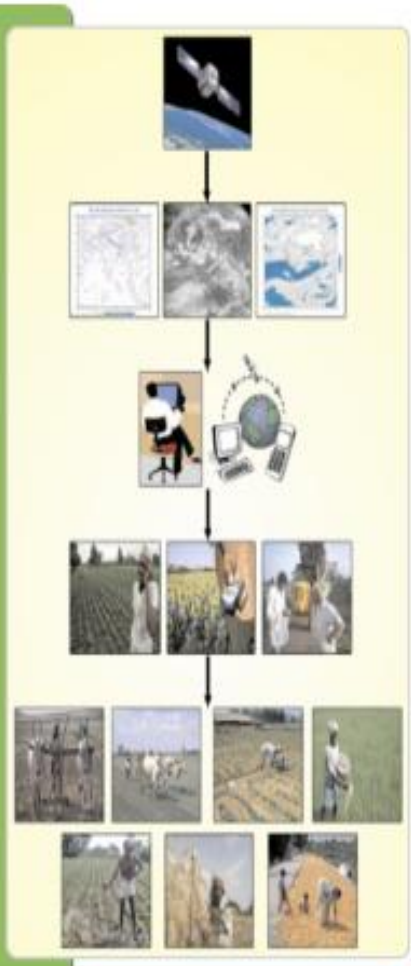
Agricultural Mission Mode Project under National e-Governance Plan

Department of Agriculture & Cooperation
Ministry of Agriculture
Government of India

NeGP
AGRICULTURE
EMPOWERING FARMERS



Providing Information On Forecasted Weather & Agro-Met Advisory

Software Requirement Specifications

Agriculture Infomatics Division
National Information Centre
Dept. of Information Technology
Ministry of Communications & Information Technology
Government of India

"The State Agriculture Portal would be the front end for all the services' delivery in Agriculture MMP. A farmer would typically come to SAP to find information / avail any service through CSC / Internet."

Sahara India Center
2, Kapoorthala Complex,
Aliganj
Lucknow -226024. India

(Source: AICRPAM center, Regional Research Station, Bijapur, Karnataka)

Amendment Log

Version Number	Date	Change Number	Brief Description	Sections change
1.0 D	30/03/2012	1.0 D	Draft	All.
1.0	11/04/2012	1.0	Final	2.1.3
1.1	06/06/2012	1.1	Revised	2.6, 2.8

Table of Contents

1 Introduction

1.1 Overview

It is a known fact that variable weather plays a dominant role in year-to-year fluctuation in crop production; both in rain fed or irrigated agriculture. Though complete avoidance of farm losses due to weather is not possible, however losses can be minimized to a considerable extent by making adjustments, through timely agricultural operation and accurate weather forecasts. Weather forecasts are of four types, viz., **now casting (4 to 5hrs)**, **short range forecast** (valid for 48 hours), **medium range** (valid for 5 days to a week) and **long-range** or seasonal forecast (valid for month to season). All these three types of weather forecasts are prepared by weather forecasting agencies in most of the countries of the world, including India.

Generalized forecasts have, however, limited use in farming. Weather information for agricultural operations shall be a tailored product that can be effectively used in crop planning and its management. A comprehensive weather based farm advisory is an interpretation of how the weather parameters, in future and present will affect crops, livestock and farm operations and, suggests actions to be taken. The Agro-Met Advisory Services (AAS) will be more effective if they are given in simple and local language that farmers can understand it. In order to make the Agro-Met Advisory Services more successful and continuous process, it is to be supported with: (a) agro meteorological database, (b) crop conditions, (c) real time weather, research results on crop-weather relationships, and (d) skilled manpower in multi-disciplinary resources and users interface. Keeping all these aspects in view, this project is proposed to take the Agro-Met Advisory Services to the doorsteps of farmers, by using the latest emerging IT and web technologies.

STATUS OF AGRO-METEOROLOGICAL ADVISORY SERVICES IN INDIA

Realizing the importance of weather information in agriculture, the Indian Meteorological Department IMD of the Ministry of Earth Sciences, started issuing weekly weather bulletins for the farming community from its State Regional Meteorological Centers, in collaboration with the State Department of Agriculture of the respective State Governments. **As it being a general advisory, its applications to a certain location are limited**. In view of the demand for agro-met advisory services specific to the region and problems faced by farmers, IMD launched Integrated Agro-Met Advisory Services **(IAAS)** in the country, from the year 2007, in collaboration with different organizations, including State Agricultural Universities (SAU) and few ICAR institutes. At present, IMD at national, state and district level is issuing Agro-met

Advisory Bulletins. Among these, district level bulletins are prepared at the different Agro-Met Field Units (AMFUs) representing different agro-climatic regions. These AMFUs provide the advisories to all districts falling in the agro-climatic regions represented by it. There are about 130 AMFUs operational under the IAAS.

In addition the IMD, the Indian Council of Agricultural research (ICAR) has established All India Coordinated Research Project in Agro-Meteorology (AICRPAM), with the Central Research Institute for Dry land Agriculture (CRIDA) as the Nodal agency and about 30 AICRPAM Centers in various SAUs (see Map-#). These AICRPAM centers are also part of AMFUs. They use the forecast issued by IMD and the crop status supplied by State Agriculture Departments. Weather based agro-advisories are prepared and disseminated through mass media communication including SMS, IVRS, Internet and Websites. Though issue of agro-advisories so far is the domain of government organization only, of late, few private organizations have joined. The IMD has planned to involve institutions (IITs, IISc, NITs, Universities, private organizations etc.) through MOU for strengthening IAAS in the country.

The National Crop Forecasting Centre (NFDC) of the Department of Agriculture and Cooperation (DAC) facilitates:

- Central level monitoring of the situation about crop, weather, supply of inputs, pests/diseases and related aspects, through the mechanism of **Crop & Weather Watch Group** in the Department of Agriculture & Cooperation;
- Coordinating the proposed projects/scheme on “Development and Application of Extended Range Forecast System for Climate Risk management in Agriculture (ERFS)” and “Forecasting of Agriculture output using Space, Agro-meteorology and Land based observations (FASAL)”.

The Crop and Weather Watch Group of the Ministry of Agriculture meets weekly and its Minutes are available at http://agricoop.nic.in/weather.htm.

Agropedia (http://agropedia.iitk.ac.in) is a vision which seeks to address lacunae in Indian agriculture knowledge and application, specifically the lack of content, organized information, and extension services which are serious challenges. It has developed delivery mechanisms such as **vKVK** and **KVK-Net,** which are a means to connect extension scientists and farmers, based on its web platform which hosts information on agriculture and rural livelihood. The web platform, **agropedia,** is unique in the agricultural domain as it is semantically organized and enabled so as to assist one in getting exactly what information or service she or he is looking for. Along with content

in the library section, certified by the Indian Council of Agricultural Research **(gyan dhara),** it also allows space for interaction, knowledge co-creation **(jana gyan)** and social networking (chat, blog, forum) making the site dynamic and learning participative.

It is envisaged that the proposed solution provides the end users with the ability to access services through an online platform. For this purpose, the architecture can be viewed to consist of five components:

- Central Agriculture Portal (CAP)
- State Agriculture Portal (SAP)
- Existing Applications
- Enhanced New Applications
- Delivery Channels (SMS, IVRS, email, e-Post, AIR, TV Channels, Print Media, etc.).

Portlets has proposed to be done, using industry's widely accepted and adopted Service Oriented Architecture (SOA) framework. The interoperability is built on XML (Extensible Markup Language) and Web Services Standards (WSS). The following are the important features of Agriculture MMP solution: -

- Adopt Service Oriented Architecture;
- Develop business functionality as services;
- Provide web based interface;
- Extensible to support multiple access devices such as desktop computer, IVRS, Mass Media, Mobiles, Private Kiosks etc.

1.2 Purpose

The purpose of this document is to specify detailed requirements to:

- Provide information on forecasted Weather and Agro-met Advisories issued by authorized centers (stakeholders) to farmers/citizens, through delivery channels;
- To disseminate Expert advice on issues related to weather vagaries for agricultural operations by domain experts;
- Disseminate agro-met advisories throughout the crop life cycle (operations from pre-sowing period to post-harvest);
- Disseminate agro-met advisories for livestock farmers and poultry farmers;

- Disseminate agro -met advisories to Fish Farmers (both Inland and Marine)
- SMS alerts for weather forecast and crop impact;
- Information availability on Local Language;
- Update stakeholder for best practices in respect to their climatic zone
- Make public information and government services available to citizens and officials anytime, anywhere;
- Create users convenience by subscribing to SMS alert and advisory archive;
- Provide personalized information for individual stakeholder or groups of Farmers;
- Grow efficiencies on farming activity;
- Reduce cost through agro based advisory;
- Increase adaptability for farming future requirements;
- Provide mechanism for grievance management with regards to a specific activity / process within the state and central government framework.

This document will also be a reference for the designer, developer, system testers and user acceptance and quality of the software product

1.3 Intended Audience

The Intended Audience for this project can be broadly classified under four main categories as follows:

1.3.1 Farmers

1) Individual farmers
2) Farmer groups / Farmers club (NABARD)

1.3.2 Central Government

a. Ministry of Agriculture
   - National Crop Forecasting Centre (NCFC), Directorate of Economic and Statistics
   - Department of Agriculture & Cooperation;
   - Department of Animal husbandry, Dairying and Fisheries;
   - Indian Council of Agricultural Research (ICAR)
     1. Natural Resources Management Division
     2. Agricultural Extension - KVKs

b. Ministry of Water Resources
   - Central Water Commission

c. Ministry of Earth Sciences
    - Indian Meteorological Department
    - National Centre for Medium Range Weather Forecast (NCMRWF)

d. Ministry of Information & Broadcasting
    - All India Radio
    - DoorDarshan

1.3.3 State Government

i. Department of Agriculture
ii. Department of Animal Husbandry & Veterinary Services
iii. Department of Fisheries
iv. State Agricultural Universities/ State Animal & Veterinary Sciences Universities/ State Fisheries universities / Colleges
v. Agro-Meteorology Research Centers / Agro-meteorology Field Units
vi. Regional Research Stations / Zonal Research Stations
vii. Department of Water Resources / Irrigation

1.3.4 Private Sector

✓ Telecom Providers
✓ Call Centers

➢ **Stakeholders identified for the project**

a. IT Division, Department of Agriculture & Cooperation, Ministry of Agriculture;
b. NIC Central, State and District centers
c. Crop Weather Watch Group, Department of Agriculture & Cooperation;
d. AICRPAM Centers of CRIDA (ICAR);
e. AICRPDA centers of CRIDA (ICAR)
f. NICRA Centers of CRIDA (ICAR)
g. Agro Meteorological Field Units (AMFUs) of IMD;
h. Krishi Vigyan Kendra (KVKs) of ICAR
i. IMD and Its Regional centers
j. Block level Agricultural Officers
k. Agro Meteorological Research centers of the State Agricultural Universities;
l. IIIT, Hyderabad (e-AGROMET Project)

m. Crop Farmers, Livestock Farmers, Fish Farmers

- **Responsibilities of key stakeholder:**

IMD (NCMRWF)

Issue of medium range forecast (at 5 days interval), long-range forecast of monsoon (before the season) and short range forecasting (24 to 48 hours in advance) at district level;

Research and development for improving all these types of forecasts based on users' feedback;

Imparting training on recording of data, understanding of weather forecasts, etc.;

AMFUs

- To receive the forecasts from IMD and after scrutiny, pass it to KVKs under their Agro climatic Zone;
- To act as Nodal Officers and help in interpretation of forecasts and preparation of AAS for the districts;
- To work in collaboration with KVK;

KVK Centers

- Establishment of agro meteorological advisory Board headed by a group of experts including agro meteorologist;
- Establishment of Automatic Weather Stations;
- Monitoring of current weather and crop conditions at district level as well as blocks or mandals;
- Preparation of agro-met advisories for each block based on weather forecasts, current crops and weather conditions;
- Placing the agro-met advisories of each block on website and transferring the information to block level officer through Internet or fax;

BLOCK LEVEL OFFICES

- To supply information to KVKs on crop condition in their respective blocks, including pest/ diseases;
- Passing the agro-advisories to all the Panchayats or Village Knowledge Centers after scrutiny, through SMS or Internet;
- To act as liaison between farmers and KVK officials for receiving queries from farmers and replies from KVK staff;

EXAMPLE:

DEPARTMENT OF AGRICULTURAL METEOROLOGY

P.A.U. LUDHIANA

In the department of Agricultural Meteorology the following two research projects are operational:

1. All India Coordinated Research project on Agro meteorology (AICRPAM)

The Ludhiana center of the AICRPAM project operational at Punjab Agricultural University, Ludhiana is providing the following information (given in the table) to the farmers of the district. This information is uploaded on the website www.cropweatheroutlook.in. Any one without any Registration & fee can assess this information.

Sr. No	Information uploaded	Day on which information is uploaded
1	Weekly report on crop weather conditions	Friday/ Saturday forenoon
2	Weather based agro advisory	Friday/ Saturday forenoon
3	Current weather data (of the just passed week)	Saturday afternoon/Monday forenoon

Under the newly initiated project 'National Initiative on Climatic Resilient Agriculture' (NICRA), in the department two villages namely (Bauranga, Zer and Badhosi, Kalan) in district Fathegarh Sahib have been adopted. In both of these villages 60 farmers (20 large, 20 medium and 20 small depending upon their land holding) have been selected for providing weather-based agro advisory to them through SMS on their mobile phone. This information is send to the farmers on every Tuesday/Wednesday.

Under both these project Department of Agricultural Meteorology, PAU Ludhiana, also organizes farmer's awareness camps at different places in the state to educate the farmers about the climate change and mitigation strategies to be adopted.

2. National Centre for Medium Range Weather Forecasting (NCMRWF) of IMD:

Under this project the Department of Agricultural Meteorology, PAU Ludhiana is providing the following services to the farmer

- Agro-Met department on every Tuesday and Friday is issuing the agro advisories, which are based on the forecast received from IMD and Met Centers, Pune on every Tuesday and Friday.
- These agro advisories comprise the weather outlook for next 3-4 days of the region including crop status and different cultural operations to be undertaken in view of coming weather.

- These agro advisories are very useful for the farmers during extreme weather events, cold wave and hot wave conditions. Farmers can take precautionary measures 3-4 days in advance to save their crops from weather hazards.
- Time to time special weather bulletins are issued by department for the use of farmers during abnormal weather conditions.
- The agro advisories are disseminated to vernacular newspapers and to different media for the use of farmers. It has been issued by five centers representing five different agro climatic zones.
- The district wise weather forecast and weather based agro advisories have been issued for all the districts of each respective zone.

  The daily weather report is also prepared at Ludhiana based on different cloud pictures, meteorological data and IMD forecast. The daily weather report is also disseminated to different newspapers and TV channels.

1.4 Scope

The project focuses on enabling electronic delivery of service for the agro-met advisories in an efficient manner. The scope of this document is to identify the software requirement specifications relating service “Providing Information on Forecasted Weather & Agro-Met Advisories”, and their delivery through different delivery channels up to block/village level.

1.4.1 Scope for the present document

1. District level information with Agro Climatic and National Agricultural Research Project **(NARP) nomenclature** of zone distributions;
2. Dissemination of information on Forecasted Weather by IMD;
3. Agro-Met Advisory (Maharashtra Model of Customized SMS based advisories to be adopted);
4. District Level advisories available at present to be used for dissemination;
5. A strong Feedback mechanism/ Help Desk to be developed so as to capture the observations of the farmers and improve upon the Advisories accordingly;
6. To contact organizations having expertise in conversions of Roman to Vernacular Text. IIT Kanpur has done considerable work for language conversions. CDAC may also be contacted.
7. Technology for SMS dissemination to be explored keeping in mind how to send text in 160 characters, text to voice conversions etc.;
8. IMD and related sources to transfer advisories and related information to NIC to be ported on portal;
9. Advisory Bulletins to farmers and stakeholders regarding weather sensitive agricultural operations to mitigate weather based risk on crop cultivation;

10. Advisories on Forecasted Weather, Variety Selection, Field Selection, Sowing Time, Crop Health and Agro-met Advisory to be provided by experts at the State and National Level;
11. SMS Alerts on
    a. Weather Forecast
    b. Impact on Crop,
    c. Impact on livestock
    d. Impact on fisheries
12. Grievance management through multiple service delivery channels to the farmers;
13. Study of Existing Automation of Meteorological Bulletin done by NIC Tripura / Pune on for Disseminating the following
    - Forecast based on IMD 5 Day Medium Range data
    - Early Warning System (EWS) on natural calamities
        - Dissemination over SMS/ e-mail/ Web (G2F & G2C)
        - Actual Weather Summary based on Daily Weather Data
14. Dissemination of Agro-Met Advisories
    - Based on the derived Meteorological Forecast
    - Content from Domain Experts at Central/State/ AMFU & KVKs, with Early Warning System (EWS) on Pest/Disease infestation.
    - Dissemination over SMS/ e-mail/ Web (G2F)

Further, the service components are being mapped with the applications identified on the basis of content management, transactions and workflow as specified below:

1.4.2 Service Component to Application mapping

Content Based Components		
Sl. No.	**Service Component**	**Application**
1.	Weather forecast summary	Medium Range Weather Forecast comprising of capturing of forecast data published by the IMD, allow for its moderation by IMD local office
2.	Information on Actual weather summary	Actual Weather comprising of capturing actual weather data on different parameters (Temperature min. / max. Wind Speed / direction, Rainfall, Humidity min. / max. Cloud) as sent by the different Agro-Met Stations, converting and incorporating weather

Content Based Components		
Sl. No.	**Service Component**	**Application**
		historical data (one-time) generating actual weather summary
3.	Information on monsoon status	(Weekly / Monthly / Yearly for planning based on north West Monsoon
4.	Information on Agro Met Bulletin	Information on Agro Met Bulletin comprising of crop staging advisories filtered/aggregated at any level
5.	Advisory on Crop staging information and Insect/ Pest infestation information related to Agro Met	Expert Advisory on Crop staging information and Insect/ Pest infestation information
6.	Information / impact of prevailing weather conditions on different crops	Providing Information / impact of prevailing weather conditions on different crops by the agricultural officers.
7.	Information on Weather based / seasonal livestock disease	Providing information on livestock diseases and advisories to take care livestock from various weather based / seasonal conditions.
8.	Crop weather calendars	Up-to-date crop weather calendars for entire country. That consists crop growth stages, warnings, weather condition, water requirement, phytophases, meteorological conditions, crop pests and diseases, planning, irrigation scheduling and plant protection measures.
9.	Agro climatic Atlas of India	An updated version of Agro climatic Atlas is prepared by taking more no. Of stations along with inclusion of more no. Of parameters.
10.	Soil Moisture Mapping of India	Soil moisture status is an important component of water balance in a region. Based on short period data series publication on “Soil Moisture Mapping of India” has been prepared by the Agri-met Division. Gravimetric observations of soil moisture (SM) on bare soils from a network of 30 stations in India

Content Based Components		
Sl. No.	**Service Component**	**Application**
11.	MIS Reports	Few dynamic MIS reports related to agro-met System.

1.4.3 Transaction based

Transaction Based Components		
S.No.	**Service Component**	**Application**
12.	Grievance Management	Farmer / citizen should be provided facility to submit their grievances / ground level facts and the public suggestion through IVRS to Government. A System may also be provided for monitoring the grievance lodged and action taken/ solution provided by advisory bodies
13.	Forecast Weather Summary	Medium Range Weather Forecast comprising of capturing of forecast data published by the IMD, allow for its moderation by IMD local office
14.	Information on Agro Met Bulletin	Information on Agro Met Bulletin comprising of crop staging advisories filtered/aggregated at any level
15.	Information about historical and forecasted rainfall	Information about historical and forecasted rainfall
16.	Alerts on forecasted weather & natural calamities	Information on forecasted weather & natural calamities and generation of Alerts
17.	SMS Based weather & natural calamities alerts	SMS Based weather alerts to agricultural / fish farmers
18.	SMS Based Crop- weather alerts	SMS Based Crop- weather alerts

1.4.4 Definitions, acronyms, and abbreviations

AASU	Agro-met Advisory Service Unit
AMFU	Agro-Meteorological Field Units

ACWWG	Agriculture Crop Weather Watch Group
AICRP	All India Coordinated Research Project
CRIDA	Central Research Institute for Dry land Agriculture
CSC	Common Service Centre
CWWG	Crop weather Watch Group
DOA	Department of Agriculture
G2G	Government to Government
G2C	Government to Citizen / Farmer
C2G	Citizen / Farmer to Government
G2B	Government to Business
GOM	Global Observations and Modeling Project
ICAR	Indian Council of Agricultural Research
ICT	Information and Communication Technology
IMD	Indian Meteorological Department
IVRS	Interactive Voice Recording Service
KVK	Kissan Vignan Kendra
MOES	Ministry of Earth Sciences
NAASC	National Agro met Advisory Service Centre
NCMRWF	National Centre for medium range weather forecast
NGO	Non-Government Organizations
NIC	National Informatics Centre
USSD	Unstructured Supplementary Service Data
IMD	India Meteorological Department
ISSRO	Indian Space Research Organization
ICT	Information and communication technologies
IKSL	IFFCO Kisan Sanchar Limited
ENVIS	Environmental Information System
EMCBTAP	Environmental Management Capacity Building Technical Assistance Project
P&D	Pest And diesease

1.4.5 References

- Discussion with the Deputy Director General (NRM), ICAR
- Discussion with the Deputy Director General (NIC)
- Discussion with Dr. K.K. Singh, Scientist-SE, Mausam Bhavan, New Delhi

- Discussion and study SMS process flow from C-DAC –NOIDA
- Discussion with the Director, CRIDA
- Discussion with Dr. Rana, Agro-Met Research Centre, H.P. Agricultural University, Palampur;
- Discussion with IIIT, Hyderabad on e-AGROMET Project
- Discussion with AICRPAM Centre, Regional Research Station, Bijapur, Karnataka
- Discussion with Dr. Rana, Agro-Met Research Centre, H.P. Agricultural University, Palampur;
- Discussion with Dr. Satish K. Bhardwaj, Scientist (Soil) Dr. Y.S. Parmar University, H.P. Agricultural University, Nauni (Solan);
- Discussion with Dr. R.K. Agarwal, Nodal Scientist Dr. Y.S. Parmar University, H.P. Agricultural University, Nauni (Solan);
- Discussion with Dr. N. Chattopadhyay D.D.G Agriculture Meteorologist IMD-Pune
- Discussion with Mr. Vijay Kumar Trishul, Meteorologist IMD-Shimla
- Discussion with Shri K.S. Hosalikar, Scientist-E IMD-Mumbai
- Discussion with Smt. Shubangi Bhute, Meteorologist IMD-Mumbai
- Discussion with Shri A.K. Jaswal, Director of National Data Center IMD-Pune
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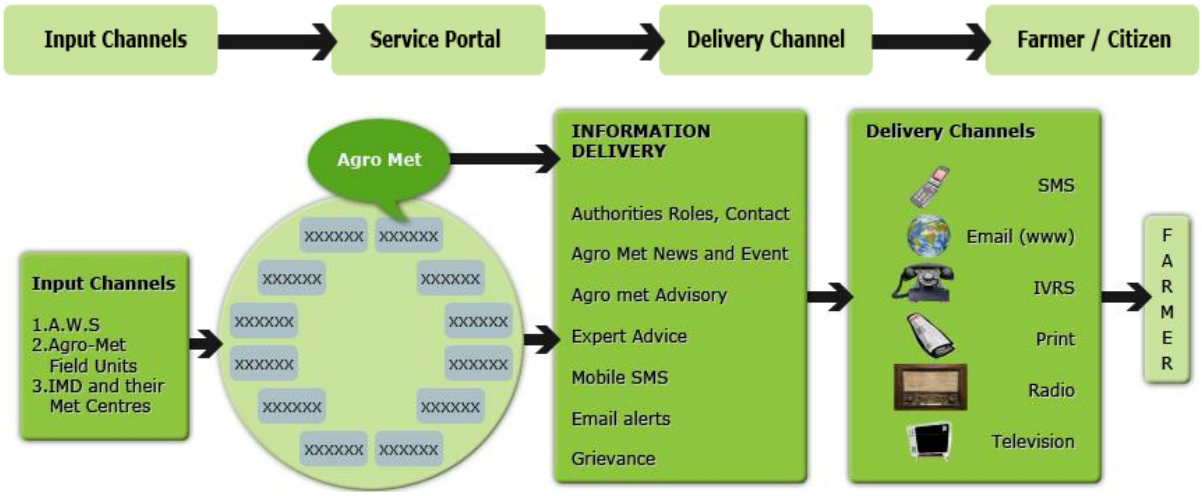
- Early warning system in kerala.doc

- PAU Ludhiana.doc
- Web Source
- http://www.imd.gov.in
- http://www.indg.in/
- http://www.tdil-dc.in [Related: convert SMS to 22 regional language]
- http://www.nbsslup.in/divisions/land-use-planning-lup
- http://www.nfsm.gov.in/NfsmMIS/StateProfile/State.aspx
- Documents
- Brochures – NICRA and others
- Presentation and documents shared by NIC.
- FINAL REPORT OF THE WORKING GROUP ON AGRO-CLIMATIC ZONAL PLANNING INCLUDING AGRICULTURE DEVELOPMENT IN NORTH-EASTERN INDIA FOR XI FIVE YEAR PLAN (2007-12)

1.4.6 System Overview



Input Channels: AICRP AM Centers, AICRP DA Centers, NICRA Centers, IMD's AMFUs, KVKs, ISRO, DST etc.

