorized dealer by paying 100% amount and submits the bills to DAO to claim the subsidy amount. The verification of machinery to be delivered should be done by third party and report to be submitted to DAO with necessary feedback document. After verification, the **subsidized amount is released to farmer's account**.

Business Process: Farm Machinery –Input Subsidy: To Be Process (Payment to Vendor)

Context Diagram- Input Subsidy on Farm Machinery

(Part Payment made by farmer; Subsidy is claimed by Dealer after the delivery)



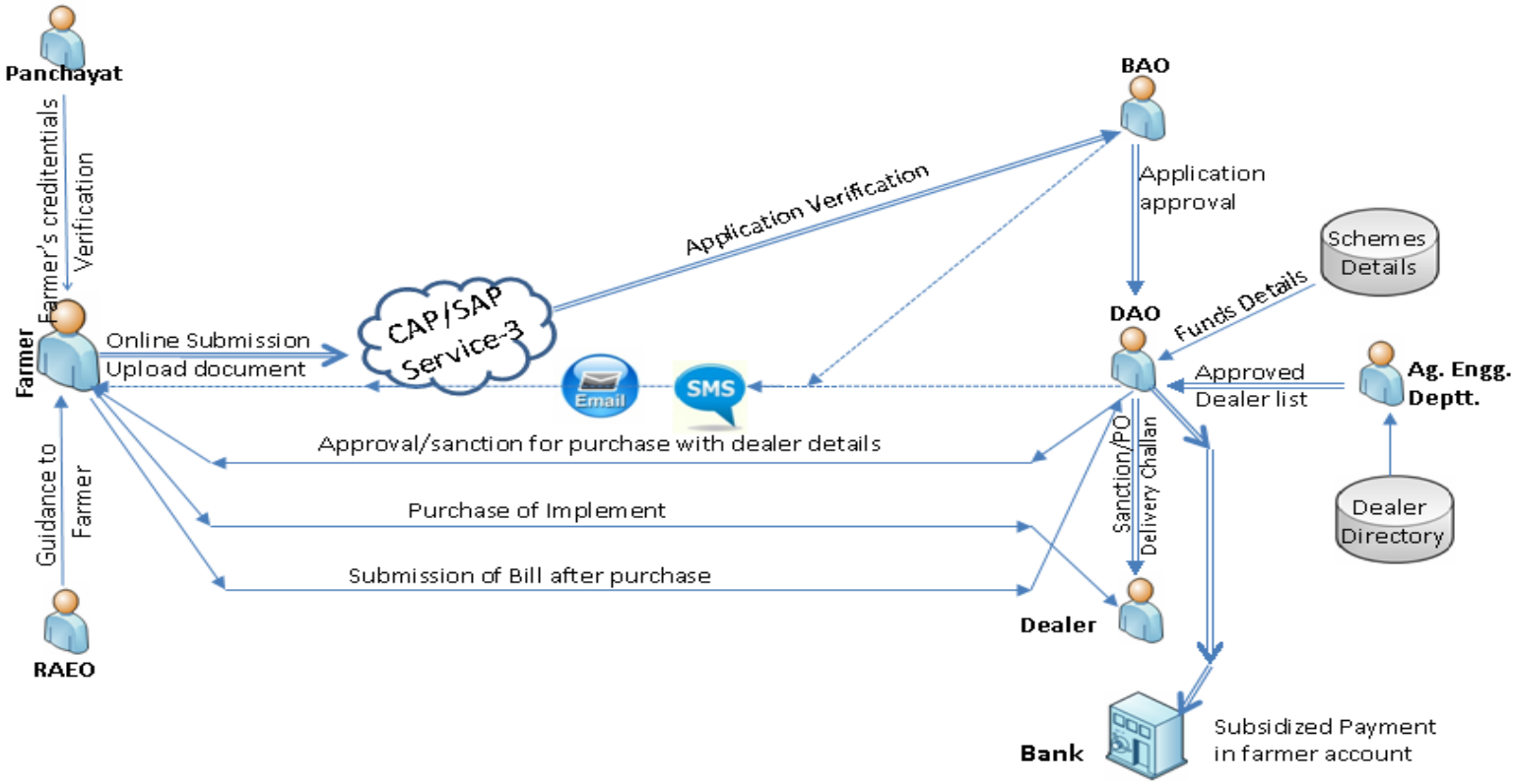
Workflow -

CAP : Central Agriculture Portal
BAO: Block Agriculture Officer
DAO: District Agriculture Officer
RAEO : Rural Agriculture Extension Officer
SAP : State Agriculture Portal

Business Process: Farm Machinery –Input Subsidy: To Be Process (Payment to Farmer)

Context Diagram- Input Subsidy on Farm Machinery

(100% Payment made by farmer; Subsidy is claimed after the payment & Purchase)