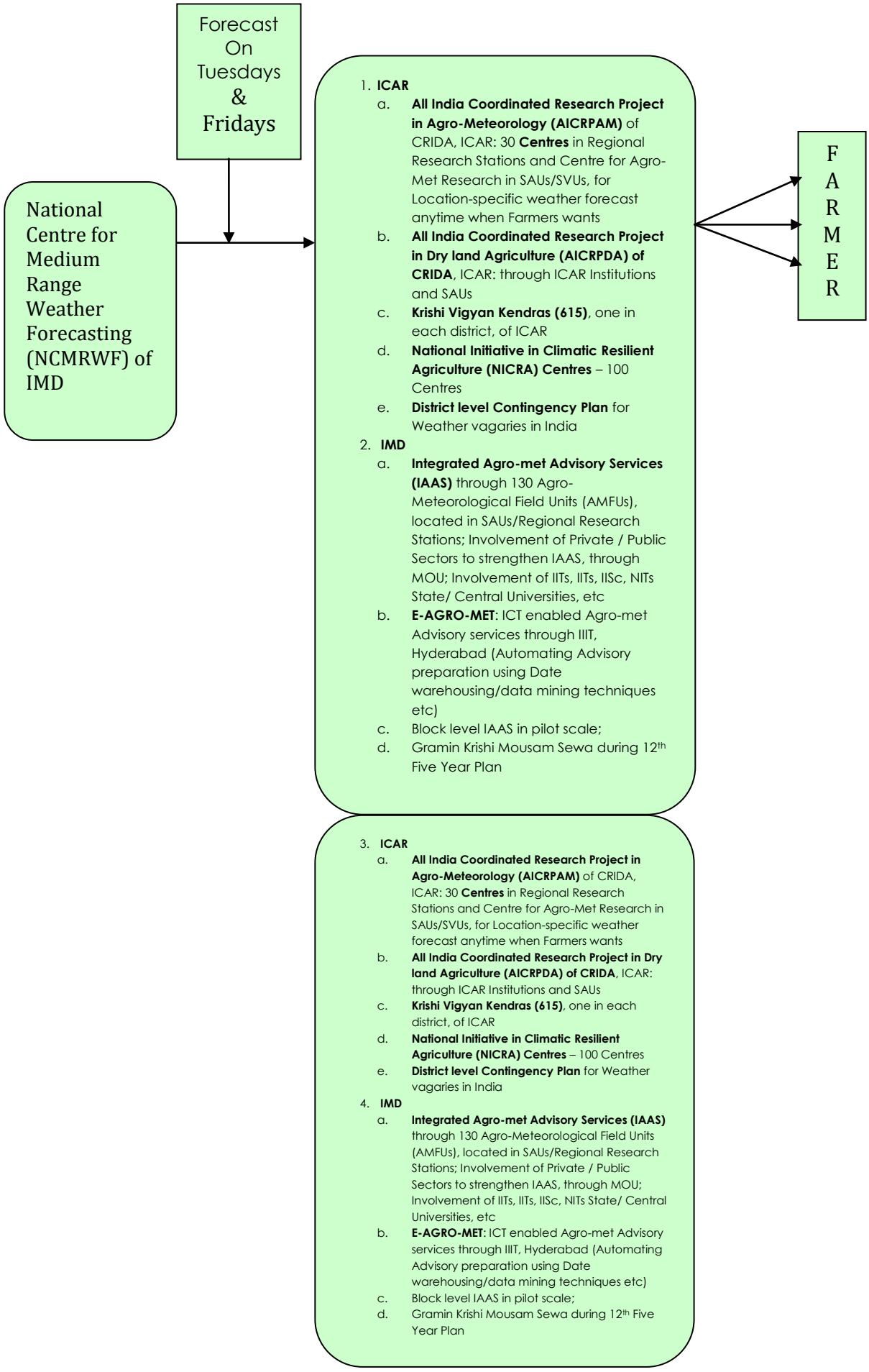
2 Overall Description

2.1 Product Perspective

PIFWAMA (Providing Information on Forecasted Weather & Agro-Met Advisories) is one of the 12 Core software applications envisaged as part of the National e-Government Plan under Mission Mode project (MMP), initiated by the Ministry of Agriculture which aims service orientation to farmers no matter if the services originate from the central or the state government, they would be provided through a single delivery interface.

PIFWAMA will be a generic and information portal that captures the information related to agro-met advisory and disseminates the advisory to the end user. This portal will also give an opportunity to the user group to file their grievance, under the grievance management activity. The framework, as stated above, will be prepared under the sponsorship of Ministry of Agriculture, Government of India. The portal will provide a holistic view of the Weather forecasting and dissemination of agro-met advisory, in accordance to the agro climatic zones.

2.1.1 AS-IS scenario: Agro-meteorological Advisory Services in the Country


Forecast On Tuesdays & Fridays
National Centre for Medium Range Weather Forecasting (NCMRWF) of IMD
1. ICAR
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b. All India Coordinated Research Project in Dry land Agriculture (AICRPDA) of CRIDA, ICAR: through ICAR Institutions and SAUs
c. Krishi Vigyan Kendras (615), one in each district, of ICAR
d. National Initiative in Climatic Resilient Agriculture (NICRA) Centres – 100 Centres
e. District level Contingency Plan for Weather vagaries in India
2. IMD
a. Integrated Agro-met Advisory Services (IAAS) through 130 Agro-Meteorological Field Units (AMFUs), located in SAUs/Regional Research Stations; Involvement of Private / Public Sectors to strengthen IAAS, through MOU; Involvement of IITs, IITs, IISc, NITs State/ Central Universities, etc
b. E-AGRO-MET: ICT enabled Agro-met Advisory services through IIIT, Hyderabad (Automating Advisory preparation using Date warehousing/data mining techniques etc)
c. Block level IAAS in pilot scale;
d. Gramin Krishi Mousam Sewa during 12th Five Year Plan
FARMER
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2.1.2 Observational network for agro-met services

Agro-met Division of IMD maintains different agro-met observatories, for agro meteorological, evaporation, soil moisture, evapotranspiration, dewfall and desert locust monitoring. At present, there were 264 agro meteorological observatories, 42 ET and 43 soil moisture observatories, 219 evaporation observatories and 76 dewfall observatories. 110 stations from all over the country. Besides Agro AWS at 98 places is installed all over the country and the data is being received in DCP, Pune regularly. Scrutiny of CWS, SM, ET and dew data has been done up to year 2009.

Type of Observatory	Nos.	
Surface Observatories	559	
Aviation Current Weather Observatories	71	
High Wind Speed Recording Stations	4	
INSAT-based Data Collection Platforms	100	
Hydro meteorological Observatories	701	
Non-Departmental Rain gauge Stations:	- Reporting-3540	- Non-Reporting-5039
Non-Departmental Glaciological Observatories (Non-reporting): Snow gauge	21	
Ordinary Rain gauges	10	
Seasonal Snow Poles	6	
Agro meteorological Observatories	219	
Evaporation Stations	222	
Soil Moisture Recording Stations	49	
Dew-fall Recording Stations	80	
Evapotranspiration Stations	39	
Ozone Stations	6	
Radiation Stations	45	
Air Pollution Observatories - Background Pollution Observatories	10	

Urban Climatological Units	2
Urban Climatological Observatories	13
Ships of the Indian Voluntary Observing Fleet	203
Seismological Observatories	58
Automatic Weather Stations	500+
Automatic Rain Gauge Stations	1350
Doppler Weather Radars	12
Automatic Weather Station Data Collection System	2
10 IMS	1500
Wind Profilers	4
Optical Theodolites	70
High Performance Computing System	2
Lightening Detectors	10
Automatic Message switching System	4
Integrated and Automated Systems for Airports	26
GPS Stations For upper air Data Collection	5

The above generate the set of observations on a round the clock basis at a fixed interval of time. Majority of observatories take observations at 3 hourly intervals at 00, 03, 06, 09 …… GMT. The autographic instruments keep on recording the data. Automatic Weather Stations and Automatic Rain gauges record and report the data every hour, averaged for a minute.

Over the years there has been rapid technological advances in digital automated systems, use of non-conventional observations such as radar and remotely sensed satellite based observations and high-resolution multi-model forecasting systems. In short, manual synoptic weather forecasting has given place to hybrid systems in which synoptic science is overlaid on numerical models supported by modern observation network with real time connectivity.

In July 2004 during a discussion on the status of monsoon rainfall, called by the Hon'ble Prime Minister, IMD had reiterated the need for special Plan Allocation to facilitate establishment of modern infrastructural facilities, which would lead to improved services. As a sequel to this, IMD had prepared a Preliminary Feasibility Report giving detailed requirements for upgrading its observational, data processing and forecasting systems which was approved, in principle. Planning Commission gave a number of guide-lines for modernization of IMD and advised the newly created

Ministry of Earth Sciences (MoES) in May'2006 to review the whole proposal and take a holistic view of the modernization plan by integrating the observational requirements for oceans as well. Ocean observation requirements are being implemented under a separate plan scheme of the Ministry.

Besides this the up gradation of satellite observation facilities is in process. At present half an hourly observations recorded as digital images in the visible, infrared and water vapor channels. With launch of new satellite a few more channels such as soil moisture; wind profiles etc. will also be recorded.

2.1.3 Meteorological Service In Agriculture

Through State Agricultural Universities –

Five days forecast on the below mention weather parameters.

1. Rain
2. Temperature
3. Wind
4. Cloud
5. Season change – time and stages of agriculture
6. Human manned – Canal Irrigation
7. And the Global warming and the changes that affects the present predefined season
   Calamity prone like – Cyclone, Tsunami, Heavy Rain, Heavy heat of sun, etc.

Crop - Weather Watch is a G2G system.
Department of Agriculture & Cooperation reviews status of crop condition, weather conditions and input availability on a weekly basis
The participating organizations are:

- State Agriculture departments (input on crops)
- IMD – Rainfall/ Weather Conditions
- NCMRWF – Medium Range weather forecasts
- Ministry of Water Resources – Availability of water
- Ministry of Chemicals & Fertilizers – for Fertilizers
- ICAR – Advisories on variety of seeds
- Seed Division, DAC -Advisories on seeds
- Plant Protection Division, DAC – Status on pests and availability of pesticides

NIC is proposing for Providing Information on Forecasted Weather and Agro-met Services under Agriculture Mission Mode Project National e-Governance Plan (NeGP) with the following objectives:

- Providing Information on forecasted weather (rainfall, wind, temperature, Cyclone, Heavy Shower, Humidity etc.)
- Providing Information on Dry and Wet Spell for Irrigation scheduling
- Providing Information on agro-met advisory
- Providing SMS alerts for weather forecast and impact on crops

- Providing Expert advice on issues related to agro-met advisories which would be answered by domain experts
- Providing Crop specific advisories
- Providing Location specific advisories
- Providing an application System for capturing the grievances from the citizen / farmer and to manage / process within the State / Central Govt.

2.1.4 Geographical Information System 'GIS'

A geographical information system (GIS) is a system that captures, stores, analyzes, manages, and presents data that are linked to location(s). In the simplest terms, GIS is the merging of cartography, statistical analysis, and database technology. GIS may be used in archaeology, geography, cartography, remote sensing, land surveying, public utility management, natural resource management, meteorology, precision agriculture, photogrammetry, urban planning, emergency management, navigation, aerial video, and localized search engines.

As GIS can be thought of as a system, it digitally creates and "manipulates" spatial areas that may be jurisdictional, purpose or application oriented for which a specific GIS is developed. Hence, a GIS developed for an application, jurisdiction, enterprise, or purpose may not be necessarily interoperable or compatible with a GIS that has been developed for some other application, jurisdiction, enterprise, or purpose. What goes beyond a GIS is a spatial data infrastructure (SDI), a concept that has no such restrictive boundaries.

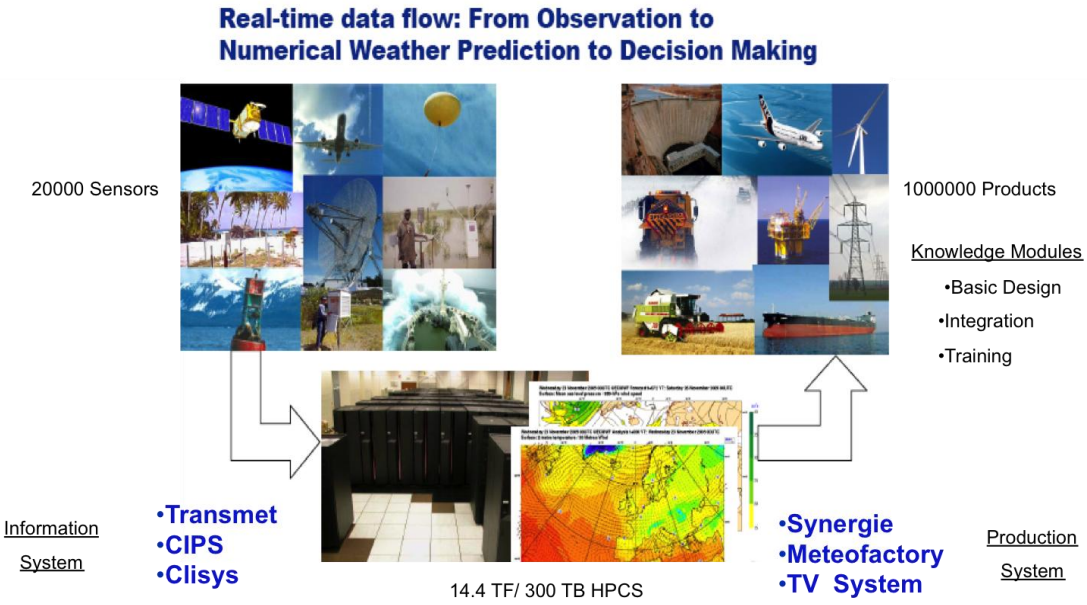
Therefore, in a general sense, the term describes any information system that integrates, stores, edits, analyzes, shares, and displays geographic information. GIS applications are tools that allow users to create interactive queries (user-created searches), analyze spatial information, edit data, maps, and present the results of all these operations. Geographic information science is the science underlying the geographic concepts, applications and systems.

GIS technologies use digital information, for which various digitized data creation methods are used. The most common method of data creation is digitization, where a hard copy map or survey plan is transferred into a digital medium through the use of a computer-aided design (CAD) program, and geo-referencing capabilities. With the wide availability of ortho-rectified imagery (both from satellite and aerial sources), heads-up digitizing is becoming the main avenue through which geographic data is extracted. Heads-up digitizing involves the tracing of geographic data directly on top of the aerial imagery instead of by the traditional method of tracing the geographic form on a separate digitizing tablet

GIS uses spatio-temporal (space-time) location as the key index variable for all other information. Just as a relational database containing text or numbers can relate many different tables using common key index variables, GIS can relate otherwise unrelated information by using location as the key index variable. The key is the location and/or extent in space-time.

Any variable that can be located spatially, and increasingly also temporally, can be referenced using a GIS. Locations or extents in Earth space-time may be recorded as dates/times of occurrence, and x, y, and z coordinates representing, longitude, latitude, and elevation, respectively. These GIS coordinates may represent other quantified systems of temporo-spatial reference (for example, film frame number, stream gage station, highway mile marker, surveyor benchmark, building address, street intersection, entrance gate, water depth sounding, POS or CAD drawing origin/units). Units applied to recorded temporal-spatial data can vary widely (even when using exactly the same data, see map projections), but all Earth-based spatial-temporal location and extent references should, ideally, be relatable to one another and ultimately to a "real" physical location or extent in space-time. Related by accurate spatial information, an incredible variety of real-world and projected past or future data can be analyzed, interpreted and represented to facilitate decision-making.

2.1.5 Pictorial Presentation of Weather Forecast Collection / Dissemination

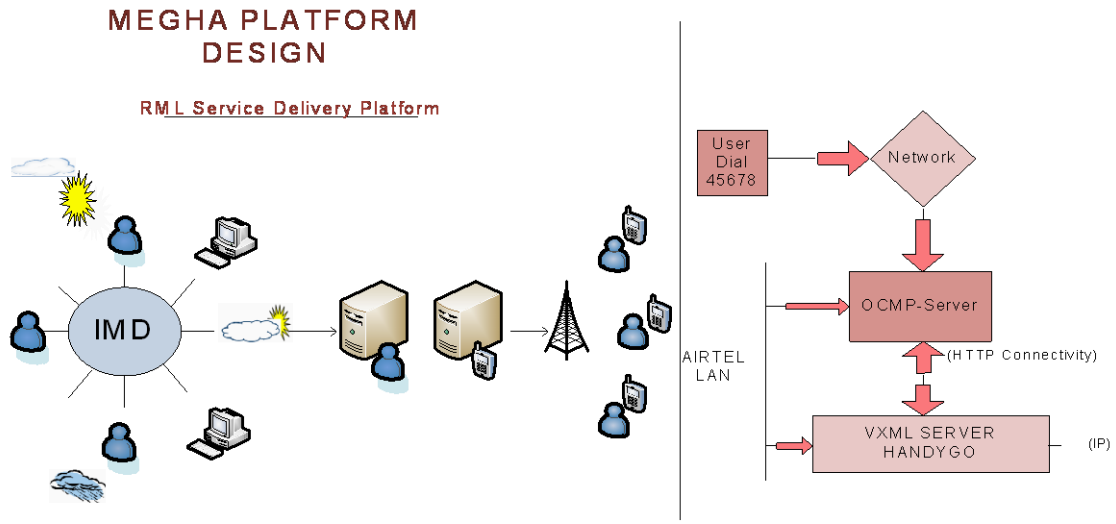


Constraints

Accuracy of weather forecasts generally decreases with increase in time domain, i.e., the short-range forecasts are more accurate than the medium range ones. Short-range forecasts are issued for larger spatial domain (Meteorological sub-division), which makes them less usable for agriculture. Even though medium range forecasts are issued for smaller spatial domains (district), many times the forecasts need updating within the five-day period due to changes in occurrence/movement of weather systems, which is not met with the present method of forecasting for next five days on fixed days (Tuesday & Friday). Also, the utility of even short range forecasts at smaller spatial domain would be limited as the lead time available for the farmer to act would be insufficient. Due to these limitations and contradictions in time and space domain, neither of these forecasts could be efficiently made use of by the farmers. **In an interaction session during Krishi Mela of 2005 at Bijapur, the farmers too expressed that they needed a local forecast for timely adoption in agriculture (Source: Brochure of AICRP AM, RRS, Bijapur)**.

With this background and also to overcome the lacuna in utility of short and medium range forecasts disseminated through mass media, it was felt necessary to develop location specific forecasts - say, at Taluka or District level - and provide the same to the farmers immediately - i.e., morning, evening or night - and/or as and when the farmer requests. The present day information and communication technology is a boon in this context.

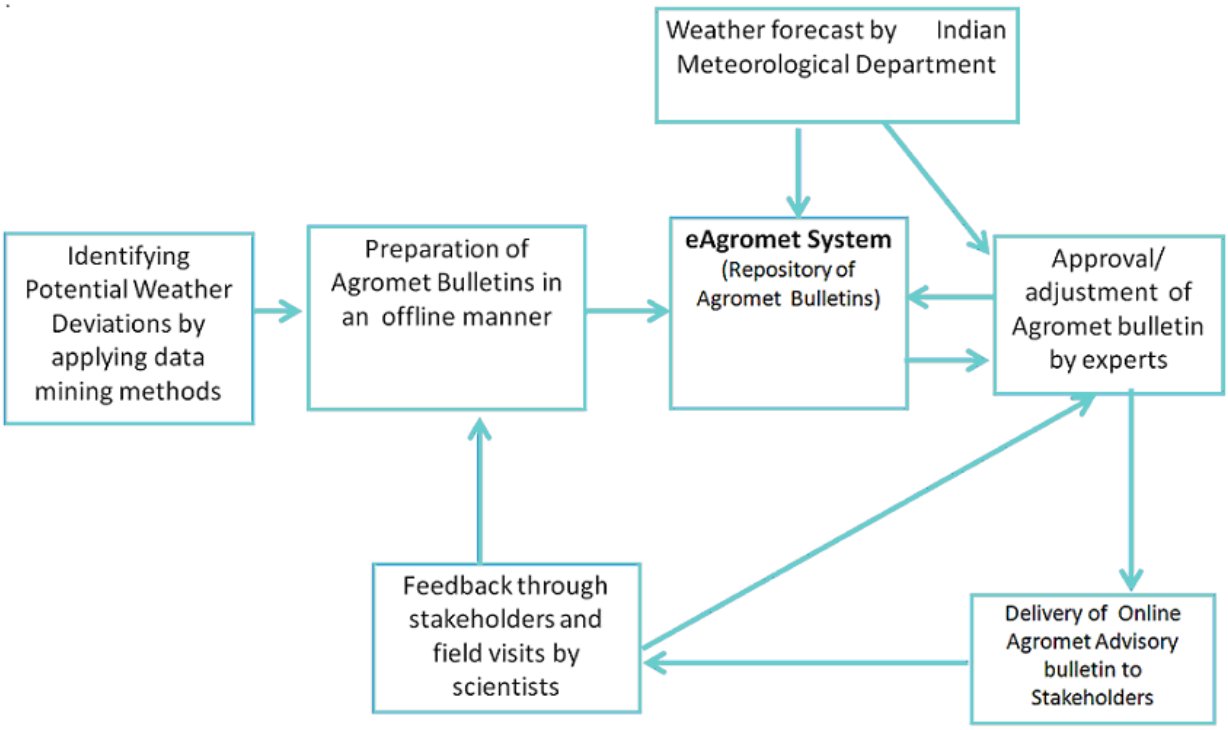
2.1.6 Existing dissemination mechanism



A number of private firms namely Reuter Market Light, Handygo, Vritti Solution, IFFCO Kisan Sanchar Limited (IKSL); Nokia is disseminating the Agro-met Advisories generated under IAAS through SMS and Interactive Voice (IVRS). At present, 15 States namely Uttar Pradesh, Punjab, Haryana, Rajasthan, Madhya

Pradesh, Orissa, West Bengal, Gujarat, Karnataka, Kerala, Tamilnadu, Andhra Pradesh, Bihar, Maharashtra and Himachal Pradesh have been covered under this service. Advisory is also disseminated through SMS to the farming community of Maharashtra, in collaboration with the State Department of Agriculture, Government of Maharashtra. **At present 1965361 farmers were benefitted by this service.**

2.2 To be scenario: Agro-meteorological Advisory Services System overview (as proposed by IMD through e-AGROMET project):



Delivery of Online Agro met Advisory … is to be linked to PIFWAMA Port let.

2.2.1 The design of e-Agro-met system

The objective of the proposed system will be explained. Next, the observation about ongoing agro-met bulletin process will be discussed. After listing the issues, the key ideas evolved for developing the system and the refined definition of weather deviation will be mentioned, which is a crucial aspect of the proposed system.

2.2.2 Objective:

The objectives of e-Agro-met system are as follows:

i. The system should be simple to use and understand.
ii. The efficiency of agro-met bulletin preparation process should be increased.
iii. The agro-met bulletin should be searchable and reusable.
iv. The system can be deployed in any location.

2.2.3 Ongoing process of agro-met bulletin preparation: Observation:

In order to design the proposed system, it was observed the current system of agro-met advice preparation process and made the following observations.

The process of agro-met bulletin starts with the receipt of weather prediction from IMD to AMFU. At the AMFU, the following steps are followed to prepare agro-met bulletins.

i. Capturing the type of weather deviation

After receiving weather prediction for next five days, the agro-met expert captures the trend regarding how weather parameters vary in the predicted week and influence on the crop. Next, he/she tries to analyze past week actual weather data of the region, and makes effort to capture the influence of past week's weather data on the crops. Normally, it was observed that, the agro-met expert try to understand how the weather of past several weeks has influenced the crops and possible influence of weather prediction on the given crop. So, the agro-met expert understands the effect of weather deviation (how weather trend vary over past few weeks to the predicted weather) and starts the process of preparing agro-met bulletin.

ii. Agro-met advice preparation

After grasping the affect of the weather for past few weeks on the crop and the possible effect of predicted weather, the agro-met scientist prepares agro-met bulletin, which contains the possible risk mitigation steps by considering each crop.

2.2.4 Issue in the design of e-Agro-met system:

With respect to the objectives and observations on the agro-met preparation process, the following issues to resolve to build e-Agro-met system:

i. How to capture the weather trend of the predicted week?
ii. How to capture the weather trend of past weeks?
iii. How to capture weather deviation?
iv. How to comprehend the influence of weather deviation on the crop?
v. What is the format of agro-met bulletin?
vi. How to ease the process of preparing the agro-met bulletin with additional support?

2.2.5 Concepts employed for designing e-Agro-met system:

The notion date of forecasting (df) is employed to represent the day of forecasting. The notation past duration (pd) indicates the number of days proceeding to df. The notation forecasted duration (fd) indicates the number of days for which weather forecasted from df. Given df for a given region, the following framework has developed to understand the affect of weather prediction and prepare agro-met bulletin.

1. Methods to comprehend the deviation of weather values from pd to fd.
2. Framework to understand the affect of weather deviation on the crop.
3. Agro-met advisory format
4. Agro-met bulletin preparation

The description of the methods is as follows.

i. Methods to comprehend the deviation of weather values from pd to fd.

The term is defined, weather summary (we) as follows. The weather summary of for a duration d, ws (d) are given in Definition 1.

Definition 1: Weather summary for a duration d (ws(d)): For each day we receive values for Tmin, Tmax, RH, RF, R, WS and WD. The notation ws(d) is the summary values for Tmin, Tmax, RH, RF, WS, WD and R variables over duration 'd', i.e., ws(d)=(s (Tmin), s(Tmax), s(RH), s(RF), s(R), s(WS), s(WD)). Here, the notation s(x) indicates the summary of weather variable 'x' over duration 'd'.

The agro-met expert has to grasp the change in the weather from pd to pf. For this, we define the notion of weather deviation in definition 2.

Definition2: Weather deviation wd(df): Given the date of forecasting (df), the weather deviation is indicated by wd(wf), which is equal to <df, ws(pd), where ws(pd) indicates weather summary of past duration and ws(fd), indicates the weather summary of forecasted duration. Normally, the past duration is divided into 7 days intervals. Also, we computed for each interval. By replacing ws(pd) with "ws(-n),…, ws(-2), ws(-1)", the definition of weather deviation for a give df is as follows: wd(df):<df, ws(-n),.., ws(-2), ws(-1), ws(fd)>. Here, 'n' is the number of proceeding weeks from df, for which ws is calculated for each week.

Some more definition on weather deviation is explained in section 2.1.3.5.

ii. Framework to understand the affect of weather deviation on the crop.

The agro-met bulletin consists of risk management advices for the crops of a given region. Given the weather prediction for df, the weather deviation is formed. The next step is to visualize the affect of weather deviation on each crop. Normally, the crop cycle is divided into phenophases. Based on df and crop name, the corresponding phenophase of the crop can be known. It can be noted that the affect of weather deviation on the phenophase of the crop has to be visualized by agro-met expert.

iii. Agro-met advisory format

After identifying crop instance, combined effect of predicted weather effect and past weather effect, advice is prepared as follows: -

a. One or several types of the following effects on the phenophase of the crop were identified.

   Normal, Cold effect, Heat effect, Drought effect, dry effect, Flooding effect, Moisture effect, Fog effect, dew effect, Cloudy effect, Sunny effect, Wind speed effect, and Wind direction effect.

b. For each of the above-identified effect, the advice is prepared for the following categories.

   Preparation (Field, Seed), Sowing / Planting, Transplanting, inter-cultivation, fertilizer/Nutrient management, water management, Pest Management, Decease management, Weed management, Harvesting, Quality of produce.

iv. Agro-met bulletin preparation

v. The agro-met bulletin for a given region is the combination of advices of the crops in that region.

2.2.6 More about weather deviation:

The notion of weather deviation is the key concept of the e-Agro-met system. Since June 2011, we have investigated the notion weather deviation and refined the notion of weather deviations. The motion for the refinement is that the weather deviation should be easily understood and it should easy to search the past advices.

a. Summary-based weather deviation (wd): this is same as Definition2. Given the date of forecasting (df), the weather deviation is indicated by wd(df) which is equal to <df, ws(pd), ws(fd)), where ws(pd) indicates weather summary of past duration and ws(fd), indicates the weather summary of forecasted duration. Issues with swd: It was observed that it is difficult for the agro-met expert to understand the semantics of weather deviation. Also, it is very difficult to find the similar weather deviation by comparing integer values of several weather summaries of various weather parameters.

b. Normals-based weather deviation (nwd): It is possible to increase the understanding of weather deviation by providing the normal for the same duration. By adding notion of normal of Definition 2, the nwd definition is given in Definition 3.

Definition 3: Normals-based weather deviation nwd(df): Let n(d) indicated the weather normal for duration 'd'. Given the date of forecasting (df), the weather deviation is indicated by wd(df) which is equal to <df, ws(pd), n(pd), ws(fd), n(fd)), where ws(pd) indicates the weather summary of past duration, n(pd) indicates the normal for the past duration, ws(fd) indicates the weather summary of forecasted duration, and n(fd) indicates the normal of forecasted duration.

Issues with the nwd: The nwd definition is better than wd as agro-met expert can increase the understanding by comparing and contrasting the existing weather situation with the corresponding normal. However, even though, the definition is better than wd, still it is difficult to comprehend the meaning of weather deviation. Also, it is much more difficult to search similar weather deviation.

c. Category-based weather deviation (cwd): It was observed that the agro-met expert does not give different advice unless a weather variable changes to a considerable extent. For example, the agro-met expert does not give different advice if the temperature changes by 0.5 degrees or humidity changes by 2%. If we search based on integer values, the system considers each value as distinct. So, it is difficult to find similar advices. Also, for human being, it is difficult to comprehend reality based on integer values of weather variables. Based on these observations we have improved the definition of weather deviation based on the notion of categories.

   Category or tag: For each weather variable, we divide the domain of that weather variable into different classes. Each class is a category or tag. The tag is a description of that class. For example, the domain of temperature can be divided into: PLEASANT, HOT, MORE HOT, COLD, VERY COLD and so on. Similarly, each other weather parameter is divided to different categories.

   The weather summary of Definition 1 is redefined as category-based weather summary (cws) by incorporating the notion of categories.

Definition 4: Category-based weather summary for a duration d (cws(d)): For each day we receive values for Tmin, Tmax, RH, Rf, R, WS and WD. The notion ws(d) is the summary values for Tmin, Tmax, RH, RF, WS, WD and R variables over duration 'd', i.e., cws(d)=(c(s(Tmin)), c(s(Tmax)),

c(s(RH)), c(s(RF)), c(s(R)), c(s(WD)), c(s(WS)). Here the notion c(s(x)) indicates category of summary of weather variable'x' over duration 'd'. For example, the summary of Tmin over one week is mean value of Tmin. Let the value be 16 degree centigrade. So, s(Tmin)=16. Then, if this is classified as COLD, then c(s(Tmin))=COLD. We have to compute the categories for the other weather variables. Based the definition of category-based weather summary given in Definition 4, we define category-based weather deviation as follows.

Definition 5: Category-based weather deviation cwd(df): Let n(d) indicated the weather normal for duration 'd' and c(n(d)) indicates the category of corresponding weather normal. Given the date of forecasting (df), the category-based weather deviation is indicated by cwd(df) which is equal to <df, cws(pd), cn(pd), cws(fd), cn(fd), where cws(pd) indicates the categories of weather summary of past duration, n(pd) indicates the categories of weather normal for past duration, cws(fd) indicates the categories of weather summary of forecasted duration, and cn(fd) indicates the categories of normal of the forecasted duration.

Normally, given the weather prediction, the weather deviation is understood by considering how the predicted weather would be different from the weather situation of one or several past weeks.

Definition 6: Given df, the past duration is divided into 7 days interval. Also, cws is computed for each interval. By replacing cws(pd) with "cws(-n),.. cws(-2), cws(-1)", the definition of category-based weather deviation for a given df is as follows: cwd(df): <df, cws(-n), cn(-n),..,cws(-2), cn(-2), cws(-1), cn(-1), cws(fd), cn(fd)>. Let wsum(n) indicates the weather summary of past 'n' weeks, then the cwd is defined as follows.
Cwd(df): <df, wsum(n), cws(fd), cn(fd)>

2.2.7 Agro-met bulletin preparation process using e-Agro-met tool:

By employing the concepts explained in the preceding section, we have developed the eAgro-met System. The operational procedure is as follows:

A. For each region the following details are to be entered.
   i. Enter region details: Note that a region can be a district, block or mandal.
   ii. Enter the details of crop: All the crops in the given region are entered.
   iii. Enter the phenophase details: The phenophase details, duration and cardinal temperatures are entered.
   iv. Enter historical weather data of 15 years (Tmin, Tmax, RH, RF, WS, WD).

v. Populate the advice assistant tool: The advice assistant tool is developed to enter the crop and region specific content. The advisory steps for managing risk for different weather situations for each phenophase of the crop will be entered.

B. Suppose, a weather forecast is received on a given date of forecasting (df). The agro-met bulletin is prepared as follows:

vi. Given date of forecasting (df), agro-met expert enters weather data (weather data before df and predicted data). After entering the data, the system carries out the following steps:
    a. The system generates summaries of weather parameters for Tmin, Tmax, RF, RH, CC, WS, and WD for weather data before df and predicted data.
    b. The system generates normal values for the weather parameters Tmin, Tmax, RF, RH, CC, WS and WD for the predicted duration and the past duration.
    c. The system displays options for the categories for T-min, T-max, RF, RH, CC, WS and WD for both normal and weather summaries for the predicted duration and existing durations.

vii. By comparing summary values and corresponding categories, the agro-met expert selects appropriate options for the categories by using the following facilities:
    a. The system generates weather deviation with categories options for weather values for normal and predicted summaries.
    b. The system displays the weather situation of several weeks prior to date of weather forecasting.
    c. The agro-met expert enters the weather summary by considering the weather of several weeks prior to date of forecasting.
    d. The weather deviation for the given df will be generated.
    e. For the weather deviation, the system gives options for various crop options (phenophases of the crop)
    f. For each crop/phenophase, the system generates crop-specific weather deviations.

viii. For each weather deviation concerning to crop/phenophase, the agro-met expert prepares agro-met advice by using the following system utilities.
    a. The system displays weather deviation with normal categories, summary categories along with summary values.
    b. The system displays heading of various components of the advice.
    c. The agro-met expert enters agro-met advice using advice search and advice assistant tools.
    d. After completing the advice preparation, it is stored in the system's database.

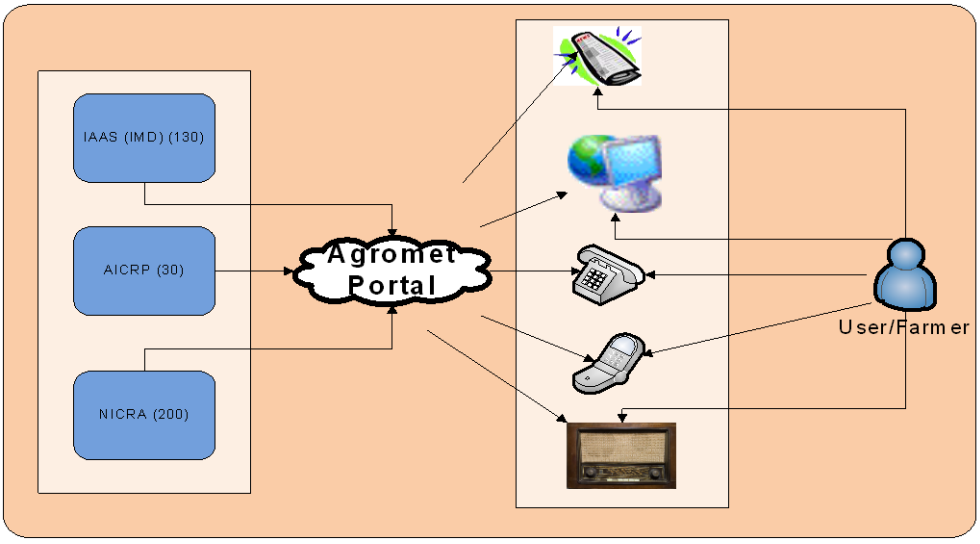
ix. Agro-met bulletin preparation: The agro-met expert prepares agro-met bulletin by merging agro-met advices of the crops of that region.

C. Two search tools are provided: Advice search tool and advice assistant tool

i. **About advice search tool**: It search's past advices and displays similar advice that has entered during previous years. Comparing categories of current weather deviation with the categories of past weather deviations of corresponding crops carries out the search.

ii. **About advice assistant tool**: it provides the facility to enter the crop and region specific content for different weather situations. While preparing the agro-met advice, the agro-met expert can take the help of advice assistant tool to display advices for a given weather situation and duration (predicted or existing).

2.3 TO BE process for Agro-Met dissemination:

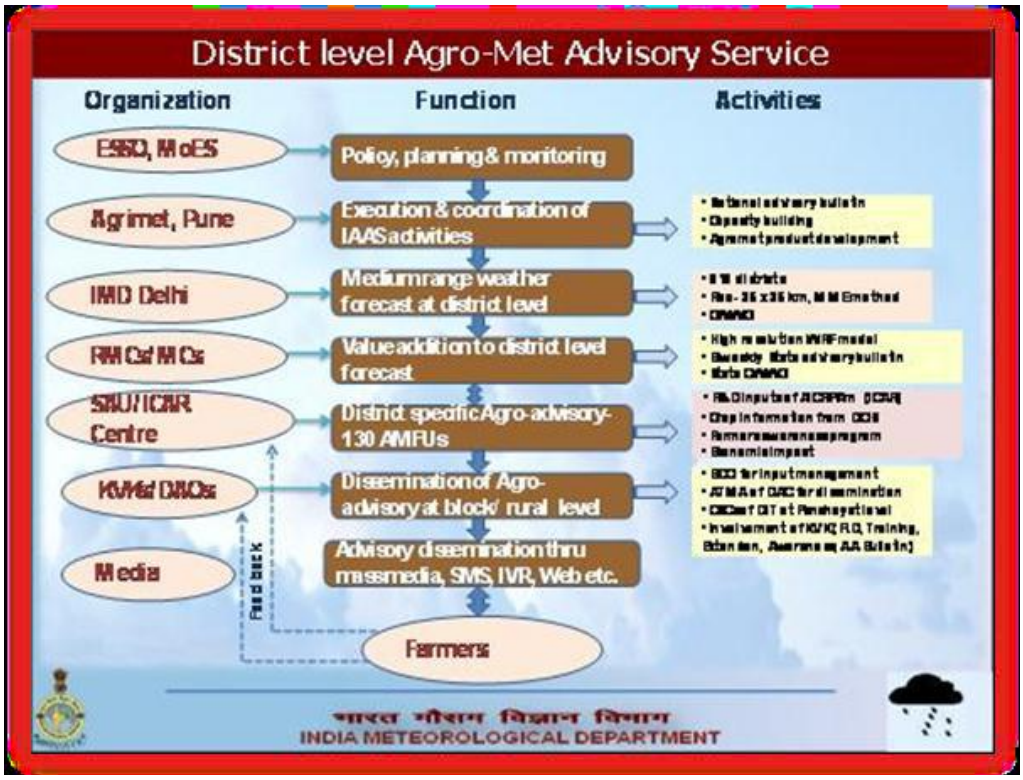


2.3.1 Integrated Agro-met Advisory Services (IAAS):

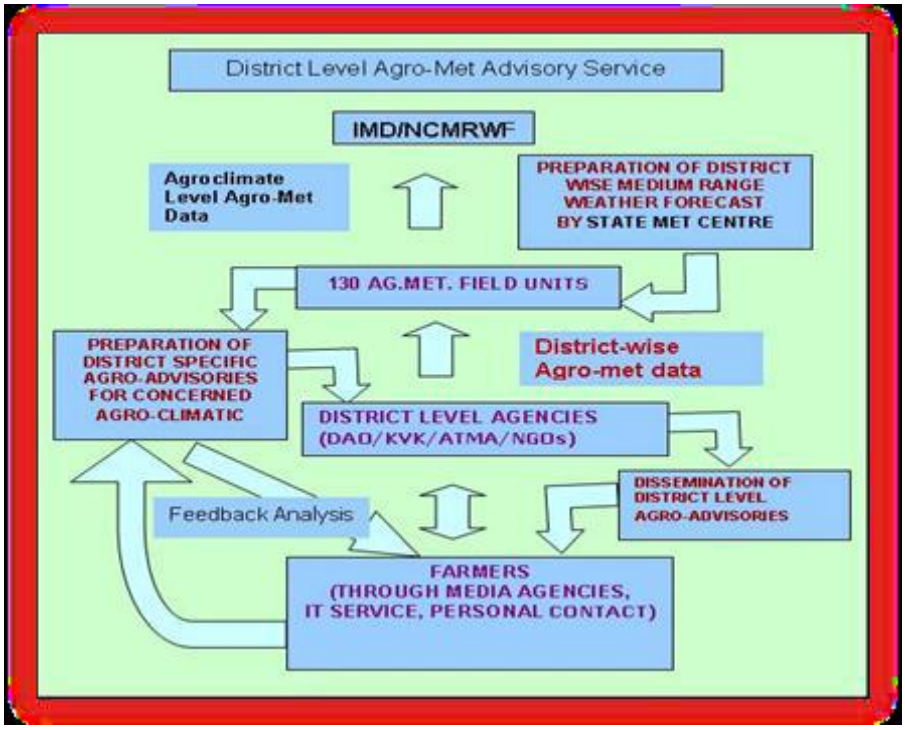
IAAS project is being implemented through five-tier structure to set up different components of the service spectrum. It include meteorological (weather observing & forecasting), agricultural (identifying weather sensitive stress & preparing suitable advisory using weather forecast), extension (two way communication with user) and information dissemination (Media, Information Technology, Telecom) agencies

2.3.2 Broad spectrum of the activities of different tier:

IMD has issued quantitative district level (619 districts) weather forecast up to 5 days and the products comprise of quantitative forecasts for 7 weather parameters viz., rainfall, maximum temperature, minimum temperatures, wind speed, wind direction, relative humidity and cloudiness. In addition, weekly cumulative rainfall forecast is also provided. IMD, New Delhi generates these products using Multi Model Ensemble technique based on forecast products available from number models of India and other countries. The products were disseminated to Regional Meteorological Centers and Meteorological Centers of IMD located in different states.



The Agro-met Advisory Bulletins were issued at district, state and national levels to cater the needs of local level to national level. The district level bulletins were issued by AMFUs and include crop specific advisories including field crops, horticultural crops and livestock. At present these bulletins were issued for 550 districts of the country. The State Level bulletin is a composite of district bulletins.



These bulletins were jointly prepared by State Meteorological Centre of IMD and AMFUs and mainly used by State Government functionaries. This is also useful to Fertilizer industry, Pesticide industry, Irrigation Department, Seed Corporation, Transport and other organizations, which provide inputs in agriculture. This bulletin is a significant input to the State level Crop Weather Watch Group (CWWG) meeting. Presently, these bulletins were issued for all the states of the country. National Agro-met Advisory Service Centre, Division of Agriculture Meteorology, and IMD-Pune, using inputs from various states, prepared national Agro-met Advisory Bulletins. Ministry of Agriculture is prime user of these bulletins, which help take important decisions in Crop Weather Watch Group (CWWG) meetings at national level.

2.3.3 Block Level Agro-meteorological Advisory Service:

A pilot project has been proposed to initiate jointly by IMD and the Consultative Group on International Agricultural Research (CGIAR) under the Research Program on Climate Change, Agriculture and Food Security (CCAFS) to develop block level advisories for district in Haryana, Bihar and Rajasthan.

2.3.4 Agro-met Advisory Services at Block Level:

District-level weather forecast is provided to 130 Agro-met Field Units (AMFUs) located at the State Agriculture Universities (SAUs), institutes of Indian Council of Agriculture Research (ICAR), IITs, etc.

There is need to further improvement in these services particularly through preparing the weather forecast at a level smaller than a district, extend the temporal range of weather forecast and also aggressive extension, outreach & agro-met advisory dissemination system. In order to operate at block level, there is a strong need to set an operational unit at District level. Hence, it is proposed to set up District Agro-met Units (DAMUs) in the country. These stations may be collocated with the existing Krishi Vigyan Kendras (KVKs), which are operating through State Agriculture Universities, ICAR Institutions and NGOs etc. and are funded and technically guided by ICAR.

There are a few bottlenecks in the existing services like optimum observations, seamless weather forecast, manpower and permanency of staff in AMFUs, real-time information flow particularly crop & pest/disease information, establishment of connectivity, outreach/extension mechanism, R & D support for Agro-meteorology etc. Dissemination of right information at right time to each and every farmer of the country is a challenging job.

The proposed projects for dissemination of Agro-met advisory bulletin are through IFFCO KIsan Sanchar Ltd., Reutor Market Light (RML), MahaAgri, Vritti Solutions, Handygo, Common Service Centers (CSC), and National Bank for Agriculture and Rural Development (NABARD), MS Swami Nathan Research Foundation (MSSRF) etc.

Inclusion of these services will cover large fraction of farmers in the country to get the benefit. Moreover, Agro met Division; IMD is establishing linkages with the State level ICTs like Kisan Kerala, e-livestock. ICT for agriculture knowledge management needs to be establishment, etc. All FM channels of AIR and now casting centers of Doordarshan under Prasar Bharati may also be included.

Regular feedback from farmers, State Agricultural Departments and Agricultural Universities / ICAR and other related Institutes would be collected and processed for further improvement of services.

Feedback information would also be collected from Regional and Narrowcasting stations of DD, AIR, and FM channels, KVKs, ATMA, CSCs, NGOs, VRCs and VKCs and also through Kisan Melas.

The District Agro-meteorological Units may be set up at KVKs through provision of grant-in-aid on the same pattern as is being done for AMFUs under the existing memorandum of understanding with the collaborating universities/institutions.

2.4 The main functions of the District Agro-met Units (DAMUs) will be as under:

1. Receive weather forecast from IMD and prepare Agro-met Advisory bulletins at block levels. For this DAMU will be guided by AMFU.
2. Disseminate Agro-met advisory bulletins through print media, radio, Television and other possible mechanisms.
3. Assess users' requirements and impact of AAS.
4. Participate / operate Agri-clinics or such mechanism (Kisan Call Centers).
5. Participate in farmers fair and organize awareness activities to popularize AAS.
6. Maintain agro-met observatory, record observation, and dispatch and store data.
7. Prepare local climatological information & database. Receive current weather observations and agricultural data from districts.
8. Identify weather sensitivity of crops, animals, pests& diseases and management practices.
9. Prepare annual reports and submit the same to designated authorities
10. Collect feedback information from Regional and Narrowcasting stations of DD, AIR, and FM channels, KVKs, ATMA, CSCs, NGOs, VRCs and VKCs and also through Kisan Melas and Co-ordination with KVKs, ATMA and NGO for better improvement of the system
11. R & D work to scale up Agro-met system.

2.4.1 The main functions of the Agro-Meteorological Field Unit (AMFUs) will be as under:

Prepare Agro-met Advisory bulletins at block levels

Monitoring and coordination of activities of AMFUs under its area of operation & agro climatic zone level review meetings. These functions include:

1. Networking to expand the outreach of AAS up to village level. Induce information technology and private public partnership to expand outreach.
2. Management of Agro-met observatory network.
3. Securing inputs from DAMUs to prepare state level advisory bulletin.
4. Assessment of impact of inclement weather on crop at agro climatic zone level.
5. Preparation of agro climatic zone level agro-climatological information.
6. Collate crop information from concerned agencies and provide the same to DAMUs.
7. Prepare Agro-met products for respective districts.

8. Set up Agro-met Kiosks with appropriate network for dissemination of advisory bulletins.

2.5 Hosting of interactive website:

A new interactive website launched on to provide required information on AAS. Main features of website were:

- Value added medium range weather forecast for all districts,
- Severe Weather Warning,
- District, State & National level AAS bulletins on real time basis twice a week,
- Bulletins in English and Local languages
- Alerts/warnings, FAQ, SMS, Feedback.

2.6 Agro-Met SMS:

The Agro-met SMS are brief notes not more than 160 letters providing information on weather forecast and other agriculture related issues to the farmers. The content is suitable for local conditions and needs. These advisories are sent twice a week and the farmers receive them in their local language.

Various stakeholders such as Ministry of Earth Sciences, Ministry of Agriculture and Telecom companies came together to start this new and innovative venture. The IFFCO Kisan Sanchar Ltd (IKSL) was launched in 2009 to empower Farmers by providing agricultural information to farmers via mobile phone using innovative voice based technology in their local language including a local support Help Line.

130 field units that are located across the country prepare the source material. These field units comprise experts in various agriculture related subjects. 50 to 100 contact farmers are under each of these units who give their feed back.

2.7 Dissemination of Agro-met Advisories:

Disseminating agro meteorological information is part of a process that begins with scientific knowledge and understanding and ends with the evaluation of the information. Information on agro-advisory is disseminated through multi-modes of delivery including mass and electronic

media. It include, All India Radio, Television, Print Media (local news paper in different vernacular languages), internet (Web Pages) as well as group and individual relationships through email, telephone etc. The Internet is one of the new and cost-effective technologies that can provide this information in an accurate and timely manner.

In addition to different multi-channel dissemination system, agro-met advisories under the project Integrated Agro-met Advisory Service (IAAS) were being disseminated to the farming community in India through SMS and IVR (Interactive Voice Response Technology). The advisories were crop and location specific and delivered within actionable time to the farmers.

2.8 IMD-DoA, GOM tie up for Agro Met Advisory Dissemination

- DOA has Mahaagri SMS Service for disseminating advisories.
- DOA has created user accounts for IMD, Pune and its 9 Agri-Met. Field Units in the system
- IMD, 9 AMFUs disseminate Agro Met Advisories in their respective jurisdiction on twice a week basis.
- The service is used by IMDs free of cost. DoA bears the SMS and System Cost.
- Database used by IMD is that of DOA System
- IMD is also having tie-ups with private firms and also with NABARD for Agro Met Advisory dissemination.
- Targeting same client by multiple agencies should be streamlined.

In addition to different multi-channel dissemination system, agro-met advisories under the project Integrated agro-met Advisory Service (IAAS) are being disseminated to the farming community in India through SMS and IVR (Interactive Voice Response Technology). Under the SMS system an information platform has been created which allows the existing agro-met Field Units (AMFUs) located at State Agriculture Universities (SAUs), institutes of Indian Council of Agriculture Research (ICAR), Indian Institute of Technology (IITs) etc. to provide the information in a convenient and timely manner. The advisories are crop and location specific and delivered within actionable time to the farmers. Under IVR system the information from AMFUs for each state are collected and then stored, and converted into voice where the farmer would be calling and receiving the desired information.

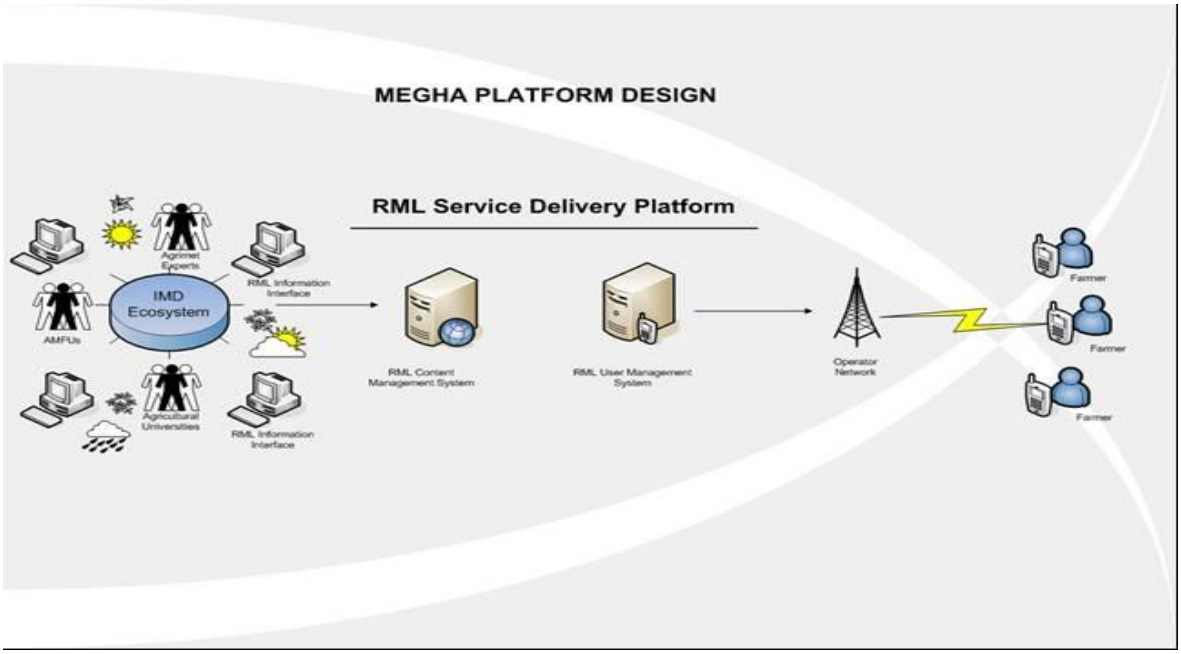
A number of private firms namely Reuter Market Light, Handygo, Vritti Solution, IFFCO Kisan Sanchar Limited (IKSL) is disseminating the agro-met advisories generated under IAAS through SMS and Interactive Voice. At present 16 states namely Delhi, Uttar Pradesh, Punjab, Haryana, Rajasthan, Madhya Pradesh, Orissa, West Bengal, Gujarat, Karnataka, Kerala, Tamilnadu, Andhra Pradesh, Bihar, Maharashtra and Himachal Pradesh have been covered under this service. Advisory

are also disseminated through SMS to the farming community of Maharashtra in collaboration with the State Department of Agriculture, Government of Maharashtra.