Workflow -

CAP : Central Agriculture Portal

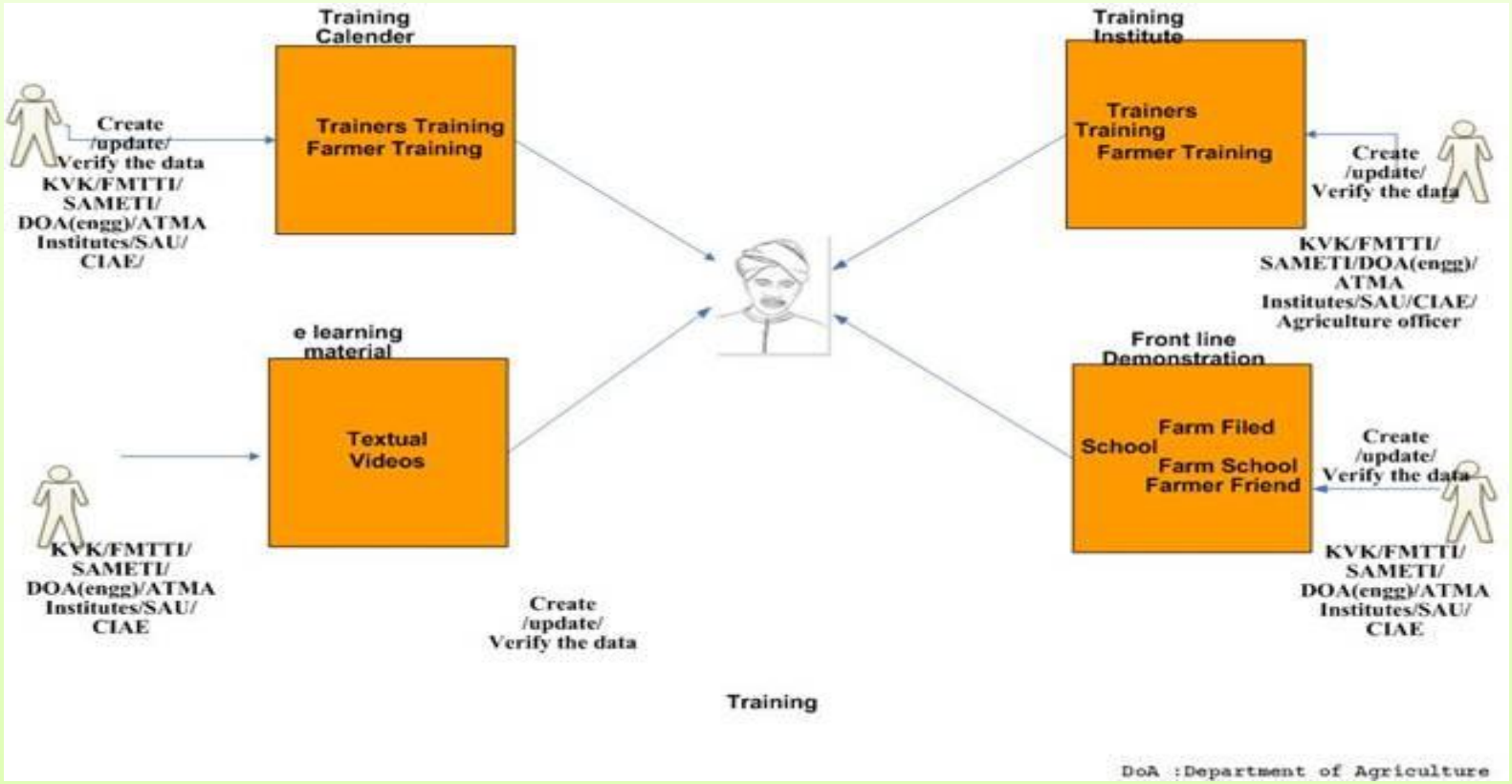
BAO: Block Agriculture Officer

DAO: District Agriculture Officer

RAEO : Rural Agriculture Extension Officer

SAP : State Agriculture Portal

Training – Context Diagram



Business Process: Training – As Is & To Be

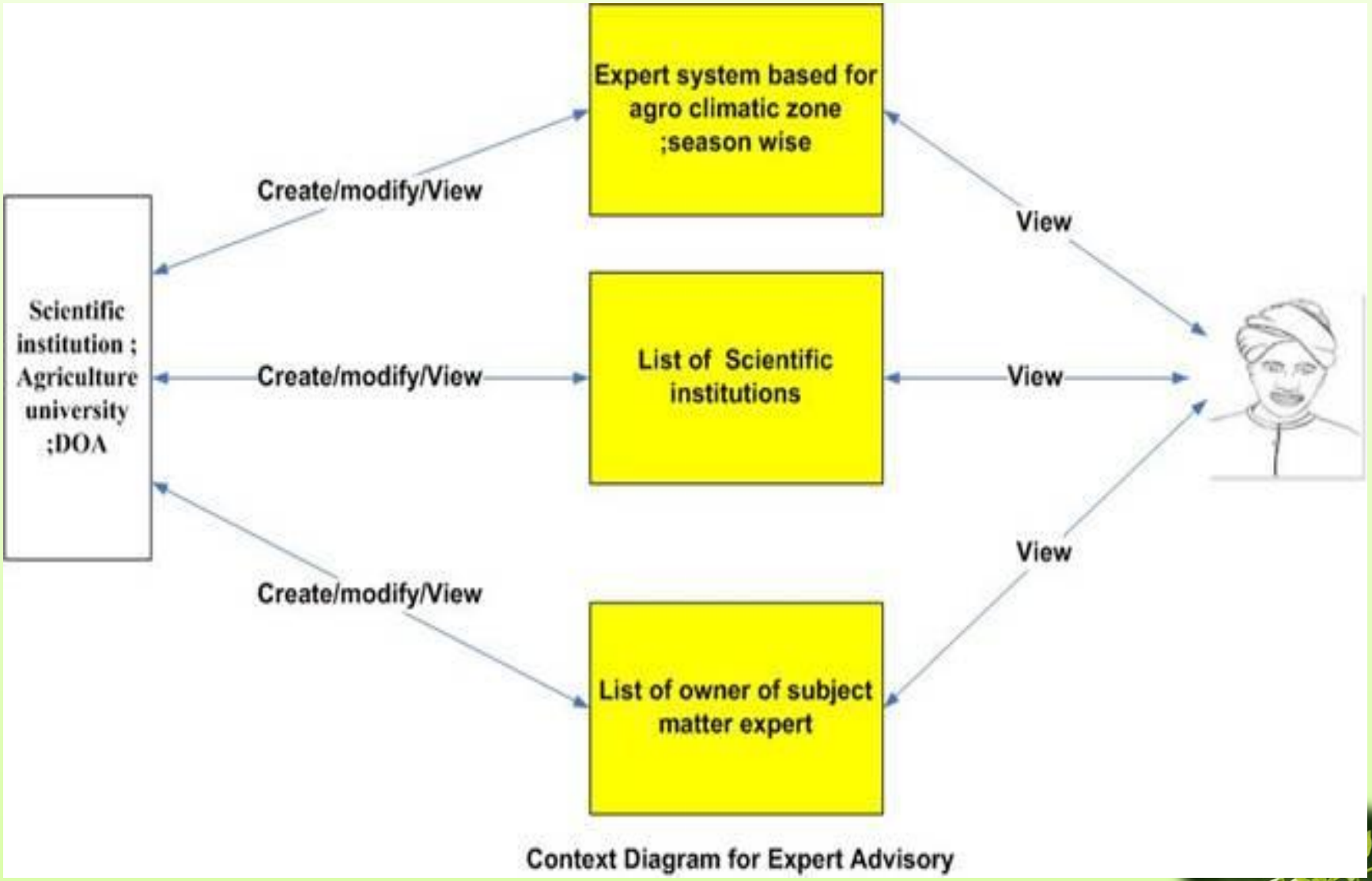
Component	Sub-Component	As-Is	To-Be
Training Institutions	FMTTI/MANAGE/SAMETI/ATMA/Institutes/Bank/FFS.. -(Trainer's Training ; Farmer's Training) Name, Resource (Rooms/Halls/Meeting rooms, availability Visuals Aid, Power Backup, Library, Trained Faculty Member – Extension/IT)	Departments/SAUs/Institutions… website/booklets/.. http://www.manage.gov.in http://cfmtti.dacnet.nic.in http://vistar.nic.in	Content Creation, Approval, Upload by FMTTI/MANAGE/SAMETI/ATMA/EEIs/SAMETIs/ Institutes/Bank/ KVKs/PPP/FFS/SHGs..
Training Calendars	FMTTI/MANAGE/SAMETI/ATMA/Institutes/Bank/FFS/Farmer's Club (NABARD)… Topics – Sector, Title, Objectives, Contents, Locations details (Venue), Eligibility Criteria (Participants), Duration (Start Date – End Date), Methodology – Lecture, Group Discussion, Case Studies, Demo, Field visit, Resource Person (Name, Address, Phone, Email), Coordinator (Name, Address, Phone, Email), Funding Pattern – Sponsored Scheme/ Paid/ Non-Paid	Training schedule - DAO; SDAO, Extension Functionaries at SAUS/ICAR Inst./ Banks.. Training Schedule information is given to the farmer manually/ website	Creation, Approval and uploading of the Training Calendar by FMTTI/MANAGE/SAMETI/ATMA/Institutes/Bank/ KVKs/PPP/FFS/SHGs..

Service 3- Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Business Process: Training – As Is & To Be

Component	Sub-Component	As-Is	To-Be
Post Training Details	➢ Participants Details ➢ Impact Analysis ➢ Feedbacks	➢ Manual recording	Creation, Approval and uploading of the Training Calendar by FMTTI/MANAGE/SAMETI/ATMA/Institutes/Bank/ KVKs/PPP/FFS/SHGs..
FLD	➢ Details on Front line Demonstrations	➢ Manual recording	➢ Creation, Approval and uploading of the Training Calendar by FMTTI/MANAGE/SAMETI/ATMA/Institutes/Bank/ KVKs/PPP/FFS/SHGs..
Alerts	➢ Registered Farmers/ Trainers; ➢ SMS – Pull & Push on Topics, Location, Dates etc. ➢ Auto Email alerts	➢ No Automatic Alerts ➢ SAUs, RAEO , BAO, DAO, Extn Workers at KVK/Banks	➢ Through Web, Mobile, email
Training Tool kit; Success Stories	➢ e-Learning Materials – Brochures/Booklets/Pamphlets/Kits ➢ Success Stories; Innovations ➢ Categories - Textual; Videos; Audios ➢ Repository of Expert Trainer's	➢ Distributed through SAUs, RAEO , BAO, DAO, Extn Workers at KVK/Banks	➢ Through Web

Expert Advisory – Context Diagram



Context Diagram for Expert Advisory

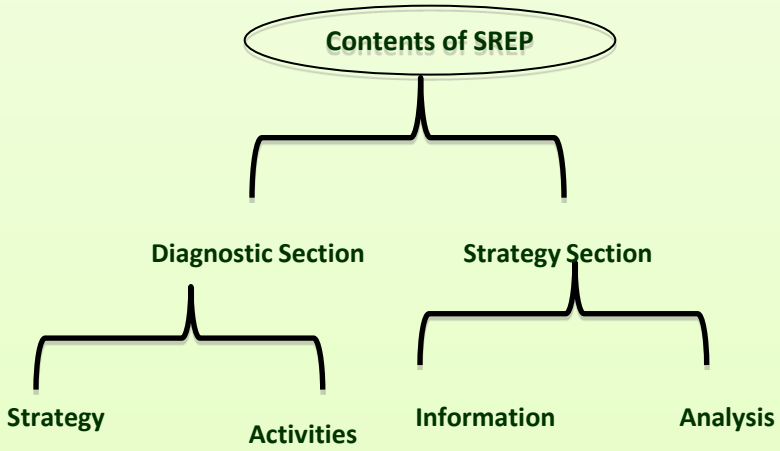
- Week-by-Week Calendar of Activities (Crop/Season/Duration/Period)
  - **Pre-Sowing** : Land development, Soil Suitability, Requirement & Preparation, Soil treatment, Crop Varieties, Seed Selection
  - **Cultivation Practices:** Seed Treatment, Method of Sowing, Manuring, IPM, Irrigation
  - **Intercultural Practices :** Weed Control, Crop rotation, Intercropping
  - **Harvest Technology :** Time, Methods
  - **Post Harvest Technology :** Cooling, Cleaning, Sorting, Storage, Grading, Packaging
  - **Practices for maintaining good quality, Processing, Marketing , Equipments**
- List of Scientific and Academic Institutions
- List of Owner of expert information

Service 3- Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Business Process: Resource Repository – As Is & To Be

Component	Sub-Component	As-Is	To-Be
Resource Repository	➢ SREP ➢ CDAP ➢ SEWP ➢ Contingency Plan ➢ A Farmer Friendly Handbook ➢ Details of Dangerous Machinery Regulation Act & Details on Safety Measures….	➢ Manually Prepared	➢ Database Structure ➢ Document Management System (DMS)
	➢ Package of Practices ➢ Success Stories ➢ Standards	➢ Manually Prepared	➢ Document Management System (DMS)
	➢ Directory of Subject matter Experts (SMEs)	➢ Manually Prepared	➢ Database Structure: Name, Subject Area, Address, Contact details …….
Mass Media Contents on Good Agricultural Practices (GAPs)	➢ Audios ➢ Online-Videos Streaming	➢ SAUs/SDAO/ Institutes/ maintains their own film library	➢ Web based library catalogued with meta tags for streaming on Online Videos on GAPs ➢ Upload of Videos by Institutions/ SDAO/KVKs, Progressive Farmer etc.