➢ Public Private Partnership for agro-met advisory dissemination

In the era of emerging IT arena in India many private companies have joined hands with IMD to deliver weather based agricultural information to the farmers using multiple modes of information communication. As some of the farmers are willing to pay for the information, IMD has tied up with different public and private organizations, which are already working in dissemination of agricultural information to the rural village. The dissemination technology employed under this are mainly based on Information Technology (IT) and includes Internet based communication systems and Mobile phone based communication system. The most advantageous feature of mobile phone based systems is that farmers can communicate with the web-based systems, while in the field and thus request for advice concerning a newly discovered problem. The IMD has so far partnered with Reuter Market Light (RML), Handygo, Maharashtra State Agriculture Department (Government of Maharashtra), Vritti Solutions, IFFFCO Kisan Sanchar Ltd. (IKSL) and TATA Consultancy Services (TCS).

IMD and Reuter Market Light (RML) are working together to disseminate weather and Agri-met crop/livestock advisory developed by Agro-met Field Units (AMFUs) located at State Agriculture Universities (SAUs), IITs, Indian Council of Agriculture Research (ICAR) etc. Such weather based advisory bulletins help farmers to decide cultural management actions and also manage the farm inputs which all are highly weather sensitive. At present the advisories are being disseminated to thirteen states. RML already created an information platform, which allows the AMFUs to provide the information in a convenient and timely manner. The information is basically crop and region specific and delivered within actionable time to the farmers. The project's experience would be leveraged upon to create a scalable model, which can expand across India and utilize the information developed for all the 640 districts of the country. The information cover realized weather information, 5-day forecasts, weather forecast based crop & livestock advisories and special alerts or warnings for severe weather conditions. This information is being provided to farmers on their mobile phones in the form of SMS as part of the RML service, stating IMD as the source. The information enables them to take appropriate actions resulting in tangible benefits.



Handygo is a Telecom Value Added Services company based at New Delhi and maintains a very healthy relation with leading mobile operators in the industry. The company is disseminating agro-met advisories through IVR (Interactive Voice Response) system to five states (Punjab, Haryana, Maharashtra, Gujarat and West Bengal) in the country. Its rural IVR service on 55678 by is designed to serve Farmers through providing information on weather, crops, livestock & fisheries, Govt. & Bank offerings for rural, Health, Family Planning, Mandi Rates etc. It fetches information from IMD for each state and stores it in our database. Thereafter, we would be converting these data into voice and then transferring the information into the Network where the farmer would be calling and receiving the desired information. Handygo plans to launch this rural service in 23 different states in the country and have the Weather Based Agro Advisory as a part of its IVR solution for the farmers. The delivery of the content is in Regional Languages. A feedback mechanism in which farmers can let us know that how relevant the information provided by IMD has also been set up.

IFFCO Kisan Sanchar Limited (IKSL) is providing Value added services to the farmers through the mobile channel. Five Voice messages per day of importance to farmers are sent free of cost to the farmers, which cover area of their immediate interest. The uniqueness of the messages is that they are in local languages and conveyed by local people. Channelizing local resources to share information related to local needs provides location specific orientation. IFFCO has started to disseminate agro-met advisory through five voice messages per day to the farmers in free of cost, which cover area of their immediate interest. Initially in 16 states they have started this project namely Delhi, Uttar Pradesh, Punjab, Haryana, Rajasthan, Madhya Pradesh, Orissa, West Bengal, Gujarat, Karnataka, Kerala, Tamilnadu, Andhra Pradesh, Bihar, Maharashtra and Himachal Pradesh.

The broad areas presently covered are recommendation for farmers on best agricultural practices, nutrient related issues, animal husbandry, and information on nearest mandies, input on weather & climate and appropriate rural technologies.

State Department of Agriculture, Government of Maharashtra is sending SMS to the farmers in the villages of the state through the website www.Mahaagri.gov.in. In addition the other areas of service, agro-met advisories are also being sent through the sites.

Status of State wise SMS service through different dissemination agencies is given below:

Maharashtra		**Punjab**	
Reuter Market Light (RML)	119116	**RML**	43334
Handygo	500	**Handygo**	750
State Government, Maharashtra	26000	**Total**	**44084**
Vritti Solutions	2300		
Total	147916		
Haryana		**West Bengal**	
RML	20556	**RML**	104
Handygo	700	**Handygo**	700
Total	**21256**	**Total**	**804**
Gujarat			
RML	**16144**		
Handygo	400		
Total	16544		
RML has presence in other 8 states also.		**IFFFCO Kisan Sanchar Ltd. (IKSL)**	
Madhya Pradesh	7471	**Circle**	**Current Active Base**
Karnataka	7784	**Uttar Pradesh East**	277119
Tamilnadu	4114	**Uttar Pradesh West**	76086
Andhra Pradesh	10410	**Bihar**	101699
Rajasthan	22976	**Tamilnadu**	27439
Uttar Pradesh	20738	**Haryana**	39910
Himachal Pradesh	365	**Rajasthan**	68422
Uttarakhand	113	**Himachal Pradesh**	6219
Total	**73971**	**Gujarat**	6145
		Punjab	8276
		Bangalore	77162
		Kerala	5981
		Madhya Pradesh	45902

		Andhra Pradesh	49327
		West Bengal	57961
		Orissa	44377
		Maharashtra	17994
		Total	**910019**

- **New Proposals on dissemination of Agro-met Advisories**

Common Service Centre (CSC)

CSCs constitute one of the three pillars of the National e-Governance Plan for enabling anytime anywhere delivery of government services. The collaborative scheme with IMD will be implemented through a Public Private partnership. CSC will be having following objectives

- Providing Meteorological Information (observation, forecast and products such as agro-met advisories) to the rural farmers at their locality i.e., villages, based on districts of the country
- Meteorological information be linked with agri-productivity measures as like farming inputs/ precautions/ package of practices –information & guidance
- Supplementing necessary information on part of meteorology into the complete solution for small farmers through integrated framework of the related stakeholders like KVK, ICAR, University-Colleges etc.
- Weather warnings to ensure minimizing disaster losses
- Establishing a two-way communication linkage through CSCs so that agri-related queries may attend and replied.
- A mechanism may also be developed to obtain regular feedback based on the skill of forecast, quality & relevance of advisories, problem solving through interactive mode, answering questions of common interest through bulletins, accessibility to information/ experts via ICT.
- CSCs may communicate local level observation (Meteorological, Crop, Soil, Pest/Disease, Sowing, Harvesting & Other prevailing intercultural operations) to knowledge pool for generating the relevant and specific advisories.
- Training may also be planned for the kiosk operators as well as farmers on use of agro-met advisories in farm management through AMFUs with active support from IMD/ICAR.

- **National Bank for Agriculture and Rural development (NABARD)**

NABARD is set up as an apex Development Bank with a mandate for facilitating credit flow for promotion and development of agriculture, small-scale industries, cottage and village industries,

handicrafts and other rural crafts. It also has the mandate to support all other allied economic activities in rural areas, promote integrated and sustainable rural development and secure prosperity of rural areas. Joint collaborative project with IMD aims at dissemination of:

- Need-based agro-meteorological advisory services to the farmers at the right time based on local context and culture.
- To bring together experts and grassroots level communities in a two-way communication with the objective of making knowledge accessible to village of the country.
- Dissemination of Agro-Advisory and feedback from farmers through the involvement of Farmers' clubs, Joint Liability Groups, Village watershed Committees in areas where Watershed projects are being implemented & self help groups.
- R&D in Operational Agro-meteorology.

2.9 All India Coordinated Research Project (AICRP):

Functional areas:

Sunflower, Safflower & Castor, Groundnut, rapeseed- Mustard, Soybean, Sesame & Niger, linseed, Chickpea, Pigeon pea, arid legumes. MULLaRP (Mungbean, Urdbean, Lentil, Lathyrus, Rajmash & Pea)

2.9.1 Activity performed for the areas mentioned above:

- All work relating to Ad-Hoc Schemes on the above crops.
- Holding of Workshops/Group Meetings /Regional committee meeting etc. on the above subjects
- Frontline Demonstrations on different Oilseeds and Pulses crops under ISOPOM
- Annual action Plan of oilseeds and pulses under ISOPOM.
- National Food Security Mission programmes for pulse production by DAC.
- Release of varieties in respect of above crops.
- Inter Session meeting of the Consultative Committee.
- Technical work/comments of QRT in respect of DOR, IIPR Kanpur, Soybean, Groundnut and Rapeseed-Mustard.
- DAC-ICAR Interface meetings.
- Price Policy notes and meetings.
- Foreign Aided Projects on Oilseeds and Pulses crops, deputation report etc.
- ICAR-ICRISAT collaborative projects.

- MOUs and Work Plan with other countries, Formulation of MOUs and Work
- Plan at Divisional level.
- Annual General Meeting agenda, action taken reports and follow up.
- All technical work including statistical data preparation, status paper, position papers, speeches for Hon'ble Ministers visits, compilations etc.
- All work related to NOVOD Board, SOPA, CIAN and other agencies.

2.9.2 Impact of Agro-met Services:

The agro-met advisory services through various channels have resulted in significant increases in farm productivity, resulting in increased availability of food and higher income generation.

They have helped the farmers not only in increasing their productions but also reducing their losses due to changing weather patterns and others problems.

The economic benefit of the agro-met services runs in crores. The Ministry Earth Sciences had engaged National Council of Applied Economic Research (NCAER) to carry out a comprehensive study on "Impact Assessment and Economic benefits of Weather & Marine Services." This study was carried out during September & October 2010 and restricted to main end users i.e. Farmers for Agro meteorological Advisory Services .The field study was carried out in 12 states and 1 Union territory It was revealed that economic profit estimates can vary between Rs. 50,000 Crore (where 24% farmers receive weather information) to 211,000 Crore (where all farmers receive weather information). This shows that its economic returns depend on the proportion of farmers receiving information.

That is why there is need to ensure that all farmers, small, marginal and big, are able to benefit from the Agro-met Advisory Services. This will no doubt go a long way in not only increasing production but also raising the income of farmers and reducing their losses and ultimately distress. But for this infrastructure to match the demand will have to be created and that will indeed be a big challenge for the government as well as other stakeholders.

2.10 National Initiative on Climate Resilient Agriculture (NICRA):

National Initiative on Climate Resilient Agriculture (NICRA) is a network project of the Indian Council of Agricultural Research (ICAR) launched in February, 2011. The project aims to enhance resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstration.

The research on adaptation and mitigation covers crops, livestock, fisheries and natural resource management. The project consists of four components

a) Strategic Research

b) Technology Demonstration

c) Capacity Building and

d) Sponsored/Competitive Grants

Objectives:

- To enhance the resilience of Indian agriculture covering crops, livestock and fisheries to climatic variability and climate change through development and application of improved production and risk management technologies.
- To demonstrate site specific technology packages on farmers' fields for adapting to current climate risks.
- To enhance the capacity of scientists and other stakeholders in climate resilient agricultural research and its application.

Weather-based agro advisories, contingency plans and identification of best management practices This program will be executed through network of AICRPDA and AICRPAM centres. The critical food crop zones identified for data collection combining weather based agro-advisories with contingency plan and best practices.

2.10.1 All India Coordinated Research Project for Dry land Agriculture (AICRPDA):

Indian agriculture is predominantly a rainfed agriculture under which both dryfarming and dryland agriculture are included. Out of the 143 million ha of total cultivated area in the country, 101 million ha (i.e. nearly 70 percent) area are rainfed. In dryland areas, variation in amount and distribution of rainfall influence the crop production as well as socio-economic conditions of farmers. The dryland areas of the country contribute about 42 percent of the total food grain production. Most of the coarse grains like sorghum, pearlmillet, fingermillet and other millets are grown in drylands only. The attention has been paid in the country towards the development of dryland farming. Efforts were made to improve crop yields in research projects at Manjari, Solapur, Bijapur, Raichur and Rohtak. An all India co-ordinated research project for Dryland Agriculture was launched by ICAR in 1970 in collaboration with Government of Canada and later Central Research Institute for Dryland Agriculture (CRIDA) was established at Hyderabad.

Improved dryland technology:

Following are the various improved techniques and practices recommended for achieving the objective of increased and stable crop production in dryland areas.

i. **Crop Planning:** Crop varieties for dryland areas should be of short duration through resistant tolerant and high yielding which can be harvested within rainfall periods and have sufficient residual moisture in soil profile for post-monsoon cropping.

ii. **Planning for weather:** Variation in yields and output of the dryland agriculture is due to the observation in weather conditions especially rainfall. An aberrant weather can be categorised in three types viz.

   a. Delayed onset of monsoon.
   b. Long gaps or breaks in rainfall and
   c. Early stoppage of rains towards the end of monsoon season.

   Farmers are expected to make some changes in normal cropping schedule for getting some production in place of total crop failure.

iii. **Crop Substitution**: Traditional crops/varieties which are inefficient utilizer of soil moisture, less responsive to production input and potentially low producers should be substituted by more efficient ones.

iv. **Cropping Systems**: Increasing the cropping intensities by using the practice of intercropping and multiple cropping is the way of more efficient utilization of resources. The cropping intensity would depend on the length of growing season, which in turn depends on rainfall pattern and the soil moisture storage capacity of the soil.

v. **Fertilizer use**: The availability of nutrients is limited in drylands due to the limiting soil moisture. Therefore, application of the fertilizers should be done in furrows below the seed. The use of fertilizers is not only helpful in providing nutrients to crop but also helpful in efficient use of soil moisture. A proper mixture of organic and inorganic fertilisers improves moisture holding capacity of soil and increase during tolerance.

vi. **Rain water management**: Efficient rainwater management can increase agricultural production from dryland areas. Application of compost and farm yard manure and raising legumes add the organic matter to the soil and increase the waterholding capacity. The water, which is not retained by the soil, flows out as surface runoff. This excess runoff water can be harvested in storing dugout ponds

and recycled to donar areas in the server stress during rainy season or for raising crops during winter.

vii. **Watershed management**: - Water shed management I s a approach to optimize the use of land, water and vegetation in a area and thus, to provide solution drought, moderate floods, prevent soil erosion, improve water availability and increase fuel, fodder and agricultural production on a sustained basis.

viii. **Alternate Land use**: - All drylands are not suitable for crop production. Same lands may be suitable for range/ pasture management and for tree farming and let farming, dryland horticulture, agro-forestry systems including alley cropping. All these systems which are alternative to crop production are called as alternate land use systems. This system helps to generate off-season employment mono-cropped dryland and also, minimizes risk, utilizes off-season rains, prevents degradation of soils and restores balance in the ecosystem. The different alternate land use systems are alley cropping, agri-horticultural systems and silvi-pastoral systems, which utilizes the resources in better way for increased and stabilized production from drylands.

2.11 Indian agriculture to climate change and climate vulnerability:

2.11.1 Objectives:

- To identify the regions experiencing significant climate change and variability.
- To develop methodologies for assessing the impacts of climate change on agricultural productivity in various agro-ecological regions.
- To suggest suitable interventions for reducing the impacts of climate change on agricultural productivity.

National Initiative on Climate Resilient Agriculture (NICRA,ICAR)

The scheme launched in 2010-11 has three components

- Strategic Research
- Technology demonstration
- Capacity building

Strategic Research of national importance in crops, natural resource management, horticulture, livestock and fisheries. Aspects of Climatic Resilience in the production systems of NE Region - ICAR-NEH

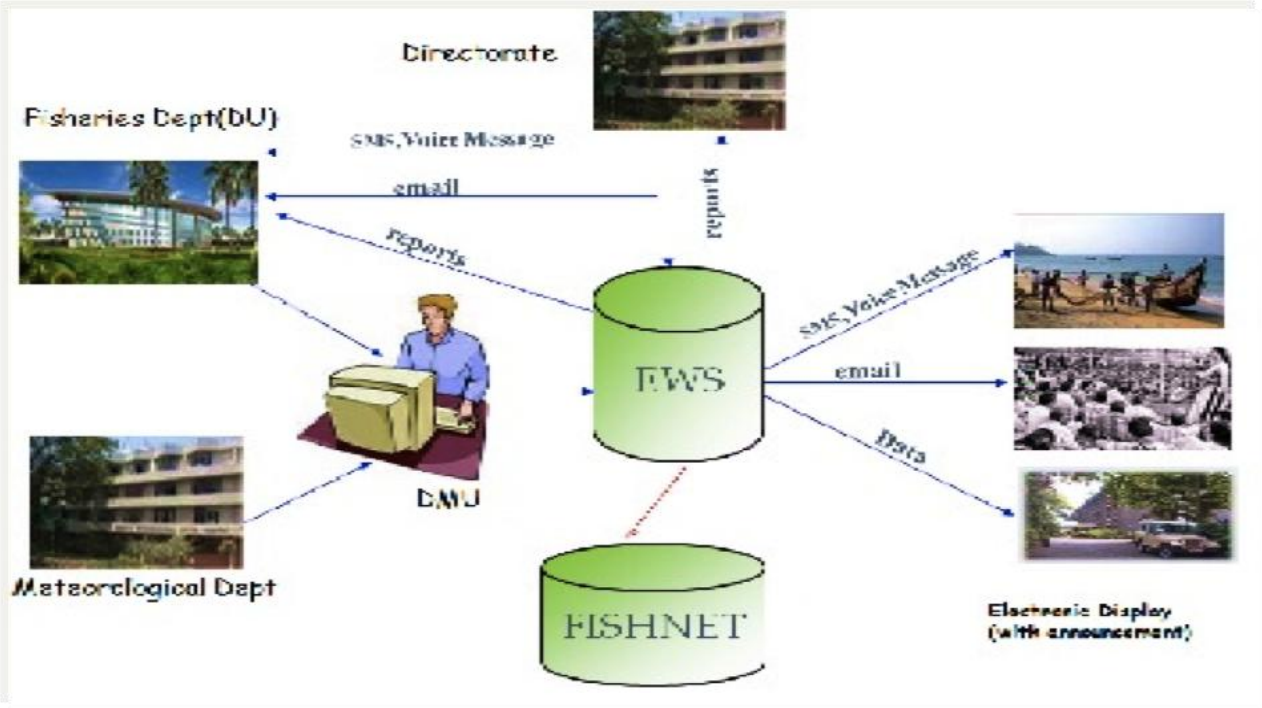
Demonstration of existing management practices for enhancing resilience of crops/livestock to climate change in 100 most vulnerable districts by KVKs and AICRP Centres

Capacity building of scientists and other stakeholders in climate resilient agricultural research and its application

2.11.2 Kerala:

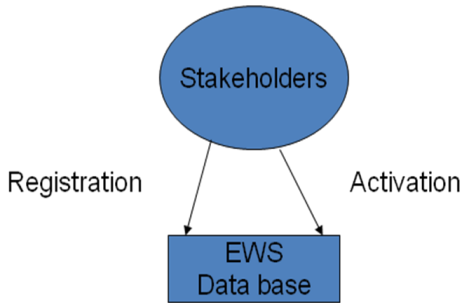
Early warning system in Kerala

EWS is a people-centered disaster warning mechanism that will function for the fishing community who are easily vulnerable to natural calamities. A facility provides fisher folk to access mobile. Provides day-to-day possible disaster information to fishermen through SMS (voice message in their language).

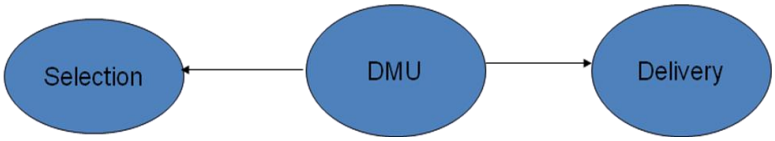


The key partner to implement this project is the Revenue Department Disaster control room in collaboration with NGOs and Grama Panchayats of the coastal areas, the Meteorological Department, BSNL etc. National Informatics Centre provides the technical assistance. The District Administration provides the overall regulatory and coordination framework, other organizations can network and provide expertise to achieve the objectives of the project. The objective is to have a sustainable program in place to provide an SMS and email alerts on a possible disaster and most importantly early warning dissemination throughout the district.

- On line registration of stakeholders
- Activation of accounts by District Administrators



- Information delivery as SMS / voice message in their language, E-mail



1. Services provided by IMD – HQ in tie up with state IMD stations.
2. Which in turn with Dept. of fisheries, Dept. for Animal Husbandry, Irrigation etc.

A. Area Cyclone Warning Centres (ACWC) and the Cyclone Warning Centres (CWC) of IMD is responsible for cyclone forecasting in the Bay of Bengal and Arabian Sea - the National Cyclone Warning Centre at New Delhi being the coordinator. The Numeric Weather Prediction (NWP) division of the Department at the H.Q., New Delhi, is issuing computerised Operational Advisory Forecasts on cyclone movements.

b. ACWC Issues four stage warnings on Cyclone alert & Cyclone warning, in case of a system striking the coast or near the coast and port & fisheries warnings and heavy rainfall warnings for various agencies. After receipt of pre-cyclone watch bulletin issued by HQ, ACWC/CWC will monitor issue of warnings under two stages warning system- Cyclone Alert and Cyclone Warning.

c. Cyclone Alert - the first stage warning: This is issued 48 hrs. In advance of the commencement of adverse weather, to Collector of coastal districts and the Chief Secretary of the concerned maritime state. After issue of alert message for broadcast, the concerned AIRs are to be requested to maintain round the clock watch to receive & broadcast the subsequent numbered bulletins.

d. Cyclone warning – the second stage warning: This is issued 24 hrs. In advance of the commencement of adverse weather, Subsequent to this warning, any other crucial warning is being sent more frequently to all the concerned recipients (Collectors & Chief Secretaries), if the storm is tracked by radar with a high degree

of confidence. These recipients will be informed that AIR stations will broadcast subsequent warning on the storm.

The fourth stage of the warning, i.e. Post Landfall Outlook (PLO) meant for Interior districts issued 12 hrs. Before the estimated landfall of the storm in order to bring to the notice of the Collectors of interior districts about their area likely to be affected by cyclone.

One of the means of communication, on which IMD depends for the dissemination of these warnings, other than AIR, is satellite, based Cyclone Warning Dissemination System (CWDS) installed at maritime district HQ, so that district authorities can initiate appropriate precautionary measures on receipt of such warnings. This scheme makes use of the S-band broadcast capability of INSAT satellite. At present there are 5 CWDS stations located in Kerala, which are at Thiruvananthapuram, Alappuzha, Ernakulum, Thrissur and Kozhikode.

e. Fisheries Warnings

When wind speed over sea area is expected to exceed 45 kmph in the sea area up to 75 Nautical miles from the coast, wind warnings are issued and communicated to the Director of Fisheries, all Dy. Directors of Fisheries and Director of Ports through fax/SMS through VPN connection, advising fisherman to be cautious while venturing into the sea.

f. Heavy rainfall warnings

When rainfall amount is expected to exceed 7 cm, heavy rainfall warnings are issued to District Collectors and various agencies, such as public services, PWD, Irrigation, Hydroelectric, Port, telegraphs, Railway and Community Project Officials, so that the disaster management machinery can be kept in readiness

During Cyclone (tsunami) depressions, the department Of fisheries receives information from cyclone warning centre Vishakhapatnam through phone or SMS after receipt of the warning district fisheries officials shall communicate the message to the field level officers (FDO) and request them to communicate the same to the fishermen. Depending on the intensity, the fishermen are made alert not to venture into the sea. The fishermen village heads are informed by phone or in phones or in person not to venture into sea directly by district officers.

g. INCOIS digital display systems are in place d in coastal areas since 2010.