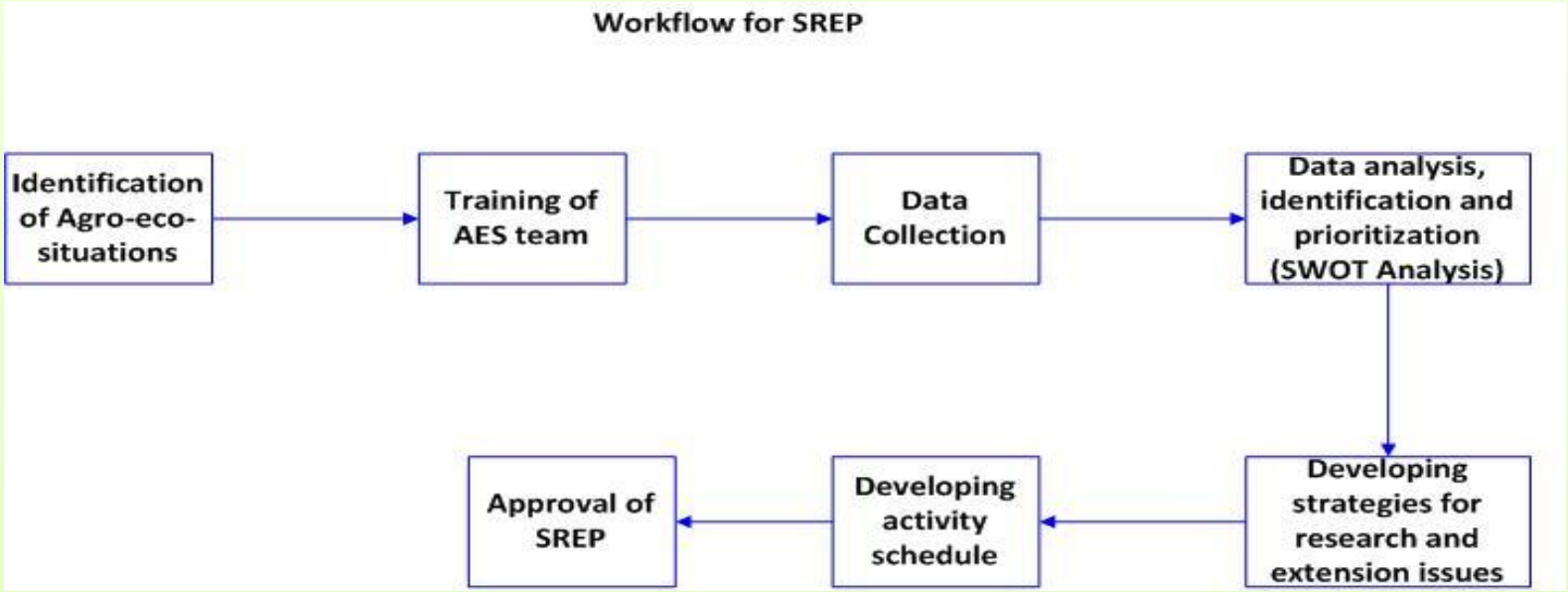
Strategic Research & Extension Plan (SREP) -



List of activities:

- Identification of Agro-Ecological Zone (AEZ) and different Agro-Ecological Situations (AES) under each AEZ.
- Identification of representative village in each AES to signify/represent the whole AES
- Collection of primary and Secondary data for representative villages
- Grouping of the data into different identified AES
- Data Analysis and prioritization of Research-Extension issues:
  - ✓ Recommended v/s farmer's existing practices for different commodities/crops and gaps
  - ✓ Identification of gaps in adoption of Improved Technologies & Managements
  - ✓ Identification of critical issues, problems and opportunities (SWOT analysis)
  - ✓ Developing strategies for research & extension
  - ✓ Developing activities schedules for strategies for preparation of work plan

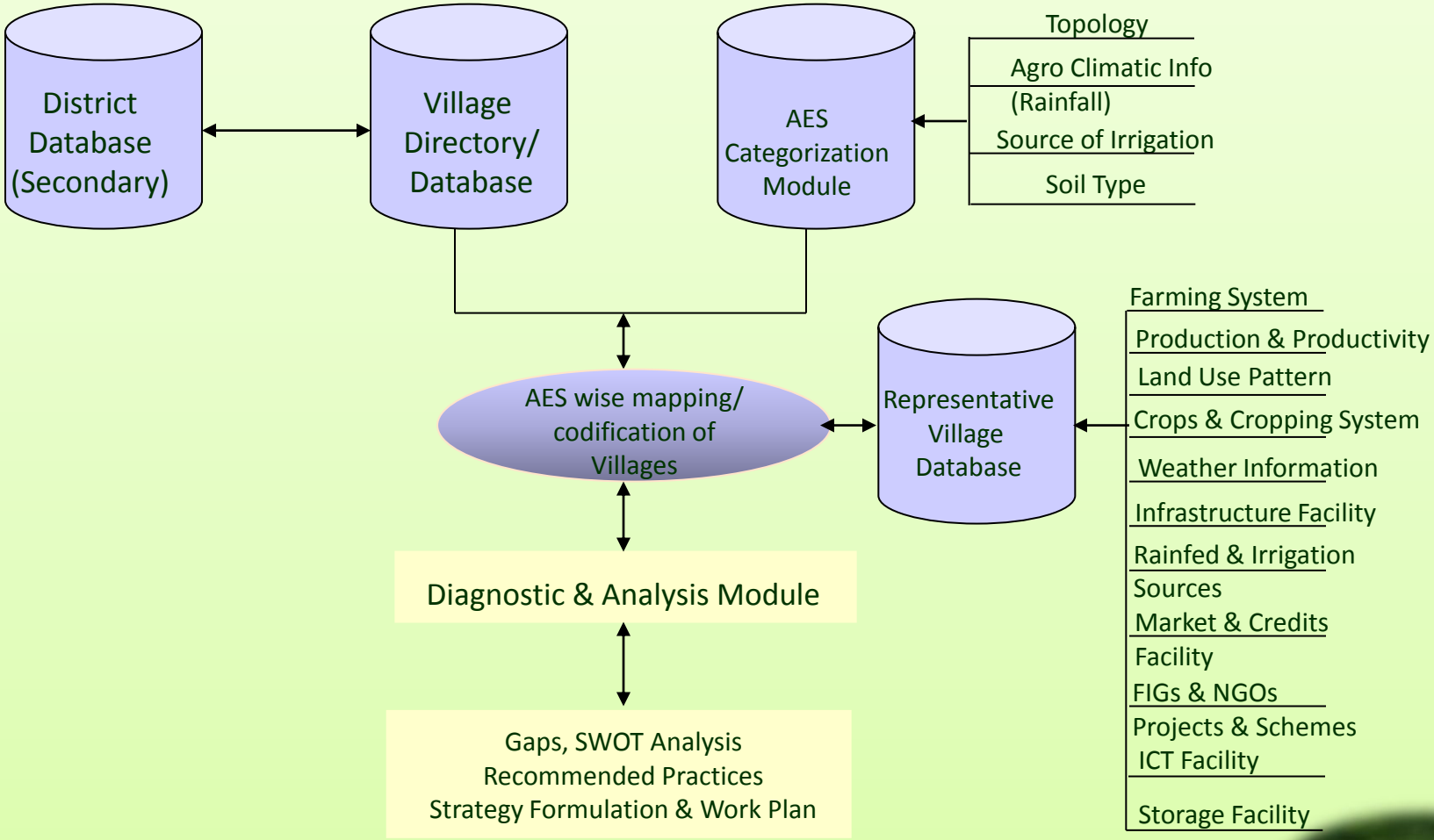
Resource Repository – Workflow of SREP & To Be



Proposed Information system To-Be:

- The entry of primary , secondary data
- The data analysis on identification of Issues w.r.t. each AES
- Tabulation on identification of gaps in adoption technologies and management
- Tabulation on identification critical issues, problems and opportunities (SWOT analysis)
- Tabulation on defining strategies for research & extension
- Tabulation on schedules for strategies for preparation of work plan

Conceptual Diagram of SREP Info System



State Extension Work Plan (SEWP)

Cafeteria of Activities : Activities to be undertaken at State and District level are categorized separately.

The state level activities include

- Support for upgrading state level training Institutions such as SAMETI,
- HRD of extension functionaries, Organization of state level Agri-Exhibitions,
- Monitoring and Evaluation of the Scheme.

The district level activities are further categorized in four groups namely,

- Farmer oriented activities include development of SREP, mobilization of farmer groups, training/ exposure visit of farmers, field demonstrations, all aimed at empowering the farmers and improving their participation in technology dissemination process. Under the category
- Farm information dissemination, local level agricultural exhibitions, information dissemination through printed materials and development of technology packages in electronic form are covered.
- The R-E-F linkages based activities include organization of Farmer-Scientist Interaction at local level, organization of Field days and Kisan Goshties and support for local level researchable issues emanated from the SREP.
- The administrative expenses under district level activities provide support for running ATMA like Institutions and a few block level Farm Information and Advisory Centers.

Proposed Information system To-Be:

- The entry of data on Farmer oriented activities by SAMETI, ATMA, FIGs at district level.
- Tabulation on identification of gaps in adoption technologies and management
- Tabulation on defining strategies for extension activities and budget analysis
- Tabulation on schedules for strategies for preparation of work plan with budget

Resource Repository: Contingency Plan- As Is

Agriculture Contingency Plan for each District consists of District Agriculture Profile and Suggested Contingency Measures

A. District Agriculture Profile :

Agro-Climatic / Ecological Zone	Agro-Ecological Region (ICAR); Agro-Ecological Region (Planning Commission);
	➢Agro Climatic Zone (NARP) ➢List of the district falling under NARP Zone
	➢Geographic Coordinates of district (Latitude, Longitude, Altitude)
	➢Name & Address of ZRS/ZARS/RARS/RRS/RRTS ➢Name & Address of the KVKs in the district
➢Rainfall	➢SW Monsoon, NE Monsoon (Avg (mm), Normal Onset, Normal Cessation ➢Winter (Temp), Summer (Temp), Annual
➢Land Use Pattern of District	➢Area – Geographical, Forest, Non-Ag. Use, Pastures, Cultivable Waste Land, Barren, Current Fallow, other fallows
➢Major Soil	➢Area (Deep black, Deep Red, Shallow black, Shallow Red)
➢Agriculture Land Use	➢Area – (Net Sown, Sown more than once, Gross Cropped)
➢Irrigation	➢Area (Net, Gross, Rainfed), Source (Canal, Borewells, Lift irrigation), No., Area…
➢Major Field Crops & Horticulture etc.	➢Crops (Cereal, Pulses, Oilseed..), Hort. (Fruits, Veg.), Fodder .. Area (Kharif, Rabi, Summer)
➢Livestock, Poultry, Fisheries	➢Livestock (Male, Female, Crossbreed..) Poultry (Commercial, Backyards)-No. of Farms, Birds) ➢Fisheries(Capture, Inland, Culture..)- No. of Boats, Fisherman, Nets ….
➢Production & Productivity of Major Crops	➢District Major Crops - Kharif, Rabi, Summer – Production (Tons) & Productivity (Kg/ha)
➢Sowing Windows for 5 major Crops	➢**Kharif**- Rainfed, Irrigated; **Rabi-** Rainfed, Irrigated
➢Major Contingency, district is prone to?	➢Drought, Flood, Cyclone, Hail Strom, Heat/Cold Wave, Frost, Mite, Blast, Smut, Pest & Disease
➢Include Digital Map of District	➢Location Map, Mean Annual Rainfall Map, Soil Map