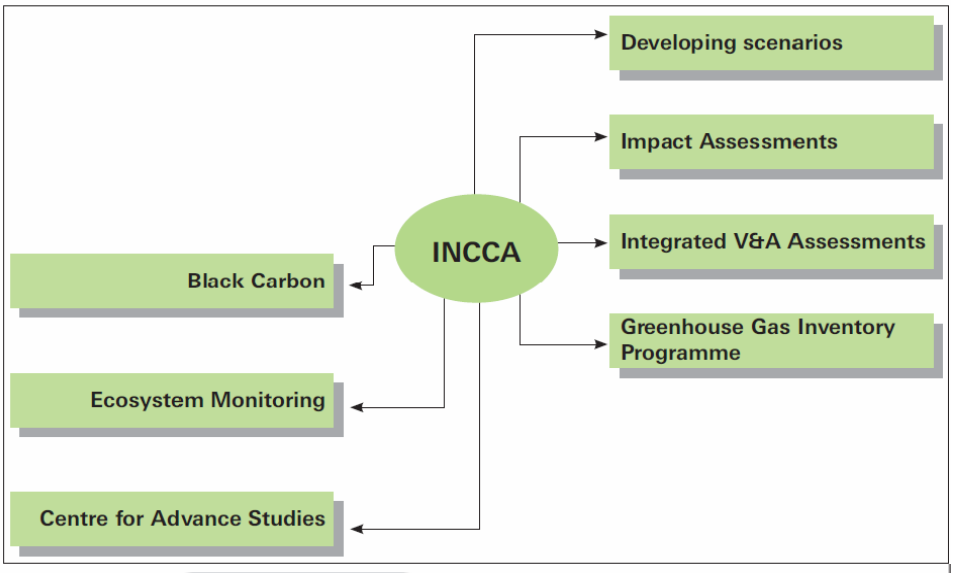
The following measures have been adopted by the hatchery units, farms etc. Under the inclement weather

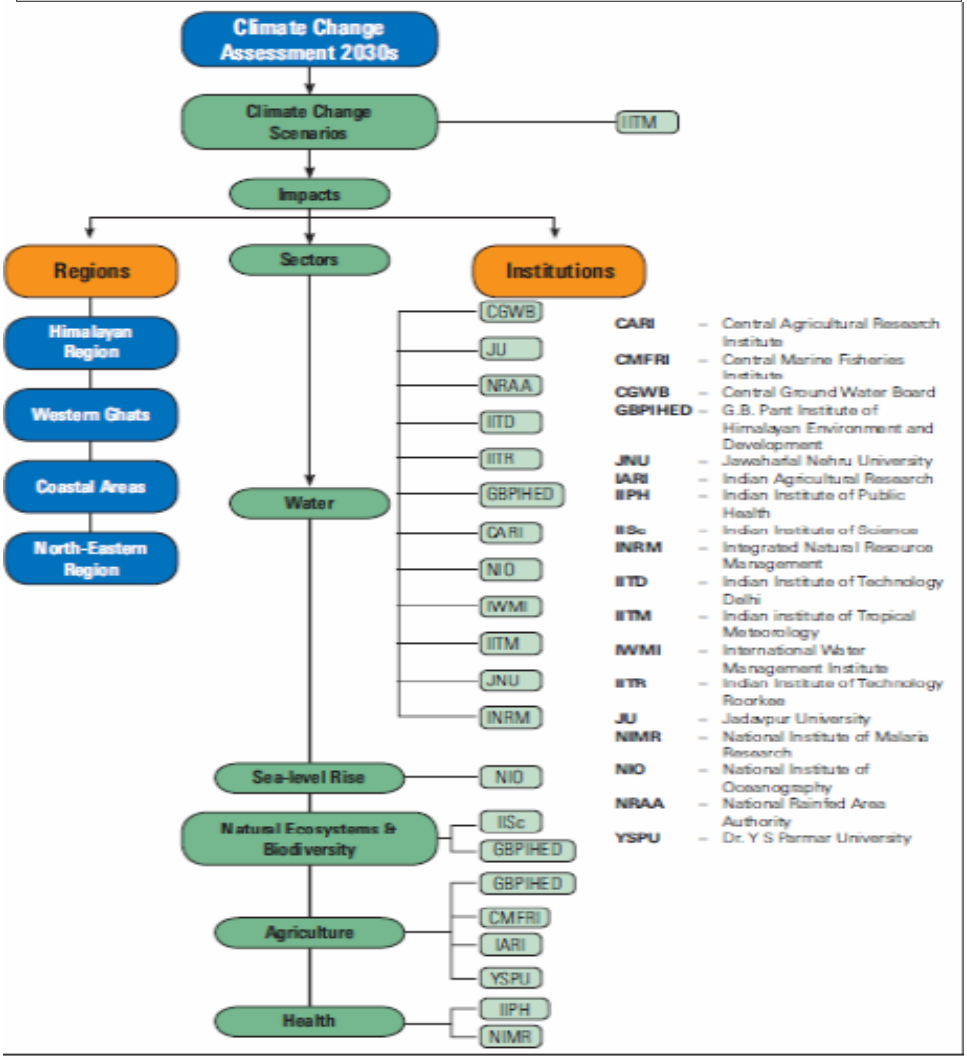
a. Under depression rainy season, cyclone condition, farmers should stop feeding to the seedlings
b. Reduce stocking density
c. Test the water quality

d. If ammonia is high, apply zeolite at 10-15 kgs per acre.

Use bioremediations to prevent release and accumulation of bad gases like ammonia, hydrogen sulphide etc.

INCCA Network: (Indian Network on Climate Change Assessment)





2.12 Climate-Resilient agriculture and green growth

Climate-smart agriculture seeks to increase productivity while reducing contributions to climate change. Success is essential in order to provide enough food for the world's population and to mitigate environmental damage. The World Bank, FAO and the e-Agriculture community invite you to explore how information and communication technologies (ICT) can support "green growth" and climate-smart agriculture.

2.12.1 Overview

Subject Matter Experts leading the discussions include:

- Marjory-Anne Bromhead, Natural Resource Management Adviser, World Bank
- Ademola Braimoh, Senior Natural Resources Management Specialist, World Bank
- Dr Bruce Campbell, Director, Research Programme on Climate Change, Agriculture, and Food Security, CGIAR
- Dr Elizabeth Dodsworth, Global Director for Knowledge Management, CABI
- Rodomiro Ortiz, Professor of Genetics and Plant Breeding, Swedish University of Agricultural Sciences
- Reuben Sessa, Natural Resources Officer, FAO
- Eric Seuret, Technology Consultant, Syngenta Foundation for Sustainable Agriculture
- Pierre Sibiry Traore, Remote Sensing Scientist and Head, GIS, International Crops Research Institute for Semi-Arid Tropics (ICRISAT)
- Pai-Yei Whung, Science Adviser, World Bank

2.12.2 Current Forum

Green growth is on the top of the agricultural development agenda. Climate change, scarce natural resources, population growth, and greenhouse gas emissions (GHG) are all contributing to reductions in agricultural productivity and increased poverty. Farming practices such as diverse crop rotations have stabilized soils, but others like overgrazing have resulted in land degradation. Some assessments predict that world agriculture productivity will decline 3-16% by the 2080s (Cline 2007) due to these threats.

2.12.3 Why is climate-Resilient agriculture is important:

Climate-smart agriculture seeks to increase sustainable productivity in an environmentally and socially sustainable way, strengthen farmers' resilience to climate change, and reduce agriculture's contribution to climate change by reducing greenhouse gas emissions and increasing carbon storage on farmland. It strengthens food security and delivers environmental benefits. Climate-smart agriculture includes proven practical techniques—such as mulching, intercropping, conservation agriculture, crop rotation, integrated crop-livestock management, agroforestry, improved grazing, and improved water management—and innovation practices such as better weather forecasting, more resilient food crops and risk insurance

A variety of strategies can help to achieve green growth. Carbon financing, improving genetic traits in crops, scaling up better farming practices (such as crop rotation, agroforestry, etc.), and reducing greenhouse gas emissions are just some of the ways to achieve green growth. Yet what is the role of information and communication technologies (ICT)? How can information and communication technologies help to collect data on green growth, disseminate information on green growth, and achieve green growth directly on smallholder farms? Two Sourcebook modules, Increasing Crop, Livestock, and Fishery Productivity through ICT, and ICT Applications for Risk Management, discuss trends and ICT tools that hold promise for green growth. This forum is purposed to explore these areas further.

Emerging economies like India are no exception, with climate change impacting not just agriculture but rural ecosystems more broadly and urban environments too (Gov. of India 2008). India has some advantages, though, in being able to learn from the mistakes and experiences of the industrialized world, and to take advantage of new technologies; Including information and communication technologies (ICTs).
ICT holds real promise in two particular areas: as tools for land use planning and management; and, as risk management tools for climate change adaptation.

This forum explores two main areas where ICT can be used to achieve climate-Resilient agriculture:

- Tools for land use planning and management
- Risk management tools for climate change adaptation

2.12.4 Tools for land use planning and management

1. Refinement of methodology for land use planning at different levels.

2. Perspective land use planning at the levels of state and district through close linkages with Department of Land Resources, Ministry of Rural Development (GOI), State Land Use Boards, Commodity Boards, Forest Departments, etc.
3. Larger use of various tools, namely, participatory resource appraisal, resource inventory, scenario analysis, multiple goal linear programming and GIS in different land use planning programme.
4. Participatory land use planning for sustainability at village/micro watershed level based on stakeholders' perceptions using PRA tools and farming system analysis.
5. Integration of biophysical factors with socio-economic parameters in the characterization and analysis of different cropping systems.
6. Refinement of soil suitability criteria for location specificity.
7. Use of crop simulation models and alternative yield estimation techniques for identifying efficient crop zones.
8. Assessment of land quality at selected benchmark sites Vis a Vis land use changes for sustainability parameters using Land Quality Indices (LQI).
9. Risk analysis and evaluation of economic efficiency of the present cropping systems, development of contingent land use plans for aberrant weather conditions.

2.12.5 ICT that can be used to support efforts to improve and maintain soils include:

- Tools that monitor, report, and validate (MRV) carbon and nutrients in soils;
- Geographical information systems (GIS) that are used to overlay land use patterns on social, physical, and other data;
- Satellite imagery that measures variations in soil fertility and crop growth;
- Sensors for nutrients.

Communication technologies such as mobile phones, PDAs, and radio can be used to disseminate this information as well as information on good farming practices to farmers.

2.12.6 Risk management tools for climate change adaptation

Farmers have always faced multiple risks. Long-standing risks include variable weather and natural disasters, pest and disease outbreaks, conflict, and theft, among others. More recently such risks as price volatility, sanitary and phytosanitary risks, and increases in weather variability are of great concern.

This forum seeks to discuss tools for risk mitigation and risk transfer, particularly in relation to climate. Risk mitigation strategies prevent events from occurring, limit their occurrence, or reduce the severity of the resulting losses. Examples include pest and disease management strategies, crop

diversification, and extension advice. Risk transfer strategies transfer risk to a willing third party, at a cost. Financial transfer mechanisms trigger compensation or reduce losses generated by a given risk; for green growth purposes, one of the primary tools used is weather insurance.

ICT is being used to improve risk mitigation and risk transfer. Weather stations that monitor microclimates allow public agencies and other entities to send localized and timely weather information to smallholder farmers through SMS messages. Early warning systems provide farmers with enough reaction time to take preventative measures. Sending other types of advisory information through cell phones is also a form of risk mitigation, supporting farmers' ability to make swift and informed decisions on farm activities. Index-based weather insurance, which uses ICT tools such as weather stations and satellite imagery coupled with better predictive weather models and more reliable data, improves access to finance in the event of unpredictable events like floods and droughts.

The key requirement for strategic decision-making is good information and, with this objective, the Environmental Information System (ENVIS) was set up in 1982 in India. It was significantly strengthened in 2002 through stronger institutional networks and updated ICTs with the support of the World Bank's Environmental Management Capacity Building Technical Assistance Project (EMCBTAP). ENVIS is a network of distributed subject area centres seeking to support integration of national efforts in environmental information collection, collation, storage, retrieval and dissemination. It is basically a clearinghouse mechanism providing pointers to distributed environmental information for decision makers, policy planners, scientists and engineers, researchers, etc.

As of 2011, ENVIS consisted of 76 network partners all located in India, of which 46 is subject specific, Encompassing information on the following areas?

- Environment and Energy Management
- Ecology and Ecosystems
- Flora, Fauna and Conservation
- Environment Law and Trade
- Media, Environment Education and Sustainable Development
- Chemicals, Wastes and Toxicology

The remaining 30 partners fall into the "State of Environment" category, comprising those who provide information for the individual States in India on topics such as:

Eco-friendly technologies, coastal ecosystems, carbon and other emissions, green buildings, renewable energy, National Action Plan on Climate Change, etc.

Figure: eArik

The eArik project staff regularly undertook field visits to observe crop conditions and to diagnosis pests, diseases, nutrient deficiencies and physiological problems. They could then digitally document these issues using ICTs in the field (see Figure) and, via email and webcam, communicate them to staff at the eArik Research Laboratory at the Central Agricultural University. Problems were analysed by the experts (who themselves sometimes also undertook field/advisory visits) and recommendations were passed on to the eArik Village Knowledge Centre by email and then to the concerned farmers by phone or personal face-to-face Communication by the farmer facilitators. Dissemination of information and good practice was also addressed by innovative approaches such as farmer-to-farmer communication and local self-help groups.

2.13 VetGIS: DIS based System

2.13.1 To Find Suspect Regions For Animal Disease/Discomfort Caused By Hazardous Water:

It is well known certain weather conditions are not suitable for different animals. Different species/ breed can live in climate suitable to them and also some of them adjust to the climatic conditions prevailing over a region. Examples are Penguins survive only in extreme cold conditions and they cannot survive in the waters around India, Polar bear and many other species cannot live in hot weather conditions. The domesticated animals may fall sick if exposed to very cold or very hot weather conditions. Farmers try to protect animals and poultry from extreme weather conditions and usually keep them in covered area.

2.13.2 Objective

Objective of this document to work out detailed proposal for identifying suspect regions prone to outbreak of animal disease caused by weather conditions prevailing for somewhat longer durations.

Animal Health Problems In Drought

The drought is a dangerous situation in which animal deaths not only occur due to starvation but also a number of diseases spread in surviving animals. At the time of drought breaking rains animals suffer from a number of health hazards. The transition from drought is an important time of concern for livestock health. Even though the drought appears to have broken, there is no time to relax on matters of livestock health. More care and attention needs to be given to livestock.

With the advent of drought-breaking rains, the feed and water supply situation may dramatically change. A comment often made by graziers is that they managed to keep their stock alive through the drought only to suffer losses when the drought broke. Bloat, pulpy kidney, plant poisonings and hypothermia would be among the most common problems causing deaths at the end of a drought because, at such times:

1. The livestock may be in poor condition of health;
2. The livestock may have become accustomed to eating restricted quantities of unusual types of feed;
3. The water supplies may be restrictive in terms of quantity and quality;
4. The livestock are not accustomed to eating green forage;
5. The livestock may be suffering from long-term vitamin and/or mineral deficiencies;
6. The usual disease prevention measures, such as vaccination or worming, may not have been given;

Adverse weather conditions are frequently associated with drought-breaking rains. Even in the middle of summer, sever cold weather conditions can be experienced, and stock in poor condition can be highly susceptible. Poor health condition, poor or inadequate feed, lack of shelter, an interruption to provision of supplementary feed, and recent shearing are just some of the factors that can contribute to a death of animals.

One need be alert to weather changes and ensure that susceptible stock have access to shelter. Supplementary feeding is necessary if there is any chance that feeding may be interrupted as a result of rains. Sheep that have been recently shorn are the most susceptible, especially if they are in poor health. You may need to keep them in sheds, or confine them to small paddocks with feed and shelter. Following are associated problems in the event of drought break:

Water

If sufficient rain falls to replenish surface water supplies, the surface run-off may carry excessive amounts of livestock manure into the water storage, making it unacceptable or even dangerous to livestock particularly in the hilly terrain. This can be avoided by restricting the livestock access to these water supplies.

Feed

Initially, the brown drought becomes a green drought the newly germinating plants do not contribute significantly to the nutritional needs of stock. Stock, especially sheep, can waste precious energy chasing the green pick if drought feeding is stopped too soon. Following the rain, continue with the usual drought-feeding regime until the feed really comes away. Then progressively reduce the supplementary feed over about 2 weeks. In this way the major nutritional upsets associated with a sudden change in feed (such as enterotoxaemia or pulpy kidney) can largely be avoided.

Feed Changes

As mentioned above, sudden changes in the amount or type of feed can have disastrous consequences. Major problems relate to digestive upsets and plant poisonings. These problems may be avoided by allowing stock a gradual transition between feed types, such as limiting access to the pasture to an hour or two each day, then gradually increasing the amount of time each day until they can be left on the pasture permanently.

Never, ever, put hungry stock in a fresh paddock. They will indiscriminately gorge themselves on the first available feed, often leading to poisonings or digestive upsets. Pre-feed with hay, restrict daily access or provide access to a safe, preferably mature grass paddock to overcome the hunger before allowing access to rapidly growing, lush different feed.

Bloat

Rapidly growing legumes, such as lucerne, clovers and medics, frequently cause bloat, especially in young cattle. If pastures contain a significant amount of legume, bloat protection is an absolute must. A variety of techniques exist, including the use of: (i) bloat capsules; (ii) pasture sprays with anti-bloat preparations; (iii) bloat blocks; (iv) bloat oils mixed with supplementary feed.

Grass Tetany

Stock should be brought up to date with their vaccinations if any have been missed during the drought. In particular, a booster dose of pulpy kidney vaccine is recommended for both sheep and cattle. This is because the protection afforded by vaccination may only last for 3 months after a booster dose of vaccine. A sudden change in the amount and type of feed available exposes both sheep and cattle to a very high risk of developing pulpy kidney.

Blowflies

Because of the prolonged dry weather, most sheep will not have been given a preventive fly treatment. In addition, in order to minimize stress on stock during drought, many lambs may not have been mules. If the weather stays warm following the rains, all the factors are present for a fly problem to develop.

Sheep Worms

Through a drought, sheep worm eggs tend to accumulate because there is insufficient moisture to permit them to hatch normally. This, coupled with relatively higher stocking densities where sheep have been hand fed, can lead to the build-up of a large reservoir of worm eggs. After rain there can be a mass hatching of eggs, and stock can be exposed to a severe worm challenge. At the end of a drought there is often very little choice of paddocks, and stock may need prolonged protection. In the warmer months, barbers pole worm can cause problems (anaemia, ill-thrift and death) in as little as 34 weeks. Closantel keeps killing barbers pole worms for up to 6 weeks.

Footrot

Any sheep that develop lameness should be investigated immediately. Both footrot and foot abscess can develop under similar lush pasture conditions.

Sheep Lice

It is difficult to detect lice on sheep that have less than 3 months wool, even if they have not been treated after shearing. Remember; even if you cant find lice in short wool, the sheep could still be

infested. Keep them isolated from other sheep for as long as possible, and re-inspect them for lice frequently.

Johnes disease

Johnes disease causes wasting, diarrhoea and death. It can affect both cattle and sheep. The strains of the bacteria causing Johnes disease in cattle rarely affect sheep, and vice versa. But there is a risk, and because it is very difficult to eradicate the disease, it is best to keep Johnes disease at bay.

Leptospirosis

Leptospirosis is another bacterial disease that is often associated with wet conditions. It is important because of its ill effects on both cattle and people. Protecting cattle by vaccination also reduces the risk of infection in people working with the cattle.

If drought affected regions with the severity index are known the measures to protect livestock can be planned a little advance. GIS based Drought Monitor System need be developed to detect suspect regions of drought related livestock health problems.

Animal Health Problems Following Floods

Floods can result in serious short and long-term animal health problems and drought-breaking rains are often a mixed blessing. Many problems relate to physical damage, e.g. foot problems after standing in water; inadequate feed; and an upsurge in infectious diseases. During flood the welfare of animals is the immediate concern, and nutrition is a critical factor. Getting feed to stranded animals is vital, particularly when they have had to swim to save themselves, and have expended a huge amount of energy in doing so. Many of these animals will have no reserves left, and pregnant animals in particular will quickly develop metabolic problems and die if not adequately fed.

Good quality hay is the preferred feed, as digestion of roughage generates heat that will help to keep the animals warm, particularly if they are still standing in water. Hypothermia (low body temperature) can develop rapidly in stock standing in water, even in summer. Every effort should be made to move stock to an area that is high and dry.

As the flood recedes, other health problems will start to emerge. You will need to work out how you are going to feed your surviving stock over the coming months, particularly if flooding has ruined the pasture or crop. One should also be aware that, while feed is often generously donated after disasters like floods, there might be problems with its quality and suitability for the livestock.

Ideally any feed change needs to be as gradual as possible. It is often difficult in emergency situations.

Moulds develop easily on feed that has been damaged by water, especially in warm weather. Moulds can dramatically decrease the nutritive value and palatability of both standing and stored feed. Some moulds are toxic and may cause sudden death or longer-term health problems such as liver damage.

Despite stranding, stock may refuse to drink floodwater if it is polluted or tastes different from their normal supply, e.g. if they are accustomed to bore water. When feeding stock, watch them carefully to make sure that they are drinking.

Inspect And Arthropod Problems

A very wet season (with or without a flood) is likely to result in larger than usual insect and arthropod (e.g. tick) populations. Problems due to increased insect activity are likely to become widespread, particularly if preceding seasons have been dry, resulting in limited exposure and low levels of immunity to insect-borne viruses. Mosquito and midge numbers can increase dramatically, causing irritation and anaemia. The incidence of insect-borne diseases such as Akabane virus or ephemeral fever can increase dramatically. These diseases may occur in areas where they have not been seen in the past few years.

In coastal regions, tick paralysis in calves could be worse than usual, due to high numbers of ticks. The blood parasite Theileria buffeli, which is carried by ticks, may also cause significant anaemia in cattle when tick numbers are high. Fly worry, including buffalo fly on the coast, may cause significant losses. Flystrike in sheep can cause major losses.

Most bacteria thrive and multiply in a moist environment, so bacterial diseases can become a real problem after persisting rains. Pneumonia is likely to occur in flood-affected stock, especially if they have been swept away and get water into their lungs. Salmonellosis may also occur due to stress and exposure to prolonged cold.

Disturbance to the soil by floods may expose dormant bacteria and result in the emergence of many diseases seen infrequently in dry seasons, such as ‘mud scours’ caused by Yersinia.

Flooding may also occasionally expose long-buried anthrax spores, resulting in unexpected incidents of anthrax.

In crossbred ewes grazing tall grass, mastitis can become a problem from the combined effects of udder engorgement due to lush feed, udder abrasions and flies. Diseases that can be spread mechanically by flies, such as diarrhoea and pinkeye, are likely to become more widespread.

Foot Problems

All stock is susceptible to foot problems after long periods of immersion in water. Wet conditions can expose cases of dormant footrot. Foot abscess and other foot problems will be common where animals' feet are constantly wet.

Skin And Wool Problems

Fly strike is very likely to occur in sheep after wetting, especially if they have much wool on them. Flies will even attack wet sheep in quite cool weather. Even when the fleece dries out, problems such as fleece rot and lumpy wool will continue to attract flies. Fly preventatives can be used before flies become active. If sheep are already struck, they will need to be treated very quickly. Diseases such as fleece rot, lumpy wool (dermatophilosis) and mud fever or rain scald can become prevalent. Other diseases that enter the body through skin wounds, such as erysipelas arthritis, may become more common if the animals' skin has remained wet for long periods.

Parasites

Worm larvae survive much longer on pasture in moist conditions, and parasite burdens may increase rapidly. Protozoan parasites such as cryptosporidium also emerge in wet seasons, causing scouring in calves.

Bloat

Sudden flush of pasture, especially clover or lucerne, can cause bloat in cattle or redgut in sheep.

Plant Poisionings

Many plant poisonings only occur because the livestock are hungry and have no access to alternative feed. When flood follows drought, you should always check early paddock germinations for poisoning potential.

Fast-germinating plant species tend to be the most prolific following drought-breaking rains. Poisonings are more likely where a single species dominates the pasture. Most producers will be aware of the poisonous plants that occur in their region and will be on the lookout for them – for example, phalaris staggers tends to be more common following good rains after a dry spell. In some cases, limiting exposure with careful grazing management may be enough to avoid problems but in other cases this may not be possible and alternative-feeding arrangements will be required.

Sudden heavy rain can result in diseases such as floodplain (blown grass) staggers and tribulus staggers. In the case of floodplain staggers the poisonous part of the plant is the seed head, therefore either graze heavily in early spring to prevent or delay seed head development, or move stock off blown grass once seed heads have formed and are starting to mature. Wet summers can encourage the widespread growth of panic grasses, and this can cause outbreaks of liver damage and photosensitization (extreme susceptibility to sun burn) in sheep, particularly young sheep. Other plants that may cause photosensitization include St John's wort, buckwheat, and caltrop.

Stock grazing weeds such as Paterson's curse during drought will have chronic liver damage. Such stock will be more susceptible to photosensitization when good feed is available.

Other poisonous plants that may cause problems include billy buttons, marshmallow, heliotrope, nardoo fern, pimelia and wild rape.

Rapidly growing plants that would normally not be toxic can also be a problem. Such plants include liver seed grass, lucerne, perennial rye grass, oats, etc. While nitrate and cyanide poisonings are probably more common in drought, they can occur in situations where the plants grow rapidly following good moisture and develop a shallow root system. They are prone to moisture stress if conditions are very hot, and wilting plants may contain toxic doses of nitrates or cyanide.

Where pasture is under floodwater and unavailable to stock, poisoning from eating trees and shrubs such as lantana or green cestrum is a significant risk.

Animal Health Problems In Cold Weather

Many people own animals that must live out side during the winter months. Some homes have outside dogs, many have cats that spend a lot of time outside and, of course, farm livestock are not brought into the home during the winter no matter how harsh the weather. If an animal has to stay

outside there are management practices that will enable the animal to be as comfortable as possible during the cold months.

The very first thing to determine is whether the pet is of type that can live outside normally. Small animals whether dog, cat, rabbit, guinea pig or other small animal tend to have a harder time staying warm just because they do not have enough body mass to maintain a body temperature that will allow them to survive in frigid temperatures. The body do have an internal temperature control but at some point that internal regulator will fail under extreme conditions. Consider two different breeds...one a Long Haired Chihuahua of three pounds and the next a rough coat St. Bernard, well over one hundred pounds. The tiny dog is not able to maintain body temperature as long as the big dog because he doesn't have enough body mass. Large animals...horses, goats, sheep, cattle, etc....tend to have much more body mass than our domestic pets and therefore, under normal conditions, are much more likely to be able to cope with extreme cold.

The environment plays a major role in keeping pets or livestock healthy in extreme cold. If you keep healthy small animals outside...such as pet rabbits...you should remember that under wild conditions the rabbit lives in a hole in the ground, a den, which actually insulates the rabbit against the extremes of nature. They cope very easily with cold weather but their lifestyle provides an underground home away from dangerous elements. Many man made rabbit hutches, while nice to look at, are actually not great at providing the type of protection the rabbit needs to keep warm and should be filled with soft fluffy hay to give the shelter the ability to protect the rabbit better. Both cats and dogs need a den to be comfortable and protected. Urban cats often live in an outside world devoid of soft cosy places. Outside cats can be offered protected places created by the owner or residents of an area using boxes with straw in them. Blankets used as bedding often attract moisture and become part of the problem much quicker than shavings, straw or hay. Goats are particularly susceptible to pneumonia if they get wet or live in an environment where they are subjected to winds. They are able to handle the cold if their enclosures are draft and moisture free. Horses should have, at the very least, a three-sided shed in their pasture for protection in extreme weather unless the owner brings them into a barn when the weather is bad.