B. Suggested Contingency Measures

Contingency Plan Template

Contingencies	Sub-group	Situation	Conditions	Suggested Contingency Measures
Strategies for Weather related contingency	➢Drought	➢Rainfed	➢Early season drought ➢Delay by 2,4,6,8 weeks …. ➢Terminal Drought	**As-Is** ➢DAC prepares and releases the district wise suggested Contingency measures ➢Contingencies releases are uploaded on DAC website by DAC **To-Be** ➢The contingency plan document shall be available in structured format ➢The Content creation, approval and upload shall be done by DAC or its identified Institution
		➢Drought - Irrigation	➢Delay in Monsoon, No Monsoon ➢Delay in release of water for canal ➢Non-release of water for canal ➢Insufficient ground water discharge	
	➢Unusual Rain	➢Short Rainfall ➢High Rainfall		
	➢Floods	➢Crop submergence	➢Transient water logging/ partial inundation ➢Continuous submergence for more than 2 days	
	➢Extreme events- Heat/Cold/Frost/ Hailstorm/Cyclone	➢Drought ➢Floods		
	➢Livestock, Poultry & Fisheries	➢Feed, Fodder, Water, Health & Diseases		

Resource Repository: Contingency Plan- As Is & To Be

Contingencies	Sub-group	Situation	Conditions	Suggested Contingency Measures
Cyclone/ Tsunami	➢Overflow / flooding of ponds ➢Change in fresh/ brackish water ratio ➢Health and disease management	➢Crop Submerge ➢Land submerge	➢Storage of feed ingredient ➢Drinking water ➢Health & Disease Management	**As-Is** ➢DAC prepares and releases the district wise suggested Contingency measures ➢Contingencies releases are uploaded on DAC website by DAC **To-Be** ➢The contingency plan document shall be available in structured format ➢The Content creation, approval and upload shall be done by DAC or its identified Institution
Heat wave & Cold wave	Drought	➢Dry Land ➢Water Scarcity	➢Management of Pond ➢Health & Disease Management	

The above parameters consisting of heads/subheads, situations, conditions with suggested contingency measures are to digitized in the database for each district.

Service 3- Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Resource Repository: A Farmer Friendly Handbook

A Farmer Friendly Handbook .. for Government Schemes & Programmes

Themes	Description	Scheme Name	Type of Assistance	Pattern of Assistance	Additional Assistance by State
➢ Soil Health Conservation & Fertilizers ➢ Seeds ➢ Irrigation ➢ Training & Extension for Farmers ➢ Machinery & Technology ➢ Agriculture Credit ➢ Agriculture Insurance ➢ Plant Protection ➢ Horticulture ➢ Agriculture Marketing ➢ Department of Seed Certification & Organic Certification	What to do? • Use appropriate theme based advisory as per holding size and crop. e.g. In Machinery Tech. following are the description • Expensive equipment can be used by custom hiring/ sharing by groups of farmers. • Conserve Resources - Use Zero-till Seed Drills, Laser Land Levelers, rotavator, Happy seed drill etc. • Learn proper use, routine maintenance and servicing through Farm Machinery Testing and Training Institutes, KVKs etc.	Central Govt. Schemes Like ▪ MMA, ▪ Initiative for Nutritional Security Through Intensive Millets Promotion (INSIMP) ▪ Integrated Scheme of Oilseeds, Pulses, Oil palm and Maize (ISOPOM) ▪ NFSM ▪ NHM ▪ Post Harvest Tech & Mgmt. ▪ …….. etc.	List of Various assistance provided through Schemes. e.g. NHM Offers following assistance • Power operated machines/tools including power saw and plant protection equipments. • Power machine(upto 20 BHP with rotavotor/equipment) • Power machine(20 BHP and above including accessories/ equipments)	List of pattern of assistance corresponding to each type of assistance e.g. NHM Offers following pattern of assistance corresponding to assistance given in previous column • Limited to ` 35,000 plier per set, 50% of cost limited to one set per beneficiary. • Limited to ` 1.20 lakh per per set, 50% of cost limited to one set per beneficiary. • Limited to ` 3.00 lakh per per set, 50% of cost limited to one set per beneficiary.	List of State Govt. Schemes providing assistance on similar theme

Service 3- Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

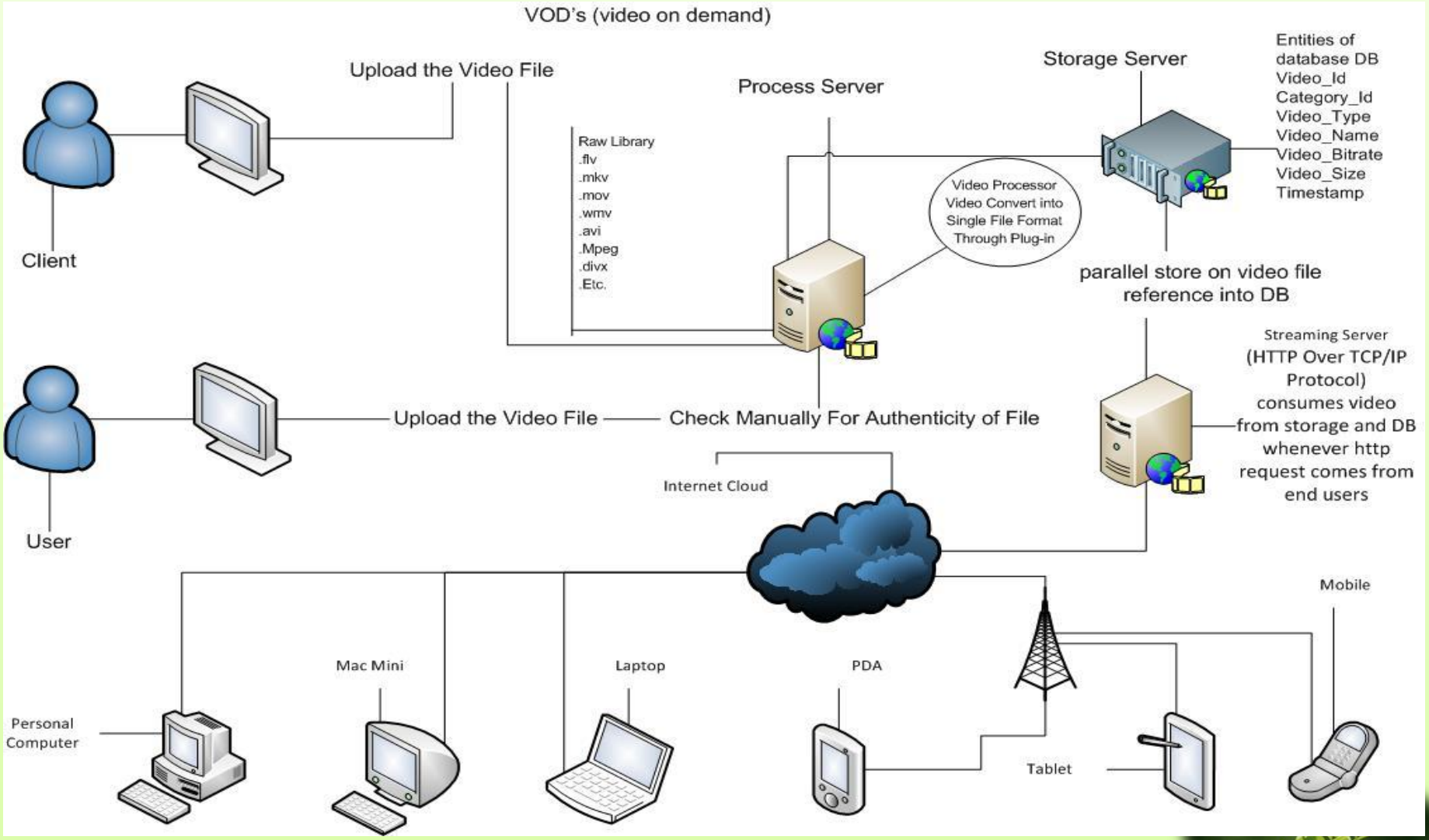
Resource Repository: Mass Media-Audio/Videos

Audios/ Videos on Good Agricultural Practices :

Component	Sub-Component	As-Is *	To-Be
Best / Innovative Practices in Crop Management	➢ Land Management, Sowing Methodology ➢ IPM & Irrigation Practices, ➢ Harvest & Post-Harvest Practices …	Audios & Videos Libraries for Extension services by ➢ DAO Extension & Training division ➢ SAUs, KVKs, SAMETI, ATMA ➢ DD, AIR, Banks, NGOs,	➢ Indexing w.r.t. Subject, Location .. ➢ Meta Tags on Audio/Video files ➢ Dissemination through Streaming & Webcast
Farm Machinery	➢ Usage of Farm Machineries ➢ Success Stories; Innovations	Audios & Videos Libraries for Extension services by ➢ DAO Extension, Training & Ag. Engineering division ➢ SAUs, KVKs, SAMETI, ATMA ➢ DD, AIR, Banks, NGOs,	
Front line Demonstration	➢ Success Stories on Best & Innovative practices	➢ Audios & Videos On Field/Off Field by FFS, FS, FFs, Progressive Farmers	

* Navkrishi portal (http://navkrishi.dacnet.nic.in) maintains & disseminate, schedules of programmes on "Mass Media support to Agriculture Extension", produced and broadcast/relayed by DD and AIR Stations across the country. The portal only provides the details of schedules well in advance so that farmers/extension workers may plan to watch/listen the desired one. The data entry for the schedules are carried out by the AIR regional centres and for DD National/regional/Narrowcasting stations.

Resource Repository: Mass Media- Web Cast Technology



Service 3- Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Resource Repository: Mass Media- Role based Workflow Web Cast

Content Creator	Content Approver	Content Uploader
▪ Farmer ▪ DD ▪ AIR ▪ ICAR Institutes ▪ KVKs ▪ SAUs ▪ NGOs ▪ Banks	▪ ICAR Institutes ▪ SAUs ▪ Directorate of Extension	▪ ICAR Institutes ▪ SAUs ▪ Directorate of Extension
Role: Content Creator, submit details on content (Subject, Category, Description)	**Role:** Content verification, add Meta tags, Archival policy	**Role:** Content Upload on Portal

Forecast on production of Crops by various entities with their activities –

Organization	Activity
Indian Space Research Organization (ISRO)	Gathering Satellite image data on Crop Area over its various production stages
Indian Metrological Department (IMD)	Gathering weather related data
Institute of Economic Growth (IEG)	Collection of data from ISRO & IMD & estimation of Crop production

Data shared by DAC with State department with following data element

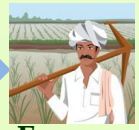
- State
- District
- Date of Forecast
- Crop Name
- Season
- Area
- Production (estimated)

Service 3- Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Linkages : Service to Farmer

DAC & Crop Directorate, ICAR Institutions	DAC, ICAR Instt., FMTTIs	DoE, MANAGE, ICAR Inst., FMTTIs, Banks	Expert Advisory from ICAR Institutes	DAC, DoE, ICAR Institutions
Agronomic Practices (Recommended Cropping Practices)	Farm Machineries details & guidelines, Subsidy Schemes	Trainer/Farmer Training & Field Demonstration	Expert Advisory at Higher level ; CROPSAP, Publication Materials	FASAL, Ag. Contingency Plan, MSP, APY & Online Audio/ Videos GAPs

CAP/SAP



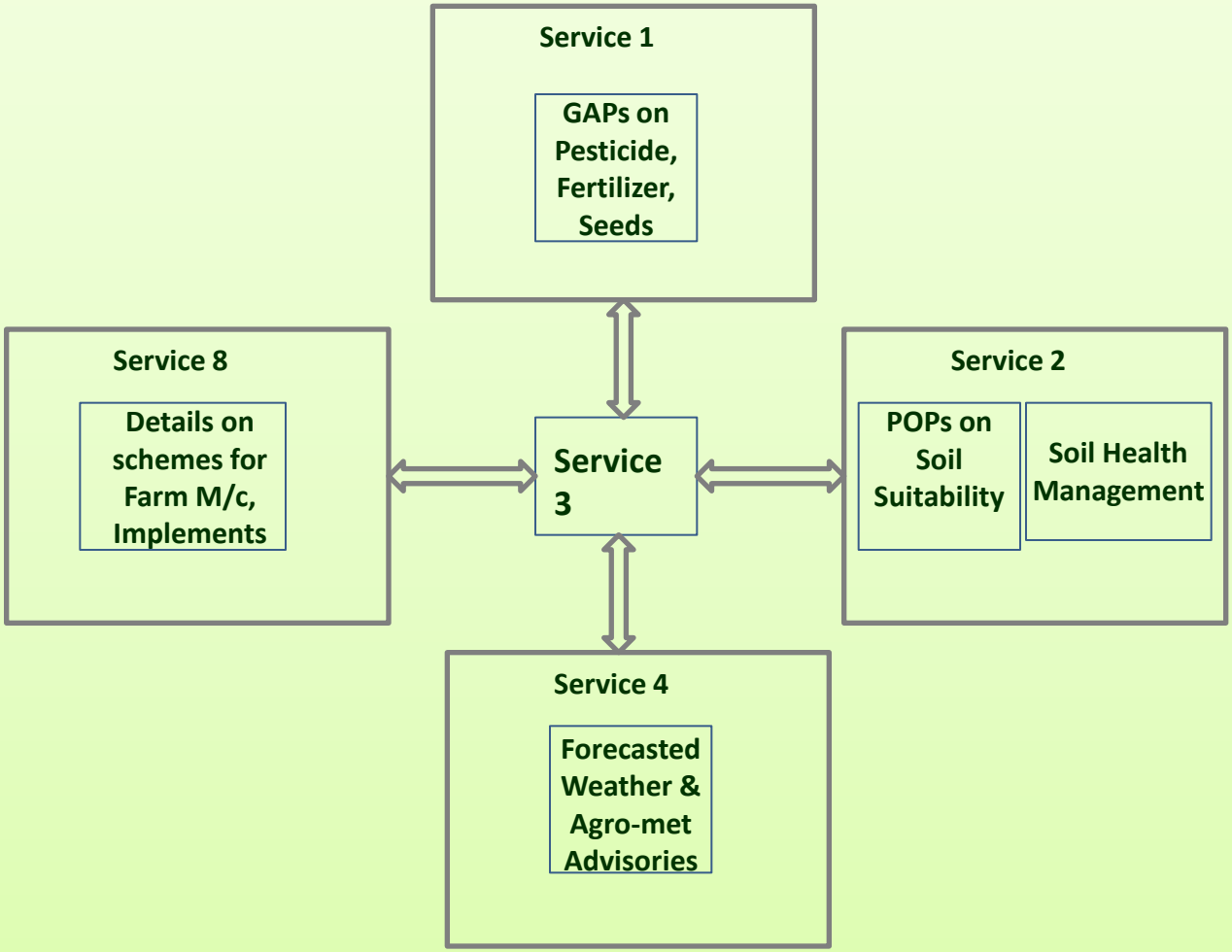
Farmer

POP, GAPs, Crop Management	Farm Machinery Guidance, Dealer details, Disbursement of Subsidy	Training on Crop Mgmt., Farm Machineries, Field Demo., Success Stories	Expert Advisory by SMEs, Farm Level Planning, Publications materials	Farmer Friendly Handbook, Online Audios/Videos on POP/GAPs, Success Stories
SDA, DAO, SAUs ZRECC, KVKs	DAO, SAU, SAMETI, ATMA	DAO, SAU, SAMETI, KVK EEIs, FFS, FS, FFs, Progressive Farmer,	DAO, BAO, SAU, KVKs, EEI, ZRECC	SDAs, SAUs, FFS, FS, FF, ZERCC,

DAC: Department of Agriculture & Cooperation; ICAR: Indian Council of Agricultural Research; SDA: State Department of Agriculture; SME: Subject Matter Expert; DAO: District Agriculture Office; EEI: Extension Education Institute;

Service 3- Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Ecosystem



Deliverables

NeGP-A : AMMP

Service 3 - Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

The following deliverables are envisaged during the life cycle of the project:

- Detailed SRS Document
- Detailed Technical Requirements Specifications Document
- Systems Design Document (SDD)
- Software Test Plan Document
- Software Acceptance Plan Document
- Project Reviews and Progress Reporting
- Manuals (Operations, User, System Administration)
- Training Plan
- Training
- Software on CD with Manuals
- Warranty Support for Six months
- Change Management Documents

Questions & Answers

NeGP-A : MMP

Service 3 - Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Thank You

A. SRS Document available at http://ammp.dacnet.nic.in.in/…
B. Presentation slides available at http://ammp.dacnet.nic.in/...

Service Project Team :-

A. Central Team
   1. Smt. Pratibha Lokhande, Technical Director & National Project Coordinator (NeGP-AMMP)
   2. Smt Sameena Mukhija, Technical Director, Cluster Coordinator
   3. Smt Beena Menon, Principal Systems Analyst (Service Coordinator)
   4. Shri Girish Tiwari, Senior Systems Analyst (Service Coordinator)
   5. Shri Shailendra Saxena, Systems Analyst (Service Coordinator)

B. State Level team
   1. Smt. M. Kasthuri , Technical Director, NIC, Thiruvanathapuram
   2. Shri Thangavel, Technical Director, NIC, Bangaluru
   3. Smt. Lakshmi Prasanna, Principal Systems Analyst, NIC, Mumbai
   4. Smt. Gauri Honrao, Technical Director, NIC, Pune
   5. Shri A.N.Siddiqui, Technical Director, NIC, Bhopal
   6. Shri Loukesh Kumar, Technical Director, NIC, Ranchi
   7. Shri Sandeep Kumar, Senior Systems Analyst, NIC, Shimla
   8. Smt. Kavita, Technical Director, NIC, Guwahati

Contact email : sameena@nic.in; gkt@nic.in

Service 3- Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Resource Repository: SREP Primary Dataset

Collection of Primary Data of Representative Village under selected AES

- Existing Farming Systems (commodity wise proportion & contribution in net annual income)
- Production & productivity of important commodities (Area, Production & Yield)
- Crop (Major crops & Area) & cropping systems
- Livestock and Livestock Production (milk, egg etc.)
- Infrastructure facilities (Seed farms, veterinary, irrigation, cold storage, warehouse, testing labs (soil, water, insecticides, pesticides), A.I. centres, hatcheries, nurseries, agro-processing and animal feed plants)
- No. of families associated with different **Enterprises** (Agricultural crops, horticultural crops, animal husbandry, bee keeping, non-farming activities etc.
- On going developmental schemes undertaken by different line depts.
- Landuse pattern (Geographical, cultivable, cultivated, current fallow, pasture, barren & uncultivable land) & operational land holdings (No. of holding & area under small, medium, large, marginal, landless)
- Rainfall & weather information
- Usages of organic fertilizers (vermicompost, bio-fertilizers, bio-pesticides) and crops produced under organic farming
- Details on medicinal, aromatic and other minor forest by produce
- Demographic information
- Area indicated under different soil type & soil problem
- Rainfed & source wise irrigated area
- Projects/schemes on Infrastructure & Research development and extension
- Markets (Commodities with quantity handled, area & no. of farm families handled), Public-Private Partnership in market related initiatives (Activities, volume & value of trade) and inflow & outflow of commodities
- Marketing & Credit infrastructure/facility
- Farmers interest groups (FIGs), SHGs, NGOs
- Input & service providers (Seed, fertilizers (NPK), pesticides, animal feed & poultry feed, veterinary medicines, fish feeds, fish hatcheries, no. of horticulture nurseries, fodder)