Chickens also need sheltered place to roost out of drafts and wet weather. Feathers are great insulation and do a fine job of keeping body heat in but wind ruffles the feathers and prevents them from doing their insulation job. Dogs kept on chains are less able to cope with the cold than a dog in a kennel run. The chain does limit exercise and also becomes ice cold in winter.

Location of shelters will be critical in helping animals cope with bad weather. If you have large animals and plan on building three sided sheds for shelter observe the site to see where the 'prevailing winds' come from and from which direction major snowstorms arrive. If winter winds come from the north-west then building a three sided shed with the opening to the west or north is not going to provide much shelter in storms and the wind will push the snow and freezing rain into the opening. If you are building a doghouse use natural wind breaks...such as a house wall or a barn wall to provide added protection.

The breed, especially in canines where there is such diversity in coat length, plays an important role in whether an animal of a particular species should be housed outside during extreme weather. The Great Dane and the St. Bernard are both giant dog breeds but the Dane has a short coat with little protection from the elements. The St. Bernard, even the smooth coat, still has a much thicker and longer coat than the Dane. The Saint also grows a thicker undercoat. The Great Dane may eventually freeze to death. He is a giant breed but is not really equipped to spend long hours out in the cold because of the length and thickness of his coat. Many cats live outside yet there is some breeds the Rex and the Sphynx in particular.... that does not have a coat that insulates them from the cold. Some horse breeds, such as the Thoroughbred do not handle cold weather very well and should be kept in a barn, blanketed during extreme weather.

Most people think long haired dogs will have no problem dealing with extreme cold. Unfortunately, some breeds do not have undercoat. The undercoat is short, soft, and very dense and designed to keep body heat in. A long sparse coat, without undercoat, isn't going to protect the animal from the cold. Animals develop heavy or thin undercoat according to their breed, health, nutrition and length of time to become accustomed to gradually changing seasons. A pet that is kept outside all the time naturally grows coat to protect against the extreme weather however a pet that has lived in the house and then instantly exposed to outside living is not going to be able to adjust quickly enough to survive if temperatures and conditions outside are extreme. Animals need a couple of months of gradually decreasing temperatures to signal their body to grow a heavy undercoat.

Nutrition, body condition and overall health can have a profound effect on an animal's ability to stay warm while living outside. A thin or sick animal is far more likely to be negatively affected by cold weather than a healthy animal in good shape. Animals in good weight have a layer of fat and a good healthy coat to keep body heat in. Age can be a major factor in the animal's ability to survive outside in the winter. Young animals are often more active which creates heat. Older animals usually start to develop arthritis and other old age problems, which discourage activity and prevent

them from dealing correctly with the cold weather. Old pets tend to spend a lot of time sleeping and this lack of activity and need to sleep force the outside pet to sleep on ice-cold ground. Many of these outside older pets risk death in the exposed environment.

Livestock are just as vulnerable to extreme winter conditions and need extra care. Many people tend to think that because they are often very big that they can handle winter extremes without proper shelter. If they are not cared for properly good nutrition many large animals live a miserable life during winter.

Animal Health Problems In Hot Weather

A difficult feeding challenge faced by dairy farmers is the drop off in feed intake and milk production during summer. During the peak summer, consumption of dry matter typically falls by about 16% for a mature Holstein. In addition, hot weather also increases energy requirements of the cow because of respiration and heart rate is increased to cool the body of cow. When reductions in feed intake are coupled with increased nutrient requirements, loss of milk production occurs.

Feeding management and timing is critical in hot weather. Cows are less interested in eating when their body temperature is elevated. Offering feed more frequently will lure cows to the feed bunk and help to maintain freshness of wet feeds. During the early morning hours, air temperature and temperature of cow's body reach their daily lows. This coincides with the morning milking time on many farms. If cows are cooled with fans and sprinklers during the milking process, cow temperatures will fall even further. To take full advantage of this, it is critical that fresh feed be present for all cows after milking. This is the best opportunity during the day to increase the cow’s feed intake. During hot weather, it is critical to feed a high quality ration that will maximize feed intake, which is critical in maintaining milk production and body condition. Feed should be fresh and available at times when cows are most comfortable and active.

Hot Weather And Poultry

Hot weather can have a severe impact on poultry performance. Production efficiency can be affected long before the temperature reaches a level at which survival becomes a concern. Heat stress begins when the ambient temperature goes above 80°F and is readily apparent above 85°F. Even before the bird reaches this point, anything you do to help birds remain comfortable will help maintain optimum growth rates, hatchability, egg size, egg shell quality, and egg production.

Poultry do not sweat and therefore must dissipate heat in other ways to maintain their body temperature at approximately 105°F. Body heat is dissipated to the surrounding environment through radiation, conduction, convection, and evaporation. The first three avenues are known as sensible heat loss; these methods are effective when the environmental temperature is below or within the thermal neutral zone of the bird. To maintain body temperature by sensible heat loss, the bird does not need to drastically alter its normal behavioural patterns, feed intake, or metabolism.

Feed Management

Any management technique that increases nutrient intake during heat stress will minimize the drop in production efficiency. Three easy ways to increase nutrient consumption are to increase nutrient density, take advantage of natural increases in feed consumption at certain times of the day, and adjust ventilation fans to provide more cooling during the evening. Hens or meat birds tend to build up body heat during extended periods of hot weather. If their body temperature can be reduced during the evening, the birds will be able to consume more feed in early morning. The house can be cooled in the evening by setting the fan thermostats so that house temperature reaches 75°F (65°F for mature birds).

Climate projections for India

Maximum temperature	increase by 2-4□C during 2050s in regions above 25oN
Minimum temperature	Increase up to 4oC all over the country. May exceed 4□C over southern peninsula, northeast India and some parts of Punjab, Haryana and Bihar
Monsoon Rainfall	marginal changes in monsoon months (JJAS) Large changes during non-monsoon months
Number of rainy days	Decrease in the number of rainy days over a major part of the country
Extreme Rainfall events	Overall increase in the rainy day intensity by 1-4 mm/day except for small areas in northwest India
Cyclonic storms	Increase in frequency and intensity of cyclonic storms

2.14 ARM recommendations:

Annual Review meeting was organized at Archarya N.G. Ranga Agricultural University, Hyderabad during 20-22 December 2010. These areas are the major areas for improvements in the existing system

- There is need to develop products on soil moisture, crop indices, stress identification, pest & disease mapping etc. for preparation on crop and location specific Agro-met advisories.
- There is need to prepare unified system for verification of District level weather forecast
- The success of the district level Agro-met advisories depends on the accuracy of forecast. It has been observed that there is a need to improve the district level forecasts particularly in monsoon season
- There is need to provide weather information and weather forecast as well as important Agro-met advisories to State Government Officials and all other users in the state including the fertilizer industries and seed corporation etc.
- Though initiative has been taken by Agri-met Division, Pune to disseminate the Agro-met advisories under PPP models to around 1 million farmers; but there is a need to extend this service to 3 million farmers during next one year.
- In order to facilitate wider dissemination of Agro-met advisories through mobile and other sources the information may be provided free of cost to disseminating agencies and funding from ATMA may be explored.
- Though a number of AMFUs have started preparation of weather-based advisories; still there is lot of scope for preparation of weather-based advisories particularly in unseasonal and extreme weather conditions. Besides, district level AAS bulletins should be prepared for all the districts (619) of the country at the earliest.
- Feedback at different levels on real time basis is one of the important components; hence it may be obtained on regular basis and used in preparation of need based Agro-met advisories.
- There is need to quantify the impacts of unseasonal weather and extreme weather events on crops.
- District level Agro-met Unit may be set up in collaboration with ICAR.

- Initiative for sensitization of media for popularization of AAS may be taken up on priority basis. Krishi Darshan Programme is an ideal platform for popularizing the Agro-met Advisory Services as large mass of the users sees this programme on regular basis.
- Regular monitoring of preparation of Agro-met advisory bulletins as well as sending the replies of the user's queries at different levels is required to make this service more vibrant and useful.
- Under the changing climate and cropping pattern in different parts of the country, there is a need to revisit the classification of agro climatic zones.
- ICRISAT and other NGOs are giving useful services particularly in watershed areas. Similarly NRSC generate useful satellite information and products for agriculture. This information will be useful in preparation of advisories.
- Data, meteorological and crop, sharing mechanism may be evolved between IMD and ICAR for development of crop growth simulation models and other R& D activities required for AAS and FASAL project.
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2.15 Forecasting Agricultural output using Space, Agro-meteorology and Land based observations (FASAL):

India Meteorological Department has developed crop yield forecasting models based on multiple correlation and regression technique. It is a linear combination of predictors (both meteorological parameters and technological parameters), which takes into account the influence of weather and technological advances on yield. Based on the above methodology, pre-harvest crop yield forecast models have been developed for kharif rice & Rabi wheat for meteorological subdivision in those parts of the country where these crops were grown predominantly. It is proposed that IMD would develop crop yield forecasting models for major crops of the country with greater accuracy in collaboration with Department of Space (DOS) and Department of Agriculture and Cooperation (DAC).

The crop yield forecasts at different stages of the growth period would be issued as follows:

- First yield forecast (F0) will be given by IEG using econometric model before the start of crop season (pre-planting stage).

- Efforts will be made by IMD to develop yield forecast at planting stage using agro-met models.

- Mid season yield forecast (F2) will be provided by IMD using agro-met model and crop areas estimation will be provided by SAC. These information will be communicated to DAC to forecast the crop production at national / state/ district level.

- Pre-harvest yield forecast (F3) will also be provided by IMD using agro-met model and crop areas estimates will be provided by SAC. Similar to mid-season forecast, both these information will be communicated to DAC for final forecast of crops before harvest.

3 System Interfaces

3.1 User Interfaces (UI):

The application will be presented with following links and menu items as user interface:

(The below mention hierarchy is the proposed hierarchy will be further expended and elaborated on the basis of the requirement gathered from the field visit)

- **Authorities (National and state level authorities)**
  - Proposed UI for authorities lists:

Interface will display a table with authority's details. User can contact with authority/(ies) as per their need.

Feature of listing:

1. Searching
2. Sorting on column name
3. Only authorized admin can update the ld.

Example:

Authority Photo	Authority Name	Designation	Contact Details	Advise For
				……
...(Field information will be updated by the stakeholders from state/district/village/blocks/talukas)	ABCDEF	XYZ	1234567890	Spécialise Field

Table 1.0

(The proposed list will be updated on the basis of information shared from Taluka / District / State / National level)

- **Latest Agro met News and events**

Weather based agricultures latest news/events will be submitted from admin area, according to priority of news.

- **Automatic Alerts on Weather Aberration**

Example for Punjab region:

Alert!

Temp will rise by 6 deg C above Threshold in next 24 hrs.

"PROTECT YOUR GRAPES FROM EXCESSIVE HEAT"

Flow	Activity	Remarks
Start	Aberration Reported on the IMD Portal	Any type of +/- Variation in the 7 parameters (Ref. Page No.--) of weather in the IMD DELHI (HQ) Server.
Portal will fetch the aberration data from the IMD Server at Delhi HQ	Server Process Connected to the IMD Delhi + Remote Sensing Weather Stations + ISRO	Portal has already saved the threshold points for every parameters of the weather along with their Map Areas.
Send Aberration Alerts to the registered Actors	SMS Trigger	Server will start the SMS Alert to the registered Users.

- **Subscribe to Agro met Newsletter**
  - Subscribe Agro met news letter Archive

- **Agro Met Archives**

Archives

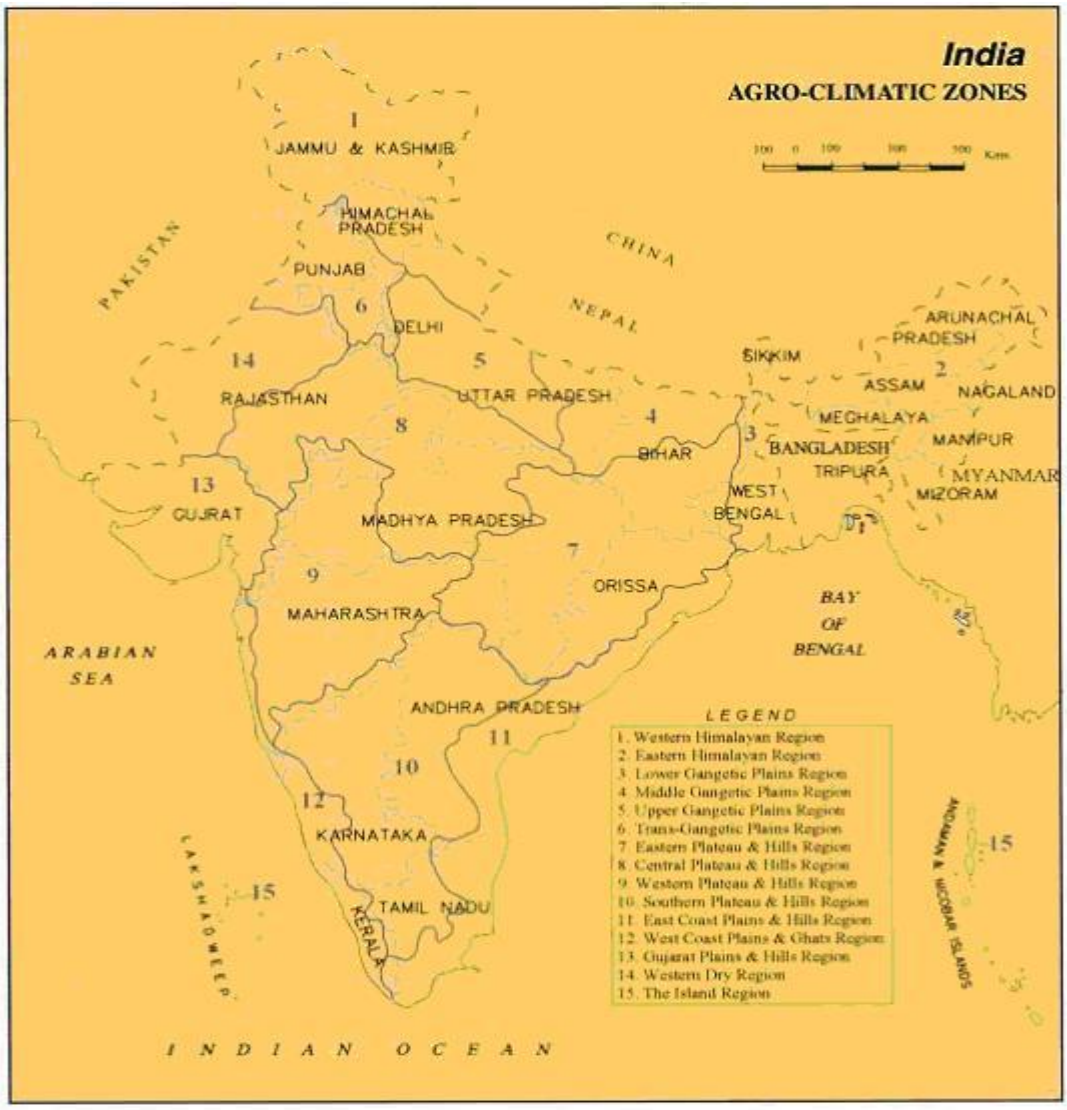
title
Gateway to India's Development Vol.3 Issue2, May 2010
Gateway to India's Development Vol.3 Issue1, Feb 2010
Gateway to India's Development Vol.2 Issue3, Sept. 2008
Gateway to India's Development Vol.1 Issue4, Jan-Mar 2008
Gateway to India's Development Vol.1 Issue1, April 2007
Gateway to India's Development Vol.1 Issue2, July 2007
Gateway to India's Development Vol.1 Issue3, Oct. 2007

- **Agro climatic zone classification**
  - National level

S.No.	Agro-climatic regions/zones	States represented
I	**Western Himalayan region**	Himachal Pradesh, Jammu & Kashmir, Uttarakhand
II	**Eastern Himalayan region**	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, West Bengal
III	**Lower Gangetic plain region**	West Bengal
IV	**Middle Gangetic plain region**	Uttar Pradesh, Bihar
V	**Upper Gangetic plain region**	Uttar Pradesh
VI	**Trans Gangetic plain region**	Chandigarh, Delhi, Haryana, Punjab, Rajasthan
VII	**Eastern plateau and hills region**	Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Orissa, West Bengal
VIII	**Central plateau and hills region**	Madhya Pradesh, Rajasthan, Uttar Pradesh
IX	**Western plateau and hills region**	Madhya Pradesh, Maharashtra
X	**Southern plateau and hills region**	Andhra Pradesh, Karnataka, Tamil Nadu
XI	**East coast plains and hills region**	Andhra Pradesh, Orissa, Pondicherry,
XII	**West coast plains and ghat region**	Goa, Karnataka, Kerala, Maharashtra, Tamil Nadu
XIII	**Gujarat plains and hills region**	Gujarat, Dadra & Nagar Haveli, Daman & Diu
XIV	**Western dry region**	Rajasthan
XV	**Island region**	Andman & Nicobar Islands, Lakshadweep

Table 2.0

The state list against each agro climatic zone will be hyper linked with state specific information

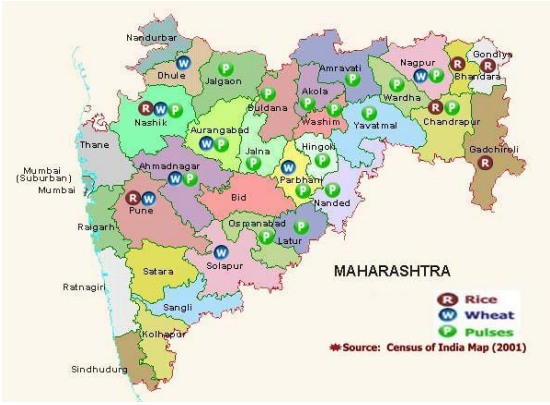


User intractive clickable map will be presented by the interface where user can click on the state to fetch the relevent information.

- List of State level agro climatic zone

The state list against each State agro climatic zone will be hyper linked with area specific information example given below:

A List of Stations in Agro-climatic Zone is mentioned in Annexure B.



Agro Climate Regions: MAHARASHTRA

Region: Eastern Plateau and Hills Region / West Coast Plains & Ghats Region / Western Plateau and Hills Region

Sub-Region Details

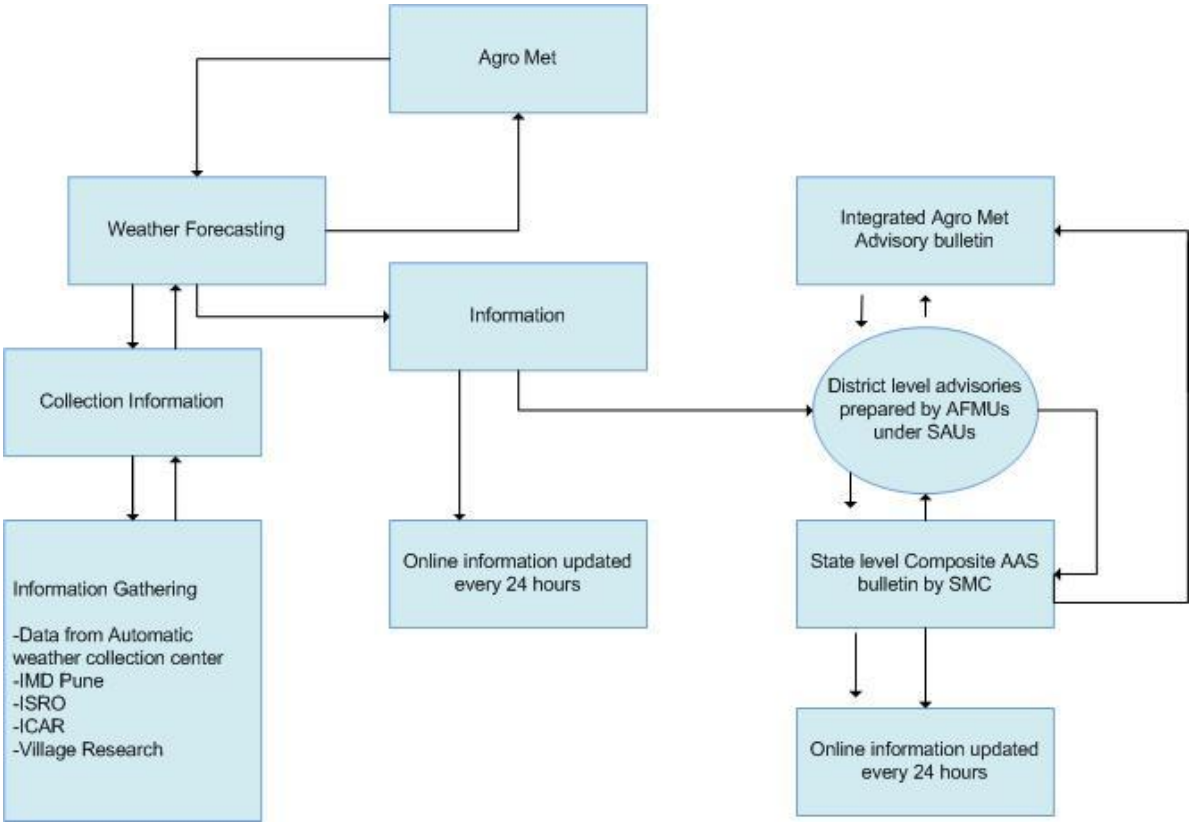
Sub Region	Rain Fall	Climate	Soil	Crops
Tribal	1338	Moist sub-humid to dry sub-humid	Red sandy, red and yellow, red loamy laterite	Rice, Ragi, niger, maize
Eastern Plateau	1369	Moist sub-humid to dry sub-humid	Red & yellow, red loamy	Rice, maize, Ragi, wheat
Eastern Highland	1436	Moist sub-humid to dry sub-humid	Red sandy, red and yellow	Rice, maize, niger, wheat
North Central Plateau	1296	Moist sub-humid to dry sub-humid	Red sandy, red and yellow	Rice, maize, wheat, Ragi
Eastern Plain	1271	Dry sub-humid	Medium to deep black red and yellow	Rice, linseed, jowar, wheat, gram, groundnut

State Wise NARP Zone

NARP ZONE	RESERCH STATION	DISTRICT
MH-1 South Konkan Coastal Zone	Vengurla	Ratnagiri and Sindhudurg.
MH-2 North Konkan Coastal Zone	Karjat	Thana and Raigad.
MH-3 Western Ghat Zone	Igatpuri	Amboli, Phonda and Amba in Kolhapur district, Koyaa and Mahabaleshwar in Satara district, Lonawala and Khandala in Pune district, Kalsoobai hills in Akola taluka of Ahmednagar district and Igatpuri and Trimbaka in Nashik.
MH-4 Sub-montane Zone	Kolhapur	Surgana, Peth, Nashik (Talukas of District Nashik). Khed, Mawal, Mulshi, Velhi, Bhor (Talukas of District Pune). Jawali, Patan, Karad (Talukas of District Satara). Shahuvadi, Panhala, Karvir, Kagal, Bhudargad, Ajara, Gadhinglaj (Talukas of District Kolhapu
MH-5 Western Maharashtra Plain Zone Ganeshkhind	Pune	Western tehsils of Dhule, Ahmednagar ad Sangli and Central tehsils of Nashik, Pune, Satara and Kolhapur districts.
MH-6 Scarcity Zone	Sholapur	Solapur, Ahmednagar and parts of Satara, Sangli, Pune, Kolhapur, Dhule, Jalgaon and Nashik districts and parts of Aurangabad, Jalna, Beed and Osamabad districts.
MH-7 Central Maharashtra Plateau Zone	Aurangabad	Parts of Aurangabad, Jalna, Bhir and Parbhani and Nanded districts, and complete Latur district. This zone also includes entire Buldhana and Akola districts excluding southern parts of Washim and Mangrulpir talukas, whole of Amravati excluding eastern par
MH-8 Central Vidarbha Zone	Yavatmal	Wardha, Deoli, Seloo, Arvi, Karanja, Hinganghat, Samundrapur (Tehsils of District Wardha),Yavatmal, Kalamb, Badhulgaon, Kelapur, Pandharkawada, Ghatanji, Ralegaon, Wani, Maregaon (Tahsils of District Yavatmal). Nagpur, Hingana, Kamathi, Katol, Narkhed, Sa

MH-9 Eastern Vidarbha Zone	Sijndhewahi	Bhandra and Gadchiroli district, eastern part of Chandrapur district (Chanrapur and Bramhapuri tehsils) and Umer Tehsil of Nagpur district).

➢ **Weather based agro Advisory**



Information Gathering Points

- Data collection from automatic center
- IMD
- Met Centers
- Agro met field units
- KVK
- Village Research center
- Village Knowledge center
- Private center

➢ **National Agro met Advisory Bulletin (Agro met advisory common areas)**

- Vegetables

- Floriculture
- Horticultural Crops
- Tea
- Livestock
- Poultry
- Mushroom cultivation
- Honeybees
- Fisheries
- ……

The bulletin is prepared for national level agricultural-planning & management and is being issued by National Agro met Advisory Service Centre, Agricultural Meteorology Division, India Meteorological Department. Prime users of this bulletin are Crop Weather Watch Group, (CWWG) and Ministry of agriculture. Bulletin is also communicated to all the related Ministries (State & Central), Organizations, and NGOs for their relevant use.

The sample bulletin is placed in annexure A.

- **Streaming/Uploading And Streaming of Best Practice Video's**

Stakeholders are adopting best practices across the country on the basis of the advisory and the knowledge base acquired from generation's of practices, on the basis of which they apply various kinds of methodologies for day-to-day farming related activities. With a notion to disseminate the best practices across the country the webpage will provide the facility use of which will enable the farmer to upload the video or information pertaining to the best practices For that stakeholders captures the best practice video's and upload on the website to make example for other stakeholders.