Collection of Secondary Data of the District

1. **General features**: Topology Details, Geographical Area
2. **Agro-climatic Information**: Rainfall Details, Temperature and relative humidity etc.
3. **Agro-ecological situations**: Agro-eco Zones, Agro-ecological situations, Weather information
4. **Demographic data**
5. **Information on Land based systems**
6. **Rainfed and Irrigated Area, and Sources**
7. **On-going Developmental Programmes**: Extension and Research activities
8. **Information on Markets**: Local Panchayat, block, District markets
9. **Agro-Processing facilities :** Packing materials, Types of Processing Units
10. **Agricultural Credit :** Agricultural credit from banks, Cooperatives
11. **Marketing Infrastructure**
12. **Input and Service facilities**: Available inside and also out side the district that
13. **Farmers' Groups and Organizations**- Number, purpose, structure, activities undertaken,
14. **Private sector organizations and NGOs**
15. **Information and Communication Technology**
16. **Number of Farm Households**
17. **Land and Soil**: Farming Systems

Service 3- Providing Information on Crops & Good Agricultural Practices (GAPs), Farm Machinery and Training

Crop Details http://agropedia.iitk.ac.in

Origin	Production Practices	Protection Technology	Post-Production Practices
Origin Botanical Description • Shoot system ➢Stem ➢Leaf ➢Inflorescence ➢Kernel • Root system • Growth stage ➢Vegetative stage ➢Reproduction stage ➢Reproduction stage Importance Cropping system Variety Grows in • Soil • Climate ➢Agro-climatic Zones	Field preparation • Leveling • Deep plugging • Harrowing • Bonding, Planking, Tillage Seed and sowing • Seed treatment • Method of sowing • Seed selection • Time of sowing • Depth of sowing, Spacing • Seed rate Water management • Irrigation ➢Irrigation sources ➢Irrigation system ➢ Irrigation scheduling ➢Dry land Water management Nutrient management • Essential plant nutrient ➢Nitrogen ➢Phosphorus ➢Potassium • IPNM ➢Organic manure ➢Biofertilizer ➢Fertilizer	Weed Control • Type ➢Grass weed ➢Sedge weed ➢Broad leaf weed • Weed management ➢Cultural weed control ➢Mechanical weed control ➢Chemical weed control ➢ Biological weed control Disease • Type ➢Fungal disease ➢Bacterial disease ➢Viral disease ➢Nematode disease ➢Disease management ➢Cultural disease control ➢Biological disease control ➢Chemical disease control ➢Mechanical disease control Insect pest • Insect pest management ➢Cultural insect pest control ➢Mechanical insect control ➢Chemical insect pest control ➢Biological insect pest control	Harvesting and threshing • Harvesting • Threshing Post harvest management • Cleaning • Drying • Processing • Storage • Value addition Economics and marketing • Marketing • Economics ➢Cost of production ➢Gross income ➢Net profit ➢Benefit cost ratio

Package of Practices – Rice

Source: http://hpagrisnet.gov.in

Package of Practices – Rice

Source: http://hpagrisnet.gov.in

Introduction

Rice is one of the major food crops of Himachal Pradesh cultivated on 86,200 hectares during 1997-98 with a production of 1,20,680 tonnes and an average yield of 1400 kg per hectare. Kangra and Mandi districts which have more than 65% rice area in the State, have great potential for improving their yields and increasing rice production in the State.

The main reasons for low yields of rice in H.P. are low plant population, less use of fertilizer and inadequate weed control. Besides, low temperature due to cold irrigation water and low ambient temperature at flowering stage, coupled with high incidence of blast disease add more to the dimensions.

Varieties

Palam Dhan-957 : It is a semi-dwarf timely maturity and high yielding variety recommended for irrigated condition under mid hills of H.P. It is blast resistant. Average yield is 40 q/ha.

Himalaya - 2216 : It is medium duration high yielding variety with intermediate plant height and recommended for transplanted/irrigated conditions. It matures in 125-130 days and has long slender translucent grains. Its average yield is 40 q/ha. It possesses field resistance to major rice diseases.

VL Dhan-221 : It is a semi-dwarf early maturing high yielding drought tolerant variety suitable for rainfed upland conditions of H.P. It matures in 105-110 days and has medium bold grains. Its average yield is 28 q/ha and possesses resistance to major rice diseases.

Hasan Sarai : It is semi-dwarf variety suitable for irrigated condition from 1000-1300 m altitude. Its grains are long, scented and bright. It matures within 125-135 days. It is diseases resistant. Its average yield is 26 q/ha. Kasturi : It is a semi-dwarf high yielding basmati variety meant for areas upto 1000 m altitude and matures in 135-145 days in the mid hills and has long, slender, scented grains with awns. Its average yield is 30 q/ha and has moderate field resistance to blast.

Himalaya-741 : It is early maturing, semi-dwarf and high yielding variety suitable for cultivation in mid and low hills of Himachal Pradesh both under transplanted and direct sown conditions. It is cold resistant widely adaptable, comparatively resistant to blast, glume blotch and brown spot diseases. It has long slender grains with good cooking quality, having 6% protein and 17 per cent amylose contents. On an average, its yields 39 q/ha should be discouraged in areas where blast severity is high.

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Source: http://hpagrisnet.gov.in

Varieties

RP-2421 : It is an early maturing high yielding variety with intermediate plant height and recommended for transplanted/irrigated conditions. It matures in 120-125 days and has medium bold grains. Its average yield is 38 q/ha. It possesses field resistance to major rice diseases.

China-988 : It is a medium coarse tall variety for irrigated as well as rainfed areas all over Himachal Pradesh because of its early maturity. It has a very good germination capacity and can withstand drought spells. It is suitable for direct sown conditions, both on dry and puddled soils, as also for transplanted conditions. It matures in 115-125 days and yields, on an average, 25 q/ha. China-988 has a wide adaptability. It is susceptible to lodging, shattering and blast.

IR-579: It is a dwarf, high yielding-cum-high quality variety suitable for cultivation in low hills and valley areas (below 750 m asl). It has long slender grains with very good cooking quality. It matures in 130-140 days. It has the yield potential of more than 60 q/ha with an average yield of 40 q/ha. It possesses field resistance to major diseases and insect-pests.

R-575 : It is a tall and purple foliage variety suitable for growing under all conditions upto an elevation of 1,000 m to fight the menace of wild rice i.e. Rissa. It is susceptible to lodging under moderate fertilizer application. It is also susceptible to blast disease and prone to the attack of stem borer. It has long bold grains having more than 10% protein. It matures in 130-135 days. Its average yield is 25 q/ha.

Himalaya-799(HPU-799): It is a semi-dwarf, early maturing, cold tolerant variety recommended for cultivation from 650-1500 m asl. It mature in 120-125 days, has long bold grains with small awns and field resistance to major diseases and insect-pests of mid-hills. Its average yield is 30 q/ha and ha an yield potential of 62 q/ha. It has good cooking quality with intermediate amylose content and gelatinization temperature having 8.12% protein. This variety has different source of resistance to blast than that of Himalaya-741 and thus will provide varietal diversification in mid hill zone.

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Varieties

Naggar Dhan (Ching Shi-15): It is semi-dwarf, cold tolerant "Japonica" variety recommended for high altitude areas above 1400 m asl in Kully valley and similar other parts of the State. It matures in 140-145 days in high hills and has short bold grains. Its average yield is 35 q/ha with an yield potential of 65 q/ha. It out-yields the local popular variety - Jatoo & Matali by more than 70% and Norin-18 by 20%. It has low amylose, cooks sticky and liked by people of high altitude areas. This variety has field resistance to blast, glume discoloration and brown spot.

Himalaya - 2216 : It is medium duration high yielding variety with intermediate plant height and recommended for transplanted/irrigated conditions. It matures in 125-130 days and has long slender translucent grains. Its average yield is 40 q/ha. It possesses field resistance to major rice diseases.

Bhrigu dhan (HPR-179) : It is a new variety recommended for high altitude areas above 1400 m asl in Katarai of Kullu valley and Naggar areas and similar other parts of the State. It is grown in both irrigated and rainfed areas. It is early maturing and tolerant to cold. It has short and bold grains. It has resistance to blast, brown spot, glume diseases and stem and leaf folder /roller.

PR-108, PR-109 & Jaya : PR varieties are recommended in areas of Nalagarh and Una district but not in Dhaulakuan and Nurpur areas where brown spot disease is a problem, whereas Jaya is recommended for Dhaulakuan and Nurpur areas.

HKR-126 : It is recommended for low hills. It has resistance to lodging and diseases. It has long grains and matures within 137 days. Average yield is 39 q/ha.

Soil Condition

Paddy is adaptable to all kind of soils varying in texture from sandy loam to clayey, with soil reactions ranging from acidic to alkaline, provided sufficient water is available either through assured rainfall or irrigation. The semi-aquatic nature of the crop, however, necessitates of heavy soil through which rain or irrigation water does not percolate easily.

Soil preparation Requirement

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Field Preparation, Seed & Sowing

Agronomic Practices

There are two main methods of rice cultivation -

1.Transplanting method:
The transplanting method is feasible in those areas where sufficient assured water exists. In this method, first the nursery is raised and then seedlings are transplanted in puddled fields when they are 15-20 cm tall and have developed 4-5 leaves.

Selection of Seed : Properly filled seeds should be selected for sowing. For selecting such seeds, dissolve 2.5 kg common salt in 25 L water and dip 3.7 kg seed at the time in this solution and discard the seeds floating on the surface. Wash and dry the healthy seeds well. 25-35 kg seed is sufficient for transplanting one hectare area.

Seed Treatment : Treat the dry seeds with Bavistin (1:400) against seed borne diseases. 2.5g of chemical is required for 1 kg seeds. The treatment can be given in a rotating drum or putting the seed in a container and shaking it well after adding chemical.

Nursery Raising: Success in getting high yields of rice lies in raising healthy sturdy and uniform seedlings. The nursery can be grown by dry of wet methods as described below :

- **Dry method :** Prepare fine raised seed-bed 10 cm high of 8x1.25 m dimension. Apply 65 g urea and 150 g superphosphate per bed and mix it thoroughly in the upper 5 cm layer of the bed. Sow 400 g good quality treated seeds on each bed, preferably in rows 10 cm apart. Cover the seed with a fine layer of soil. 20-30 kg well rotten FYM should be properly mixed in soil per bed before the incorporation of urea and superphosphate.

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Field Preparation, Seed & Sowing

Another dose of 45 g urea per bed may be applied a fortnight after sowing so as to get the seedlings ready for transplanting in about 25-30 days. 4 such seed beds will be required for transplanting on bigha. Keeping the nursery free of weeds, irrigate it regularly. If the seedlings in the nursery show yellowing of leaves, spray it with 0.5% ferrous sulphate solution after adding unsalked lime equal to half the weight of ferrous sulphate.

For weed control in rice nursery, spray Oxadiazon (Ronstar) @ 4 L/ha after 14 days of sowing. This herbicide results in temporary phytotoxic effect on the rice seedlings but the plants recover afterwards. Spray of Thiobencarb (Saturn) or Butachlor (Machete) @ 2 L/ha 7 days after sowing also controls the weeds effectively.

➢ **Wet method :** After incorporating farm yard manure in soil at the rate of 20-30 kg per bed of 8x1.25 m size, flood the field and puddle it well. Leave the puddle for 2 to 3 days as such. Prepare raised seed-beds 20 cm high of 8x1.25 m size with 1/3 m water channel in between the two rows of beds. All the practices after this are the same as for dry method except that instead of dry seed, the pre-germinated seeds is used in this nursery raising method. To obtain the pre-germinated seed, soak seed for 24 hours in water and keep it in dark room for 36 to 48 hours.

Time of Nursery Sowing : The nursery should be sown 4 weeks before the time of transplanting. The schedule for nursery raising is given below :-

Tall and dwarf varieties: 20 May to 7 June **Basmati varieties :** 15 May to 30 May

Field preparation

- Repair all bunds.
- Incorporate all the organic matter about two weeks ahead of transplanting by ploughing the field to enable decomposition. Begin puddling about 2-3 days before transplanting.

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Field Preparation, Seed & Sowing

- Work the field into a soft puddle. This will help minimize losses due to percolation of water.
- Uniformly level the fields before application of fertilizers.
- Apply all phosphorus, potassium and 1/2 nitrogen prior to the last puddling operation not more than 1-3 days before transplanting.

Uprooting of seedlings: The seed-bed should be irrigated a day before uprooting of the seedlings. The seedlings should be pulled gently so that the roots are not injured.

Method of transplanting

- Transplant the seedlings in rows, not more than 3 cm deep.
- Transplant 2-3 seedlings per hill.
- Space seedlings 15 cm x 20 cm for normal planting and 15 cm x 15 cm for late planting in case of tall varieties. Transplant at 15 cm x 15 cm for both normal and late plantings in case of dwarf varieties.
- Fill the gaps twice, 5 and 10 days after transplanting.
- Keep the water standing in the field to cover about two third length of the transplanted seedlings for 5 days after transplanting. This help in proper establishment of the seedlings.

Avoid

Transplanting over-age seedlings
Deep transplanting and wide spacing as these affect the yield adversely.
On uneven field.

Time of transplanting Tall and dwarf varieties: 15 June to 7 July

Basmati varieties: 20 June to 1 July

Field Preparation, Seed & Sowing

Inter-culture and weed control

The puddling of field and proper water management destroys many weeds and saves the crop from the first flush of weeds for about two weeks after transplanting. The weeds appear thereafter and should be controlled. Use of paddy weeder or hand weeding can help in controlling weeds but the effective, easy and better method is through chemical control.

- Machete 5% granules @ 30 kg/ha in 4-5 cm standing water or Machete 50 EC @ 3 L in 150 kg sand and broadcast in one hectare after 3-4 days of sowing in standing water.
- Stomp 5% granules @ 30 kg/ha or Stomp 30 EC @ 4 L/ha after 4-5 days of transplanting also effectively controls weeds.
- Broadcast application of Saturn 10% granules @ 20 kg/ha or Saturn 50 EC @ L/ha after 4-5 days of transplanting gives excellent weed control.
- Goal sprayed @ 600 ml/ha after 4-5 days of transplanting or 1% granules @ 15 kg/ha also effectively controls the weeds.
- If majority of the weeds comprises of nut sedge (Cyperus spp.) And broad leaved weeds, apply 2,4-DEE 4% granules @ 20 kg/ha after 4-5 days of transplanting.
- Butachlor should be applied within 48 hr of sowing of rice as pre-emergence under proper moisture conditions.

Note : In case of light textured soils, reduce the dose of herbicides by 25%.

Precaution : Use hand gloves while applying machete or mixing with sand.

Direct sowing method

In this method, the seeds of paddy are sown directly in the fields and nursery is not raised. This method is also of two types **:**

- Direct sowing of pre-sprouted seeds in puddled field
- Direct sowing of unsprouted seed in unpuddled soil

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Field Preparation, Seed & Sowing

The **first method** is locally called as **Machch method** and practiced in those areas where water is available for puddling. Transplanting, however, gives significantly higher yields than this method. The farmers are, therefore, advised to adopt transplanting method where water is available.

In the **second method** of direct sowing, the dry seeds of paddy are sown directly in the field either after onset of monsoon or even before that in dry soils. This is adopted in those fields which are unpland and assured supply of water is not available. Due to lack of proper water management, the yield of such rice is very low. As a preference, such lands should be put under maize for better return. However, if rice is to be grown on such lands, the following guidelines should be followed to increase the yield.

Weed control : In direct seeded rice, weed control is very important and only timely control can result in better production. The first weeding at 2-3 leaf stage is more critical and must be done. Thereafter, weeding should be done as and when required.

Land preparation: Prepare the land thoroughly by first ploughing with furrow turning plough and desi plough afterwards. The soil shoul dbe firable and sufficient moisture should be ensure at the time of sowing.

Sowing time : The sowing time of direct seeded rice is the same when nursery for transplanted rice is grown. Late sowing results into lesser yields. Generally, sowing should be done with the first rain.

Method of sowing : In this method, 100-125 kg seed per hectare is required. The seed should be sown in rows at 20 cm spacing behind the plough at a depth of 3-4 cm for better plant population and quick emergence. Broadcast method is not recommended as it gives very poor yield.

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Nutrient Management

Manuring

Apply whole of phosphorus and potash and half nitrogen prior to last puddling operation but not more than 1-3 days before transplanting. Incorporate the fertilizers well in the top 10 cm of puddled soil. Apply the remaining nitrogen in two splits - one 3 weeks after transplanting and the other 4-5 weeks later at panicle initiation stage. About 5-10 tonnes of well rotten FYM or compost per hectare should be incorporated before puddling. In case of sub-optimal dose of N, a single top dressing at the time of active tillering or panicle initiation would be more beneficial as compared to applying it at transplanting or in multiple splits.

Zinc deficiency

Generally, zinc deficiency is mot wide spread micro-nutrient disorder in paddy crop. The incidence of this deficiency is frequent where top soil has been removed or soils have high ph, high caco3 content and high organic matter content. The characteristic symptoms of zinc deficiency in paddy is bloaching of the mid rib of leaves. The symptoms are most marked on the 3rd or 4th basal leaf after 3-4 weeks of transplanting. While the mid ribs becomes yellowish particularly at the base of the leaf, the leaf tip remains normal green.

Besides this, light yellowish spots appear on the leaves, which later enlarge and coalesce and turn deep brown. The entire leaves becomes brown in colour and dries out with the advancement in age. Infact, irrespective of the age of the plant, if the mid rib is lighter colour than lamina, zinc deficiency is suspected. Zinc deficiency can be corrected by application of zinc sulphate @ 25 kg/ha. Soil and plant analysis need to be done for the confirmation of its deficiency and deciding its dose. In transplanted paddy, mid zinc deficiency has also been corrected by dipping seedlings in 1-4% zinc oxide solution prior to transplanting. Zinc sulphate should be applied atleast 2 days after the application of P fertilizer. If the deficiency symptoms appear in the leaves, 0.5 per cent zinc sulphate solution (5 kg zinc sulphate mixed with 2.5 kg calcium hydroxide per ha) could be sprayed.

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Water Management

Paddy crop is strongly influenced by water supply. Water should be kept standing in the field throughout the growth period. In water scarcity areas, saturated soil in a chemical reduced stage is desirable. The characteristics of flooded soil which are conducive to high yields are (i) greater availability of nutrients such as phosphorus, iron and manganese, (ii) suppression of weed competition, (iii) elimination of moisture stress as a limiting factor, (iv) micro-climate favorable to crop production. In order to achieve the above mentioned objectives, the following practices should be adopted.

1. Raise paddy nursery at a place where assured irrigation is available.
2. Level the fields uniformly
3. Where irrigation facilities are not available, store all the rain water in paddy fields by making 25 to 30 cm raised bunds.
4. Maintain about 8-10 cm of water level in the fields at puddling time and subsequently depth of ponded water may be maintained throughout the growing period.
5. It is desirable to control the water in the individual fields.
6. Withhold water for few days till the seedlings have established.
7. In areas of low temperature of irrigation water, the practices of continuous running water from field to field should be stopped and water should be kept ponded in the fields at 4-5 cm level.
8. Drain-off water for about 2 days prior to the application of fertilizers.
9. Drain-off water completely for 5 to 7 days following tillering and flowering stages. This helps to remove the toxic substances like sulphides and regulates oxygen supply to roots.