Streaming media is multimedia that is constantly received by and presented to an end-user while being delivered by a streaming provider. With streaming, the client browser or plug-in can start displaying the data before the entire file has been transmitted

The different types of video streaming on the Internet and introduces the two main methods of streaming video: Streaming servers (true streaming) and HTTP streaming.

When creating streaming video, there are two things you need to understand: The video file format and the streaming method.

There are many video file formats to choose from when creating video streams. The most common formats are:

- **Windows Media**

- **Real Media**
- **QuickTime**
- **MPEG (in particular MPEG-4)**
- **Adobe Flash**

Streaming Methods

There are two ways to view media on the Internet (such as video, audio, animations, etc.):

- ✓ Downloading
- ✓ Streaming

Downloading

When you download a file the entire file is saved on your computer (usually in a temporary folder), which you then open and view. This has some advantages (such as quicker access to different parts of the file) but has the big disadvantage of having to wait for the whole file to download before any of it can be viewed. If the file is quite small this may not be too much of an inconvenience, but for large files and long presentations it can be very off-putting.

The easiest way to provide downloadable video files is to use a simple hyperlink to the file. A slightly more advanced method is to embed the file in a web page using special HTML code.

Delivering video files this way is known as HTTP streaming or HTTP delivery. HTTP means Hyper Text Transfer Protocol, and is the same protocol used to deliver web pages. For this reason it is easy to set up and use on almost any website, without requiring additional software or special hosting plans.

Streaming

Streaming media works a bit differently — the end user can start watching the file almost as soon as it begins downloading. In effect, the file is sent to the user in a (more or less) constant stream, and the user watches it as it arrives. The obvious advantage with this method is that no waiting is involved. Streaming media has additional advantages such as being able to broadcast live events (sometimes referred to as a webcast or net cast). True streaming video must be delivered from a specialized streaming server.

Progressive Downloading

There is also a hybrid method known as progressive download. In this method the video clip is downloaded but begins playing as soon as a portion of the file has been received. This simulates true streaming, but doesn't have all the advantages.

Which Method to Use?

The method you choose will depend on your situation, but most people will opt for HTTP streaming (download or progressive download). This is the easiest and cheapest way to get started. If necessary you can upgrade to a streaming server later.

Still, you will want to understand both options so the next two pages of this tutorial look at each one in a bit more detail. After that we'll talk about how to create the actual video files.

A streaming media or streaming video server is a specialized application, which runs on an Internet server. This is often referred to as "true streaming", since other methods only simulate streaming. True streaming has advantages such as:

- The ability to handle much larger traffic loads.
- The ability to detect users' connection speeds and supply appropriate files automatically.
- The ability to broadcast live events.
- There are two ways to have access to a streaming server:
- Operate you own server (by purchasing or leasing)
- Sign up for a hosted streaming plan with an ISP (Internet Service Provider)

Operate your own server

To run your own streaming server, you can either purchase a standalone server machine or purchase streaming server software package or install it on an existing web server. Streaming software is available for all common server platforms such as Linux, Windows, etc.

Some examples of streaming media software:

- Helix Universal Server from Real Network. This server supports a variety of formats, including Real Media, Windows Media, QuickTime and MPEG-4.
- Apple QuickTime Streaming Server, supporting a few formats including MPEG-4 and 3GPP.
- Macromedia Communication Server, specializing in Flash-based video and interactive multimedia.
- Sign up for a hosted streaming plan
- In much the same way that you sign up for a website hosting plan, you can get yourself a hosting plan which specializes in streaming media. This is a far more realistic option for most people.
- Some examples of hosted streaming media plans:
- Real Networks Managed Application Services (MAS)
- Apple QuickTime Streaming Services
- Macromedia Communication Server Hosts

HTTP Streaming Video

This is the simplest and cheapest way to stream video from a website. Small to medium sized websites are more likely to use this method than the more expensive streaming servers.

For this method you don't need any special type of website or host — just a host server which recognizes common video file types (most standard hosting accounts do this). You also need to know how to upload files and how to create hyperlinks (see our website tutorials for more info).
There are some limitations to bear in mind regarding HTTP streaming:

- HTTP streaming is a good option for websites with modest traffic, i.e. less than about a dozen people viewing at the same time. For heavier traffic a more serious streaming solution should be considered.
- You can't stream live video, since the HTTP method only works with complete files stored on the server.
- You can't automatically detect the end user's connection speed using HTTP. If you want to create different versions for different speeds, you need to create a separate file for each speed.
- HTTP streaming is not as efficient as other methods and will incur a heavier server load.

These things won't bother most website producers — it's normally only when you get into heavy traffic that you should be worried about them.

To Create HTTP Streaming Video

Create a video file in a common streaming media format

Upload the file to your web server

Make a simple hyperlink to the video file, or use special HTML tags to embed the video in a web page.
That's essentially all there is to it. When a user clicks the hyperlink, their media player opens and begins streaming the video file. If the file is embedded, it plays right there on the page.

Streaming bandwidth and storage

A broadband speed of 2.5 Mbit/s or more is recommended for streaming movies, for example to an Apple TV, Google TV or a Sony TV Blu-ray Disc Player, 10 Mbit/s for High Definition content.
Unicast connections require multiple connections from the same streaming server even when it streams the same content

Streaming media storage size is calculated from the streaming bandwidth and length of the media using the following formula (for a single user and file):

- ✓ Storage size (in megabytes) = length (in seconds) × bit rate (in bit/s) / (8 × 1024 × 1024)

Real world example:

One hour of video encoded at 300 kbit/s (this is a typical broadband video as of 2005 and it is usually encoded in a 320 × 240 pixels window size) will be:

- ✓ (3,600 s × 300,000 bit/s) / (8×1024×1024) requires around 128 MB of storage.

If the file is stored on a server for on-demand streaming and 1,000 people view this stream at the same time using a Unicast protocol, the requirement is:

- ✓ 300 kbit/s × 1,000 = 300,000 kbit/s = 300 Mbit/s of bandwidth

This is equivalent to around 135 GB per hour. Using a multicast protocol the server sends out only a single stream that is common to all users. Hence, such a stream would only use 300 kbit/s of serving bandwidth. See below for more information on these protocols.

The calculation for live streaming is similar.

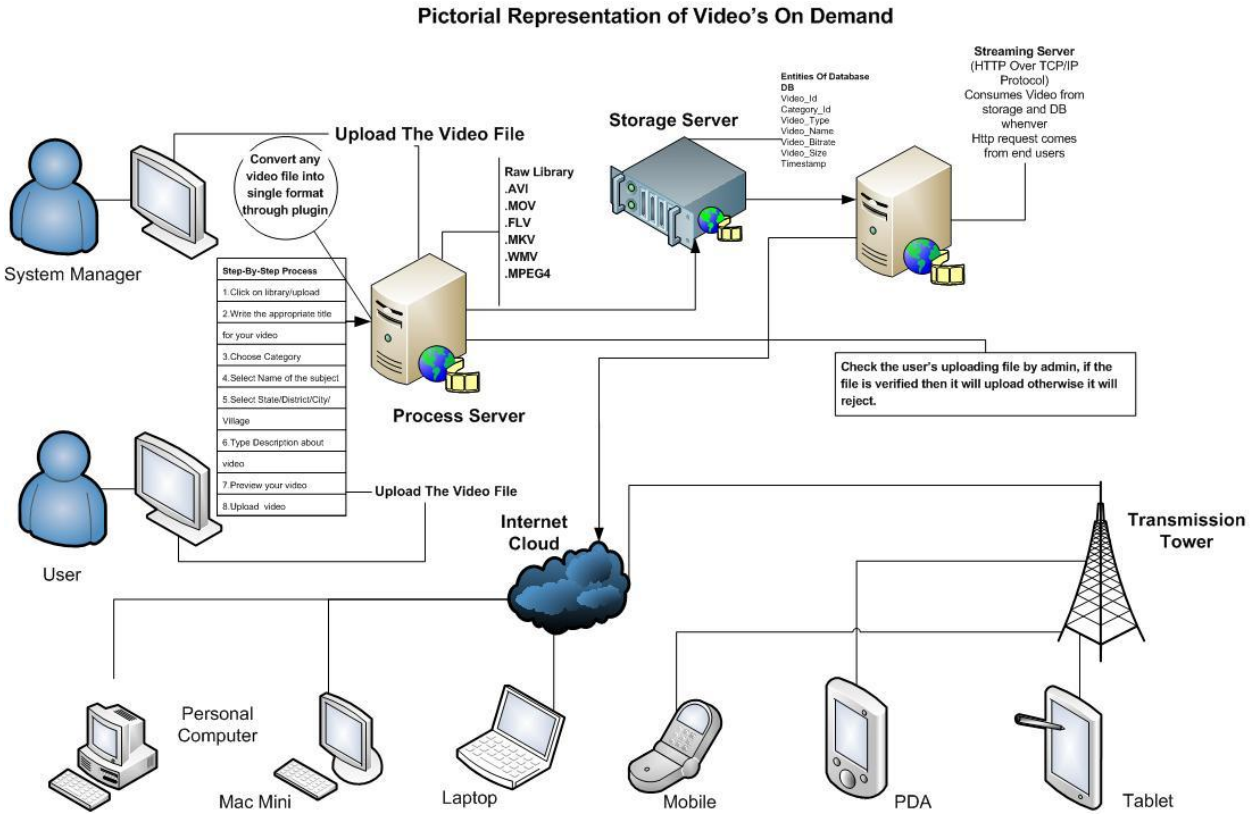
Assumptions: speed at the encoder, is 500 kbit/s.

If the show lasts for 3 hours with 3,000 viewers, then the calculation is:

- ✓ Number of MBs transferred = encoder speed (in bit/s) × number of seconds × number of viewers / (8*1024*1024)
- ✓ Number of MBs transferred = 500,000 (bit/s) × 3 × 3,600 (= 3 hours) × 3,000 (number of viewers) / (8*1024*1024) = 1,931,190 MB

Codec, bit stream, transport, control

- The audio stream is compressed using an audio codec such as MP3, Vorbis or AAC.
- The video stream is compressed using a video codec such as H.268 or VP.
- Encoded audio and video streams are assembled in a container bit stream such as FLV, WebM, ASF or ISMA.
- The bit stream is delivered from a streaming server to a streaming client using a transport protocol, such as MMS or RTP.
- The streaming client may interact with the streaming server using a control protocol, such as MMS or RTP.



➢ **State Agro met Advisory Bulletin (agro met advisory climatic zone wise)**

▪ (Sub Menu for this page will be same as National Agro Met Advisory Bulletin)

This bulletin is prepared for State level agricultural planning & management. These bulletins are issued from 22 AAS units at different State capitals. Prime user of this bulletin is State ACWWG. This is also meant for other users like Fertilizer industry, Pesticide industry, Irrigation Department, Seed Corporation, Transport and other organizations, which provide inputs in agriculture.

A sample of the state agro met advisory bulletin is placed in Annexure A.

➢ **District Agro met Advisory Bulletin**

▪ (Sub Menu for this page will be same as National Agro Met Advisory Bulletin)

This is prepared for the farmers of the districts. These bulletins are being issued from 30 AMFUs functioning at State Agricultural Universities. This contains advisories for all the weather sensitive agricultural operations form sowing to harvest. It also includes advisories for horticultural crops and livestock. These weather-based advisories are disseminated to the farmers through mass

Media dissemination, Internet etc. as well as through district level intermediaries. The advisories will be communicated through multi-channel dissemination system. A sample district level agro met advisory bulletin is placed in **Annexure A**.

- **Block/Panchayat Agro-met Advisory Bulletin**
  - (Sub Menu for this page will be same as district Agro Met Advisory Bulletin)

A sample of block / panchayat level agro met advisory bulletin is placed in Annexure A.

- **Dissemination of advisories**
  - **Email**

The registered user with valid email for respective category i.e. Vegetables, Floriculture, Horticultural Crops, Tea, Livestock, Poultry, Mushroom cultivation, Honeybees, Fisheries (which can be single or on multiple), will get all the advisories issued for a specific area or zone he is present.

- **SMS**
- **Application using USSD protocol**

The registered user with valid mobile for respective category i.e. Vegetables, Floriculture, Horticultural Crops, Tea, Livestock, Poultry, Mushroom cultivation, Honeybees, Fisheries (which can be single or on multiple), will get all the advisories SMS issued for a specific area or zone he is present. The SMS will be limited to 160 characters only.

Step1: User signs up with their mobile number on the website.

Step2: To get information related to weather, crop, Live and Livestock, Plant and Plant Material, fertilizer, insurance and Agro-Met advisory.

Process Flow of SMS:

1) Weather based alert SMS

2) Crop-weather based alert SMS

MODERATE SNOW ON AN OVERCAST SKY AND COLD HUMID DAY. MIN: 8.0 DEG C MAX: 24.0 DEG C MIN HUMIDITY: 29.0 % MAX HUMIDITY: 65.0 % RAINFALL: 0.0 MM

First Process:

On the basis of seven parameters of weather (Rainfall, Temperature (Max/Min), Relative Humidity (Max/Min), Wind Direction, Wind speed) Agro-Met Advisories give their solution in English language To the server then server process the language into Multilanguage's then send it to the end users And stakeholders.

Second Process:

On the basis of seven parameters of weather (Rainfall, Temperature (Max/Min), Relative Humidity (Max/Min), Wind Direction, Wind speed) Agro-Met Advisories give their solution in English language Direct to the end users in the shape of SMS. But end users get the SMS with one hyperlink. (Do you want to translate the SMS in your language?)

(Press yes or no)

If end users press "yes"

Then its go to the server and server change it to their needed language and return to the end-users.

If end users press "No"

Then SMS will stay in the "INBOX" of the end users mobile.

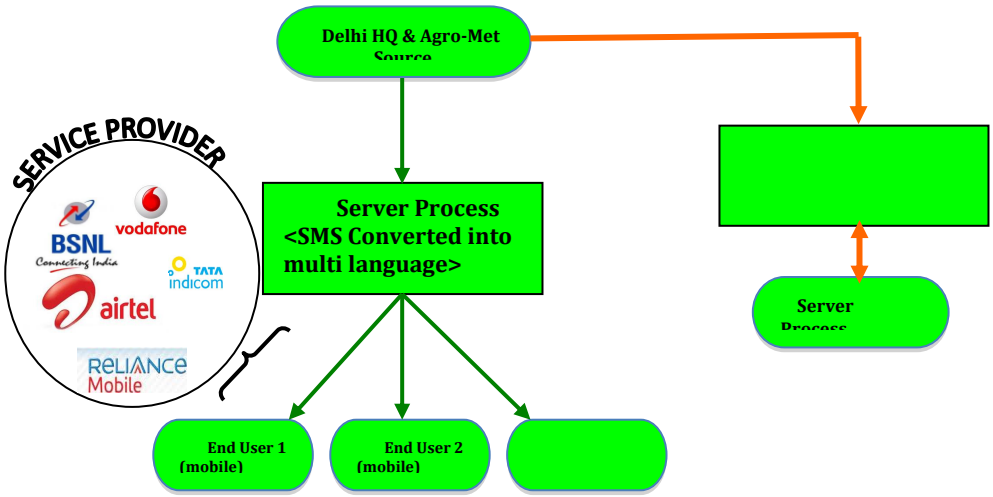
Third Process:

This is the proposed SMS plan. And it is highly used in an official or non-official industry. SMS LINGO means SMS in languished. The words used in this SMS in English.

Example "HRU" In English "how are you"? But "HRU" it's already accepted by oxford dictionary so it's gives the same meaning.

So the end users will get the SMS's in this way. But this plan is in the under process

Flow chart Of SMS Server to User Process



(The process flow and the information given above is as per information collected from C-DAC NOIDA)

1. Mobile Government (M-Government): A Step towards providing Government Services at the doorsteps of the Indian farmers and related stakeholders

Rural India faces problems related to physical connectivity (all-weather road, railway track, transport etc.) from urban areas, electric power supply, Agri-advisory services, Agro-met advisory services, Agri-input services, and lack of civil administrations and other government establishments in remote areas. In rural India, the demand is for accurate, reliable information regarding agriculture and its allied subject in the lingua franca. **Reuters India offers** its mobile Farming Information Services to farmers on crops, weather and commodity prices, in the States of Maharashtra and Punjab, through its Scheme - **Reuters Market Light**. **Airtel** in collaboration with IFFCO (IKSL), in the State of Andhra Pradesh, through its **Grameena Mobile Kranti scheme**, offers its mobile services, to strengthen the cooperative movement in rural India by empowering the farmers through information. Nokia too has launched its agricultural information services through its mobile services in India. **Some of the best applications for the farmers, presently available in India, are the AGMARKNET Portal (http://agmarknet.nic.in), Seed NET Portal (http://seednet.gov.in), National Horticulture Mission Portal (http://nhm.nic.in)** which are yet to provide information dissemination through Mobile telephones.

Governments, in most of the Countries, are increasingly making efforts to provide more access to information and services for its citizens, businesses, and civil servants through wireless devices (Yoojung,

Jongsoo, Seungbong, & Jaemin, 2004)[1]. Mobile government (or M-Government) is a subset of electronic government (e-Government) comprising an alternative provisioning channel of governmental information and services. Many countries around the world, such as the United States of America, Sweden, Denmark, Korea, and Canada have established their M-Government Services. One of the future challenges for the implementation of M-Government is the creation of effective business cases (Ntaliani, Costopoulou and Karetsos, 2007)[2]. **Like e-Government, M-Government operates on four different levels, represented by MG2G, MG2B, MG2C, and MG2E.** According to scholarly review, SMS is used as main or supplementary mG2C and mG2B service [(Chutimaskul, 2002)[3]; (Song, 2005)[4]; (Yoojung et al., 2004)[5]]. The M-Government Services can be categorized as follows: -

- Agricultural news (e.g. new cultivation products, machinery);
- Agricultural policy (e.g. laws and regulations);
- Funding opportunities (e.g. for purchasing equipment);
- Weather forecasts;
- Alerts (e.g. disease outbreak, extreme weather conditions);
- Market forecasts (e.g. product prices, supply and demand);
- Expert consulting (e.g. regarding cultivation techniques, marketing of products, new production standards);
- Notifications (e.g. for deadlines, renewal of certificates, submission of documents, new cultivation products or techniques, verification of important dates, farmer union issues, events).
- Petitions (e.g. license renewal).
- Tele-diagnosis (e.g. plant and animal diseases).

- sYoojung, Kim., Jongsoo, Yoon., Seungbong, Park., and Jaemin, Han (2004): “Architecture for implementing the mobile government services in Korea”, Lecture Notes in Computer Science, 3289, 601−612.

- Ntaliani, M., Costopoulou, C. and Karetsos, S (2007): “Mobile Government: A Challenge for Agriculture”, Government Information Quarterly 25 (2008) 699–716. Also available online at http://www.sciencedirect.com. E-mail addresses: marier@aua.gr (M. Ntaliani), tina@aua.gr (C. Costopoulou), karetsos@aua.gr (S. Karetsos). An ELSVIER Publication.
- Chutimaskul, Wichian (2002): “E-government analysis and modelling”, Paper presented at the 3rd International Workshop on Knowledge Management in Electronic Government, May 23–24, 2002 in Copenhagen, Denmark.
- Song, Gang (2005): “Transcending e-government: A case of mobile government in Beijing”. Paper presented at the 1st European Conference on Mobile Government, July 10–12, 2005, in Brighton, UK.
- Yoojung, Kim, Jongsoo, Yoon, Seungbong, Park, & Jaemin, Han (2004): “Architecture for implementing the mobile government services in Korea”, Lecture Notes in Computer Science, 3289, 601−612.

- Calculations (e.g. for subsidy or indemnification).
- Financial transactions (e.g. loan payments).
- Employment market (e.g. job offer and demand in particular area).
- Search engine (e.g. for databases, locating agencies in the surrounding area).
- Messages to public agencies (e.g. agricultural accident reports, incidents, queries, complaints, comments, interventions, opinion stating). Intra and Inter State Government Agricultural Developmental Schemes and their guidelines for implementation and monitoring;
- Input dealers (seed, fertilizers, pesticides, etc.);
- National Agricultural Research System (NARS) – IACR & SAU - Research & Extension Services;
- WTO Regulations of agricultural commodities.
- Agricultural Crop Insurance information;
- Public Grievances Redressal;
- File / Applications Tracking;
- Continuous and Integrated Agricultural Drought Monitoring;
- Government Initiatives (development schemes etc.);

SafalKHETI is a Mobile based Application to automate Agricultural Information Flow System to Farmers. SafalKHETI has three basic components, an MIS application to capture farmer profiles, an Interactive Voice Response System (IVRS) to allow farmers to call in their queries and receive their replies and a mobile application that allows Service Providers (SP) to capture up to six images and an associated voice recording in the form of a Short Dialogue Strip (SDS). The SDS is uploaded onto a web server using the GPRS available from GSM mobile service providers from the farmer's field or wherever network coverage is available. The basic integration screen of the application provides access to the Agricultural Expert to:

- View the SDS queries from the mobile application,
- Hear the IVRS queries and Refer to the farmer profile application,
- Record appropriate response, both verbal and visual, and
- Deliver the advice to the farmer who made the query.

Key issues that have emerged from the SafalKHETI experience include the following:

a. Finding ways to accumulate knowledge, linking questions to other data to create a 'management information system' that is meaningful for such small farmers;

b. Exploring relations with other rural information networks (e.g. community radio, health services) that could share infrastructure and reduce costs for the poorest;

c. Improving usability for enquirers, service providers and advice givers, accounting for the limited literacy skills of many users;

d. Encouraging peer learning, as well as advice from a central expert;

e. Integrating with other media, particularly basic phones held by some farmers;

f. Devising economic models that are sustainable for all stakeholders: farmers, service providers, co-ops, government services, network operators, handset makers etc.

- Radio
- Television
- Newspaper
- IVRS (As per USSD protocol)
- Mobile
- Email

➢ **Best Practices (On the basis of agro climatic zone)**

- General Condition
- Extreme Condition
- Contingency Plan

General Condition:

The advisory issued in the normal weather condition on a daily basis

Extreme Condition:

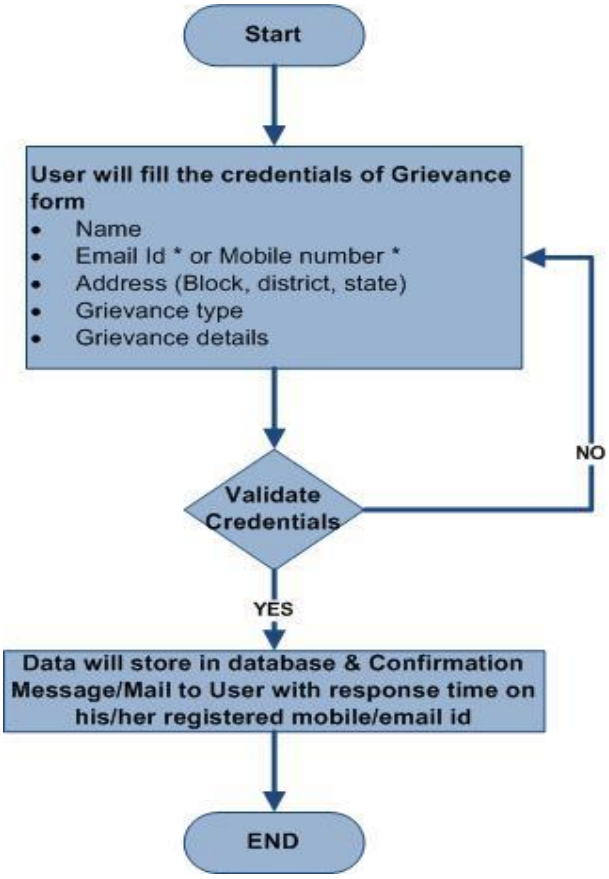
Agro met bulletin published keeping the abnormal changes in the weather and will cover all aspects, which can lead in to a situation of abnormality examples can be:

- Cold Effect
- Heat Effect
- Drought Effect
- Dry Effect
- Flooding Effect
- Moisture Effect
- Fog Effect
- Dew Effect
- Cloudy Effect

- **End user and stakeholder feedback**

  End user will be provided with an option to give his/ her feed back on the information available on the web portal he / she can also suggest the alternate or for some missing information which can be helpful

- **End user Grievance Management**



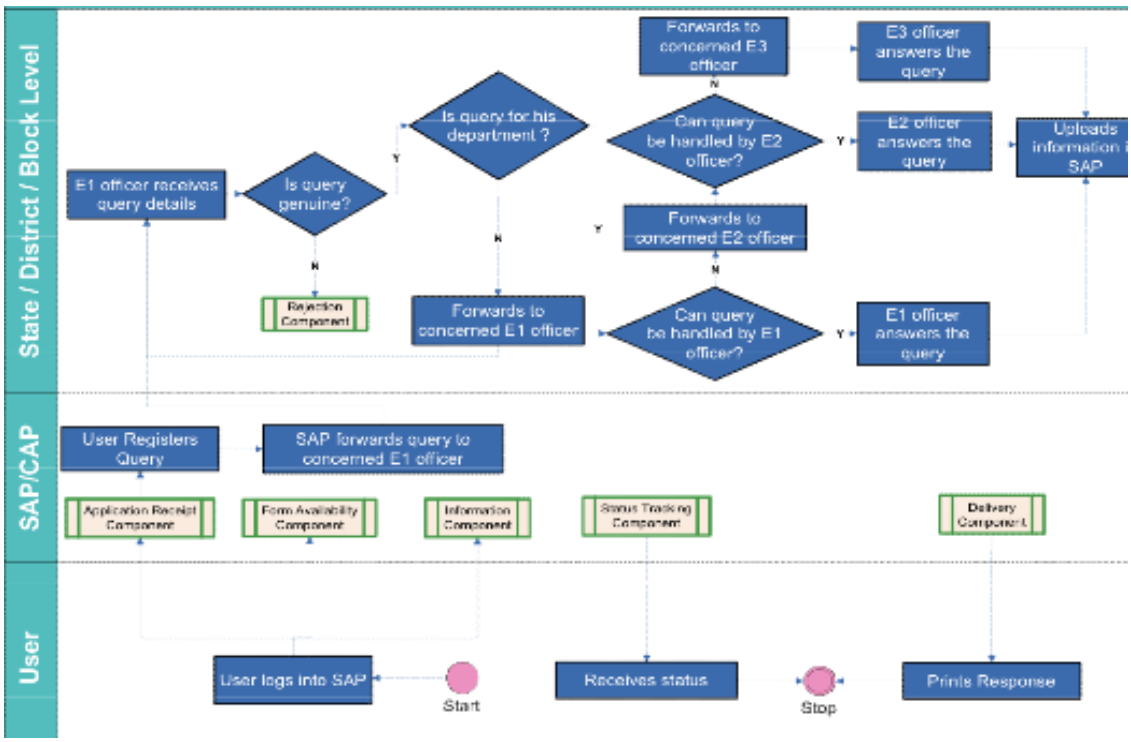
Portal will provide the counseling and farmer's training awareness programs on the Weather forecast.