Weed Management

Weed control : In direct seeded rice, weed control is very important and only timely control can result in better production. The first weeding at 2-3 leaf stage is more critical and must be done. Thereafter, weeding should be done as and when required.

To ensure effective weed control in direct sown rice, chemical method of weed controls is very effective and economical. Application of Oxadiazon (Ronstar) @ 3 L/ha or Butachlor 50 EC (Machete) @ 3 L/ha should be done by mixing with 800 L/ha water before the emergence of crop and weeds (pre-emergence). The above mentioned doses are on the basis of commercial product.

Precaution: Do not apply granular formulations of herbicides in direct seeded upland rice.

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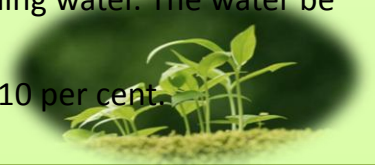
Insect Pests and Diseases Manage-ment

Plant Protection Sign of Attack/ Symptom	Control
Grasshopper: Both nymphs and adults feed on leaves in nursery and in the fields. The adults are often serious and attack the periphery of the **panicles**.	**1.** Spray 1250 ml Chloropyriphos 20 EC (0.05%) per 500 L water/ha on appearance of pest. **2.** Remove weeds ad grasses on bunds.
Paddy black beetle: Beetles appear soon after transplanting and attack the under-ground portion of the system. The infested plants then wither and die.	Apply 2 L Chloropyriphos 20 EC mixed with 25 kg sand per ha at sowing time.
Rice bug: Usually appears with early rains. Both nymphs and adults suck juice from the young succulent leaves, shoots and milky grains. The panicles of such plants are chaffy. A brown/black spot appears around the feeding hole on the grain.	1. Remove weeds and other alternate hosts. 2. Collect eggs, nymphs and adults and destroy them. 3.Before flowering, spray 1250 g cabraryl (Sevin 50 WP) or 1250 ml fenitrothion (Folithion/Sumithion/ Accothion 50 EC) in 1250 L water/ha. **Caution :** Dust or spray only when there are 10 bugs/100 heads or rice.
Rice hispa: Both larvae and adults attack the rice plant. The larvae mine into the leaf between the epidermal membranes producing longitudinal white streaks. Affected leaves wither and die.	1. Remove grasses from the bunds. 2. Spray 600 ml methyl parathion (Metacid 50 EC) or 1000 ml fenitrothion (Folithion/ Sumition/Accothion 50 EC) in 500 L water/ha. 3. Apply Cartap 4 (Padan) @ 1 kg ai/ha (25 kg/ha) 10 days after transplanting or 40 days old crop in 3-4 cm standing water. The water be kept standing for 2-3 days. **Note :** Spray only when infestation is more than 10 per cent.



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Insect Pests and Diseases Management	Sign of Attack/ Symptom	Control
		1. Apply carbofuran (Furadan 3 G) by broadcasting in 3-4 cm deep standing water @ 1 kg/ha (a.i.) 10 days after transplanting, if necessary. 2. Spray 1000 ml endosulfan (Thiodan 35 EC) or 500 ml methyl parathion (Metacid 50 EC) in 500 L water/ha. Repeat after 45 days. **Caution :** Apply insecticides only if 5 per cent or more plants are infested.
	Stem borer: Damage is caused by feeding of the larvae within the stem. The damaged plants result in `dead heart' and `white head' formation. The damage is noticeable from July to October.	
	Leaf folder or leaf roller: Caterpillars infest leaves of young plants fastening the edges of the leaf together and live inside rolled leaf.	1. Clip-off the affected leaves. 2. Remove weeds especially graminaceous ones 3. Spray 1250 ml chloropyriphos 20 EC (0.05%) or 835 ml monocrotophos 36 EC (0.06%) per 500 L water/ha on pest appearance.
	Leaf hopper: The nymphs and adults of hoppers cause heavy damage to this crop by sucking the sap from various parts of the plant during August-September.	1. Spray 1250 ml Chloropyriphos 20 EC (0.05%) per 500 L water/ha on appearance of pest.

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Insect Pests and Diseases Management

Diseases

Blast : Brown to reddish brown, spindle shaped lesions with grey or whitish centre are produced on leaves in nursery and at tillering stages. Lesions are also produced on nodes, parts of panicles and grains. Leaf blast stunts the plants, reduces the number of panicles and grain weight. Plants infested early in the seasonare often completely killed.

1. Treat the seed before sowing with Bavistin 50 WP or Beam 75 WP @ 2 g/kg seed.
2.Spray the crop with Blitox 50 (Copper oxychloride) once at nursery stage (12 in 4 L water for 100 m 2) and again depending on need at the time of tillering, late booting and panicle emergence stages with 2.250 kg Blitox 50 or 750 g Bavistin 50 WP or 750 ml Hinosan in 750 L water/ha or spray the crop at late booting and panicle emergence stages with Beam 75 WP (300 g in 500 L water/ha). In high rainfall areas, sticker Stickwel @ 0.2 g/L water should be added.
3. Do not apply excessive dose of nitrogenous fertilizers.
4. Plant resistant varieties. Himalaya - 741 should not be cultivated in blast prone areas.

Bacterial blight : The disease manifests particularly during the flowering stage of the crop. Lesions usually start as streaks along the margins of upper part of leaf blade. The lesions may cover the entire leaf blade turning it whitish grey.

1. Use heavy seed for nursery sowing. Dip the seed in 5% salt solution to remove light seed.
2. Plant moderately resistant variety like IR-579.

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Insect Pests and Diseases Management

Stem rot : The disease starts with a small, blackish irregular lesion on the outer leaf sheath near the water line when the plants are 2-3 months old. Infested culms soften, rot and collapse causing plants to lodge. In case of severe infection, plants die. Affected plants which survive remain sterile or produce shrivelled grains. The presence of small black bodies called sclerotia which can be seen by splitting open the diseased culm are the diagnostic symptoms.	1. Do not allow water to stagnate in field. 2. Stubbles should be collected and burnt after the harvest of crop. 3. Plant resistant varieties like Basmati group.
Brown spot : Seedlings are affected before and after emergence showing typical spotson leaves which are oval, brown grey or whitish centre when fully developed. Heavy infection may cause withering of leaves. On glumes, black or darkbrown spots, sometimes covering the entire glume may appear and result in blighted kernel. Himalayamut : The symptoms are observed at the time of tasselling anns are formed.	1. Treat seed with Thirm @ 3 g/kg seed 2. Spray the crop in the nursery with Indofil M-45 or Indofil Z-78 @ 0.25% (5 g in 2 L water of 10 m 2 nursrey bed). 3. In disease prone areas, cultivate Himalaya 741 which is moderately resistant.
Glume blotch : The disease appears when the panicle is still enclosed in the boot leaf. Brownish black spots which individually are roundish, appear on the glumes. Heavy and early infection results in blackening and blighting or the entire grain. Moderately severe infection reduces grain weight but light infections do not affect,	1. Spray Bavistin (0.1%) at 50% panicle emergence stage and repeat twice at 10 days interval. 2. Plant resistant varieties in disease prone areas. 3. Do not apply higher dose of nitrogen fertilizer.

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Insect Pests and Diseases Management

Glume blotch : The disease appears when the panicle is still enclosed in the boot leaf. Brownish black spots which individually are roundish, appear on the glumes. Heavy and early infection results in blackening and blighting or the entire grain. Moderately severe infection reduces grain weight but light infections do not affect,	1. Spray Bavistin (0.1%) at 50% panicle emergence stage and repeat twice at 10 days interval. 2. Plant resistant varieties in disease prone areas. 3. Do not apply higher dose of nitrogen fertilizer.
False smut : The individual grains are transformed into large greenish Velvety spore balls, which become visible as the panicles start to mature. The spore mass looks green on the outside and yellow to orange inside. High relative humidity, rain and cloudy days during the flowering period increase the incidence of the disease.	1. Collect the diseased panicles and brun them. 2. Avoid excessive doses of nitrogen fertilizers
Sheath rot: The disease induces rot on the upper most leaf sheaths where oblong to irregular grey brown lesions develop. Later, the lesions coalesce and cover the entire sheath. In severe cases, young panicles either do not emerge or emerge partially and often remain sterile.	1. Use disease-free seed. 2. Burn the stubbles after harvesting the infested crop.

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Harvesting & Threshing

The water should be drained out from the field 7 to 10 days before harvesting. To avoid the shattering losses, the crop should not be allowed to over-mature and remain in the field after maturity. The brownish colour and dried leaves of plants indicate maturity.

Crop rotation

Profitable rice based crop rotations of Zone I comprising of Una, Bilaspur, Hamirpur districts and parts of Sirmour, Kangra, Solan and Chamba districts adjoining the Punjab and Haryana State are –

Rice - Linseed - Maize Fooder; Rice - Linseed - Potato/wheat

Control of wild rice

- **Method of cultivation :** In the water and maach rice cultures, wild rice can be weeded out by hand picking after the crop has been fairly established. Transplanting metod reduces the chances of wild rice and should be practiced wherever feasible.
- **Varietal difference :** Varieties with purple foliage colour like R-575 should be grown to weed out wild rice at an early stage.
- **Rotation of crop :** Rice should follow wheat or linseed crop in winter.
- **Seed selection :** For the areas infested with wild rice, the seed for the next crop should be procured from such areas where there is no wild rice problem.
- **Eradication of wild rice from cultivated areas :** Wild rice growing in marshy and swampy places in the neighborhood of cultivated fields should be destroyed before earring.