- **Scroll information on current day weather**

  This is an automatic function.

  This use case starts when an actor comes to the web page, on the basis of the IP address the Local weather information scroll starts on **current day weather.**

Back End Process workflow:



- **External Useful Agro met links**

  All links related with the agro met services and advisories will display in case the end user wants to use these links they can do so by clicking the given links.

CURRENT WEATHER OBSERVATIONS

Date : 10-01-2012

Time : 1130 IST

Click Here to Search Station...

Stations	Temperature (C)	Relative Humidity (%)	Mean sea level pressure (hPa)	Wind (Kts)	Current weather
Agartala	22.4	67	1016.2	NW 5	Haze
Agra (AFB)	14.1	79	1022.5	NNW 5	Clear sky
Agumbe	27.4	45	1012.2	Calm	Clear sky
Ahmedabad	20.8	43	1020.0	E 6	Clear sky
Ajmer	15.0	48	1021.7	Calm	Clear sky
Akola (West)	23.0	36	1016.6	Vrb 1	Clear sky
Alipore (Kolkata)	20.0	90	1016.9	Vrb 2	Haze

http://www.imd.gov.in/section/nhac/dynamic/current.htm

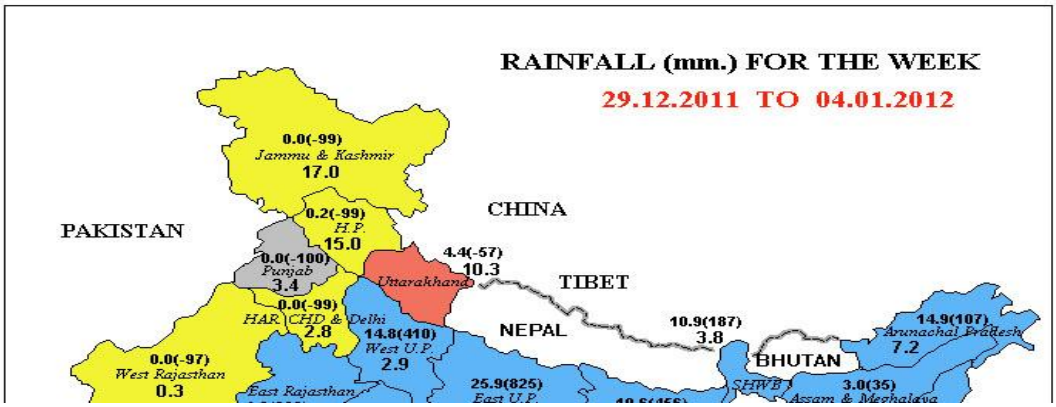
Government of India
Ministry of Earth Sciences
INDIA METEOROLOGICAL DEPARTMENT
ALL INDIA WEEKLY WEATHER REPORT

Back to home | Weekly Rainfall (Fig 1) | Seasonal Rainfall (Fig 2) | Table-1 | Table-2 | Table-3

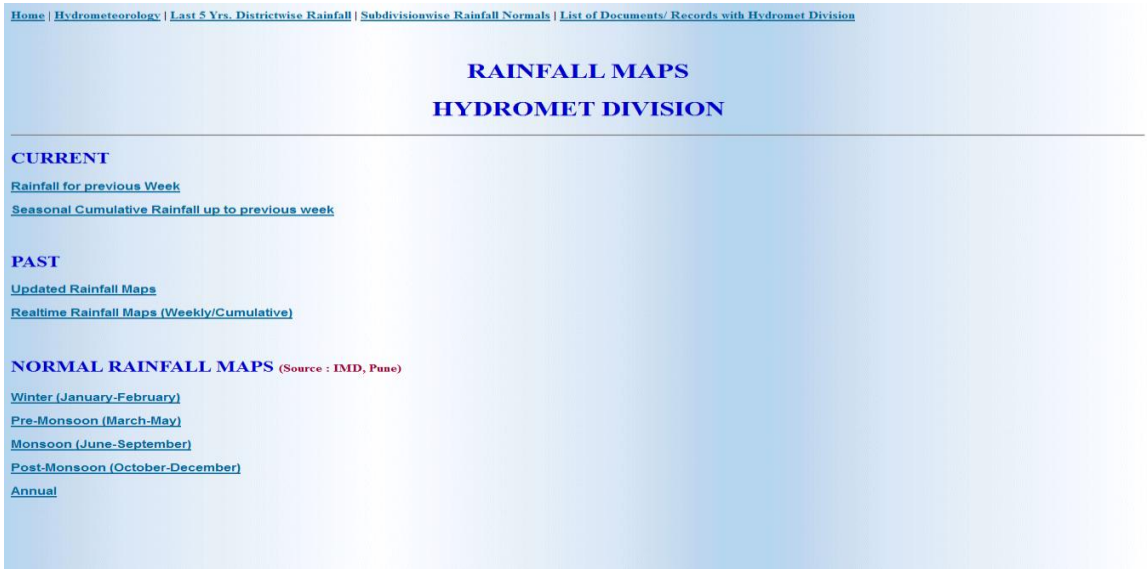
WEATHER DURING THE WEEK ENDING ON
4th January, 2012

(Seasonal Rainfall | Back to All India Weekly Weather Report)

भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT



(http://www.imd.gov.in/section/nhac/dynamic/week.htm)



(http://www.imd.gov.in/section/hydro/dynamic/rfmaps/mapsmain.html)

Make Links relevant to this activity can be added for example respective agriculture university etc.

- **Service Provider (Telecom Partners)**
  - ……

Product Functions

- PIFWAA will be divided into three major Services:
- Information Dissemination System for Agro-met advisory
- System for Grievance management.
- Information Dissemination System for Authority

From a functional perspective the following modules would be required as the core and configurable modules in this application.

A. Core Modules

A1. User Management

The different stakeholders at various levels to log into the portal and enable them to use functionalities such as user creation, user access controls and user deletion will use the user management module.

B. Configurable Modules

B1.Content Management

The system admin team to update the content made available on the portal will use content management module.

B2.SMS Management

Information with regard to agro met has proposed to be sent via mobile in the form of SMS to the farmers wherever required. The SMS management module would provide functionalities of registration of recipients for SMS, creation of scheduled tasks for auto SMS.

B3.Expert Advisory

The expert advisory will be issued on the basis of daily forecasted weather by panel of expert for each climatic zone and its sub categories.

B4.Grievance Redressal

Any grievance arising due to the content or the query raised by the user/citizen will be handle and appropriate feedback given to the user/citizen in the event of non compliance of the grievance management module, the proposed escalation procedure in the backend will be initiated.

B5.Manage FAQ

The FAQ module will keep a track and log of all frequently asked questions for future references.

B6.Registration Management

The module Registration Management will take care of all new user registration on portal will keep a log of all such registered users.

3.1.1 User Characteristics

PIFWAA application will be primarily used by the farmers, officials of Block Panchayats, District Panchayats, Agro climatic zonal center, Met Center, Agro met field units, Private and Government Institutions, Call Centers, NIC. Apart from these users, other Central Line Ministries/Departments and also the common man for various purposes and reasons can view some of the reports.

Accordingly, the PIFWAA user interface should be institutively designed so that it is fairly simple, easy to use and self-explanatory. The application should allow the users to switchover to local language so that all the textual elements are displayed in local language for better understanding and effective use.

Current Population of India in 2012	1,220,200,000 (1.22 billion)
Total Male Population in India	628,800,000 (628.8 million)
Total Female Population in India	591,400,000 (591.4 million)

Literacy rate in India: Whole India 74.04%

Male 82.14%

Female 65.46%

Computer literacy in India: Whole India only 6.1%

3.1.2 Constraints

1. PIFWAA will be an Internet based application, which will be designed, developed and centrally hosted in Open Source Environment in NIC's Data Centre.
2. The users will be accessing the software application using various connectivity scenarios.
3. As the application will be used by all the villages (no of villages), State Agriculture Departments (no of departments), Agro climatic zonal center, Met Center, Agro met field units, Government and Private Institutions the no. Of application users and concurrent users will be very high as mentioned in non-Functional Requirements.
4. The application will support only Unicode-enabled fonts for local language representation.

3.1.3 Assumptions and Dependencies

- Necessary master data would be created before work can start.
- The site and network infrastructure will be available for the development team and for testing and implementation as per schedule.
- Mobile device is not switched off.
- Mobile device to support the vernacular language for regional Languages.
- Only registered mobile with the national farmer's database can get SMS alert.
- SMS Frequency will depend upon weather condition.
- Two types of SMS alerts would be transmitted: Weather Based Alerts and Weather Based Agro-Met Advisories Alerts
- Advisory depends on input data from central server; it is to be pull mechanism to disseminate the advisories.

3.1.4 Acceptance Criteria

This SRS document will stand accepted once NIC accord a formal approval to this document. In the event of non-communication after or within 7days from NIC from the date of submission of the SRS document, it will be considered as acceptance of the submitted SRS document without any change.

4 Specific Requirements

4.1 External Interface Requirements

a. The user, hardware, software and communication interface requirements of the proposed

b. **PIFWAA** are listed below:

Web based Graphical User Interface (GUI) will be provided. Portal will be completely menu driven and user friendly. The GUI consists of the various Input forms, output screens along with the help files provided as per the requirement.

4.1.1 Hardware Interfaces

The following hardware interfaces are required to access the portal:

Computer System: any x86 based computer having minimum 512 MB RAM

Printer: Dot matrix printer (132 columns) preferably a Laser Printer will be needed to take the various outputs of the system time to time.

UPS: 0.5 or 1 KVA Online UPS will be required to maintain the uninterrupted power supply to computer and printer.

4.1.2 Software Interfaces

At Client End:

Base OS: Any Windows based operating system or any other system having graphical user interface based Operating System

Browser: Internet Explorer 6.0 or above, Mozilla Firefox, Google Chrome or Opera

Mobile handsets.

At Server End:

Base OS – Will be decided later at the development stage

Framework - Will be decided later at the development stage

Technology Platform – Will be decided later at the development stage

Database - Will be decided later at the development stage

Browser – Internet Explorer 6.0 or above

SMS gateway, national gateway system.

4.1.3 Communication Interface

The Application will work on Local Area Network (LAN) or Internet also. Along with this, the system will interact the SMS Gateway server to push SMS to different stakeholders and emails servers also to send the automated emails generated from the system to various stakeholders of the system.

Any person having minimum of hardware configuration can access the Agro-met Advisory Services through Internet. The Agro-met Advisory Services should be optimized on any kind of browser across different operating system platform. It should be accessible from mobile phone and other communication devices supporting Internet access.

4.1.4 Software Interfaces

The software will interoperate with other software applications, which are being developed under NeGP (A) Mission Mode Project, in particular Central Agriculture Portal and State Agriculture Portal.

PIFWAA will interoperate with SAP to get the information of the registered users on the SAP, their registration and other respective process. It will display the status of the registered applications on the SAP. It will also interoperate with the Registered Users Database to get the list of users and Central Agriculture Portal to access the centrally monitored applications.

4.2 Software Product Features

4.2.1 Functional Requirement:

4.2.2 Home page interface

- On the top of home page, there will be a graphic image across the width of home page signifying India's National Emblem making it distinct as government website.
- Different Sections covering Government, Citizen, Departments, Sectors, and Business. All these section will contain a small introduction to the section along with links to subsections within the section.
- The Portal will also contain the following components:
- Grievance Management
- Expert Advisory System
- Header Links to Site Map, Add to Favorite, Tell a Friend, Feedback and Contact Us
- One can search contents from State Agricultural Portal
- Sign in for Personalized Viewing of State Agricultural Portal. For personalized viewing the visitor will need to register in the State Agricultural Portal
- Spotlight: Latest topic of concern changing every fortnight

- How do I: - For Searching information for the services provided by the government, government undertakings and NGOs
- Latest News: - Latest news updates
- Automatic Alerts on Weather Aberration
- Link to maps of different categories like maps of India, Maps of State, District Maps
- Announcements Section: -One can visit to search announcements made for Central and State government departments
- Banner linked to latest subject of concern. It will change frequently as and when required
- Weekly content from State Agricultural Portal: - It will contain important content from the State Agricultural Portal
- Footer Links to About this Portal, Help, Terms of Use, Visitors Summary, Newsletter, Your Opinion, Press Media Coverage and Accessibility Statements
- Introductory Statement to the State Agricultural Portal and Central Agricultural Portal

4.2.3 Inner page Interface

- Authorities
- Latest News events
  - Agro-met Advisory
  - Agro-met News
- Automatic Alerts on Weather Aberration
- Subscribe to Newsletter
  - Archives Newsletter
- Agro climatic zone classification
  - National level
  - State level
  - District level
- Weather based agro Advisory
  - 5 Tier details
    - Ministry Policy
    - IMD Pune
    - Met center
    - Agro met field units
    - KVK

- National PRIORITY AREAS (common areas)
- State priority areas (agro climatic zone wise)
- Dissemination of advisories
    - Email
    - SMS
    - Radio
    - Doordarshan
    - Newspaper
- Best Practices (On the basis of agro climatic zone)
    - General Condition
    - Extreme Condition
        - Contingency Plan
- End user and stakeholder feedback
- End user query redressal
- Scroll information on current day weather
    - Service Provider

4.3 Actors

Super Admin

A user who has been assigned the Super Admin type has access to the Super Admin Area for all activities installed on the website and to the tools used to configure these activities. A super admin in this case can be a nominated person by NIC. (Further information regarding the selection of a supper admin can also be decided on the basis of the input received during the field visit).

Admin

A sysop (an abbreviation of system operator) is an administrator of a multi-user computer system, such as an online service virtual community. It may also be used to refer to administrators of other Internet-based network services. In respect to this portal a system admin will be a person who will be authorized to perform the activities related with updating the site information, authenticating various user groups by administrating the registration and acknowledgement of registration.

Editor

A person who will be responsible final editing of information's received from various sources pertaining to service 4 activity i.e. "Forecasted Weather & Agro-Met Advisories"

Publisher

A person has the rights to publish the finalized information on the portal. All rights will be given and reviewed by the admin / super admin.

Approver

A person who approves the content, which will be amended and upload in the portal.

SAP User /citizen

SAP User/citizen those who will be use the portal for various agro met advisory related services.

4.4 Common Use Cases

This sub-section describes the use cases, which would be available to the actor belonging to any role. The set of common use cases are:

- Log in
- Logout
- Change Password
- Switch Language
- Forget Password
- Forget User ID

Each of these use cases is described below in more detail

Use Case No.	Functionality	Description	Actor(s)
UC 4.4.1	Log In	This use case is used to Log In to SAP.	SAP User
UC 4.4.2	Log Out	This use case would allow the actor to logout of SAP Application to which he/ she is already logged in.	SAP User
UC 4.4.3	Change Password	This use case is used for existing password for SAP User.	SAP User
UC 4.4.4	Switch Language	This use case is used to switch language.	SAP User
UC 4.4.5	Forget Password	This use case is used for Forget Password.	SAP User
UC 4.4.6	Forget User ID	This use case is used for Forget User Id.	SAP User
UC 4.4.7	Select View Agro Met Advisory	This use case would allow the actor to select view Agro Met	SAP user, farmer, general users

		Advisory	
UC 4.4.8	Select View Agro Met News	This use case would allow the actor to select view Agro Met News	SAP user, farmer, general users
UC 4.4.9	Automatic alerts on weather aberration	This use case would allow the actor to get Automatic alerts on weather aberration	SAP user, farmer, general users
UC 4.4.10	Select Subscribe to Agro Met Newsletter	This use case would allow the actor to Subscribe to Agro Met Newsletter	SAP user, farmer, general users
UC 4.4.11	Select View Archives Newsletter	This use case would allow the actor to view Archives Newsletter	SAP user, farmer, general users
UC 4.4.12	Select View Agro climatic zone classification	This use case would allow the actor to view Agro climatic zone classification	SAP user, farmer, general users
UC 4.4.13	Select View Weather based agro Advisory	This use case would allow the actor to view Weather based agro Advisory	SAP user, farmer, general users
UC 4.4.14	Select View National PRIORITY AREAS (common areas)	This use case would allow the actor to view Weather based agro Advisory	SAP user, farmer, general users
UC 4.4.15	Select View State priority areas (agro climatic zone wise)	This use case would allow the actor to view State priority areas (agro climatic zone wise)	SAP user, farmer, general users
UC 4.4.16	Select Dissemination of advisories	This use case would allow the actor to Select Dissemination of advisories	SAP user, farmer, general users

UC 4.4.17	Select View Best Practices (On the basis of agro climatic zone)	This use case would allow the actor to Select View Best Practices (On the basis of agro climatic zone)	SAP user, farmer, general users
UC 4.4.18	Select upload End user and stakeholder feedback	This use case would allow the actor to Select upload End user and stakeholder feedback	SAP user, farmer, general users
UC 4.4.19	Select Upload End user query redressal	This use case would allow the actor to Select Upload End user query redressal	SAP user, farmer, general users
UC 4.4.20	Select Scroll information on current day weather	This use case would allow the actor to Select Scroll information on current day weather	SAP user, farmer, general users

4.4.1 Log In

UC 4.4.1	**Log In**
Version:	00
Context:	This use case is used to Log In to SAP.
Priority:	High
Frequency:	As and when actor want to get the information from SAP.
Primary Actor:	SAP User
Preconditions:	User has clicked on the link available at SAP. User viewed the page in default language for state.
Basic Flow	1. System presents the actor an interface to enter user name and password: 2. Actor shall enter user id and password. 3. Actor shall also enter the captcha code. 3. Actor instruct to Log In into system. 4. On Successful login User shall reach at Home page of SAP.
Alternative Flow:	1. **Invalid User ID or Password:** If actor enters wrong user id or password

	then system will display “Invalid Login”. Actor shall acknowledge the message. System will return back to Pre Condition. 2. **Actor is already login:** If Actor chooses to invoke multiple instances. System will display a message “Already Log In”. **3. Actor attempt to login with wrong User id and Password at least 3 times:** System will display the message “Your Account is temporary blocked”. **4. Actor Clicks on reset link:** System will clear the user id and password.
Post Condition:	1. Actor shall successfully login into system. 2. Actor will access the information from SAP as per defined role.
Special Requirements:	Form field shall be verify from both client and server end.
Unresolved Issues:	

4.4.2 Log Out

UC 4.4.2	Log Out
Version:	00
Context:	This use case would allow the actor to logout of SAP Application to which he/ she is already logged in.
Priority:	High
Frequency:	As and when user Log In into SAP.
Primary Actor:	SAP User
Preconditions:	Actor is logged into SAP application over the web.
Basic Flow	1. Actor shall click on the logout link. 2. System will display a message “You have successfully logout.” 3. System will return back to Home Page.
Alternative Flow:	**1. Actor chooses to Close the browser window:** a. System displays the message, “The currently logged in user was logged out. Thanks for using SAP package. b. The System would close the SAP package. **2. If the actor is already logged in into PIFWAA package and System times out the actor:** The system logs out the actor whenever the actor tries to click any option. The System returns back to the Home page.

Post Condition:	1. Actor shall successfully logout and brought to the Home Page.
Special Requirements:	
Unresolved Issues:	

4.4.3 Change Password

UC 4.4.3	Change Password
Version:	00
Context:	This use case is used for existing password for SAP User.
Priority:	High
Frequency:	As and when actor wants to change his/ her password.
Primary Actor:	SAP User
Preconditions:	Actor shall login in to SAP using UC 3.2.6.1.
Basic Flow	1. Actor shall instruct the system to change password. 2. Actor shall enter the old password. 3. Actor shall enter the new password and again enter the confirmed new password. 4. Actor shall instruct to change password. 5. System will display a message “Your Password has been modified.” 6. System will return back to Home Page.
Alternative Flow:	1. **The actor attempts to save the changed password without specifying the Old Password:** The System would respond with a message, “Please enter a password for the user”. **2. The actor attempts to save the changed password without specifying the New Password:** The System would respond with a message, “Please enter a confirmation password for the user”. **3. The actor attempts to save the changed password without specifying the Confirm Password:** The System would respond with a message, “Please enter a confirmation password for the user”.

	4. The length of the new password is less than 8 characters: The system would respond with the message, “The length of the password should be greater than 8 characters”. The length of the new password is greater than 12 characters. The System would respond with the message, “The length of the password cannot be greater than 12 characters”. **5. The New Password is same as Old Password:** The System would respond with the message, “The new password you have entered is same as old password. Please enter a different value for new password”. The New Password is same as Previous old Password The System would respond with a message, “New Password cannot be same as previous old password”. **6. Confirm Password is different from New Password:** The System would respond with the message, “Confirm Password should be same as New Password”. **7. The New Password is not a Strong Password:** The System would respond with a message, “Please correct the problem (s) with your new password. Strong Passwords must include at-least one number and special character.”
Post Condition:	1. Actor shall successfully logout and brought to the Home Page.
Special Requirements:	
Business Rules	1. The length of the new password should be greater than 8 and less than 12 characters. 2. Old Password, New Password and Confirm Password fields are Mandatory. 3. Confirm Password should be same as New Password. 4. The New Password should include at-least one number and one special character. 5. The New Password should not be same as the Old Password & Previous Old Password.
Unresolved Issues:	

4.4.4 Switch Language

UC 4.4.4	**Switch Language**
Actor(s)	**SAP User, General Citizen**
Description	This use case will allow the actor to view the SAP in one of the supported languages that is different from the language in which she is currently viewing. All fixed text on screens, drop down list of values, any error or warning messages generated by **SAP** and help text will be displayed in the chosen language.
Pre Conditions	The Actor is either viewing the default page of SAP before log in or any of the screens of SAP (which are available after login) in one of the languages supported by the package.
Triggers	The actor chooses a language from the list of languages supported by the SAP.
Normal Flow	1. The system would display the list of all languages supported by SAP. 2. The actor would be able to select one language from the list of displayed languages. 3. The current page and all subsequent pages will be displayed in the selected language. All fixed text on screens, drop down list of values, any error or warning messages generated by SAP and help text would be translated in the chosen language. 4. The system would issue an informational message, “To enter data in the selected language, please set the language in your machine”. 5. For logged in SAP users, system would additionally prompt the following messages to the actor: 6. System would prompt actor “Do you wish set this as your default language?” In case actor confirms, system sets the default language of the actor (Primary user id) as per the selected Language Package. 7. In case actor has mapped multiple user ids to his/her logged in id through Configure Multiple SAP User accounts use case, the system would also prompt the actor as “Do you wish to change the Default Language for your secondary user ids as well?” 8. In case actor confirms, system sets the default language for all secondary user ids as per the selected Language Package. Refer Configure Multiple SAP User accounts use case.

Alternative Flows	None
Post Conditions	1. The selected language becomes the current language of the SAP for the actor till she switches to another language or quits the SAP by either by logging out or her session times out. 2. This has the implication that all fixed text on screens; drop down list of values, any error or warning messages generated by SAP and help text will be displayed in the chosen language. This of course applies only to those items that have been translated. 3. For actor as logged in SAP user, system sets the default language of his/her Primary and or secondary User ids as per his/her confirmation.
Exceptions	None
Priority	High
Business Rules	1. SAP will display labels as per the following logic to ensure that labels/help text is always available in at least one language: 2. Display all the /labels/masters/messages text on screens, as translated while creating the selected language package are displayed to the actor. 3. In case no translation(s) is available in current language for some or all labels, then display those label(s) in default English language. 4. The list under Switch Language option would show all the language package names as created through Create/Modify Language Package use case.
Relationships	Extends Main page of SAP. Is Extended By None. Uses Login, if the actor has logged in to the portal.
Special Requirements	1. SAP will support entry and display of languages. 2. System has required UNICODE enabled fonts, Latin and non-Latin scripts such as Hindi, Tamil etc. 3. System reads from left to write.
Assumptions	The Default language of the SAP would always be English.

4.4.5 Forget Password

UC 4.4.5	Forget Password
Version:	00
Context:	This use case is used for Forget Password of SAP Login.
Priority:	High
Frequency:	As and when actor forget the information from SAP.
Primary Actor:	SAP User
Preconditions:	User has clicked on the link available at SAP for Forget Password.
Basic Flow	1. System presents the actor an interface to enter user name and email id: 2. Actor shall enter user id and email id. 3. System will send the new password at registered email id of user. Use Case Ends.
Alternative Flow:	**1. Invalid data** or left blank any required field. Application will check the invalid data or left blank any field before search details. And if found then display the alert messages corresponding to related field. **2. Cancel** If Actor cancels the form then system will reach at home page.
Post Condition:	1. Actor shall successfully get the password.
Special Requirements:	Form field shall be verify from both client and server end.
Unresolved Issues:	

4.4.6 Forget User ID

UC 4.4.6	Forget User ID
Version:	00
Context:	This use case is used for Forget User ID of SAP Login.
Priority:	High
Frequency:	As and when actor forget the information from SAP.
Primary Actor:	SAP User
Preconditions:	User has clicked on the link available at SAP for Forget User ID.
Basic Flow	1. System presents the actor an interface to enter email id:

	2. Actor shall enter email id. 3. System will send the new password at email id of user. Use Case Ends.
Alternative Flow:	**1. Invalid data** or left blank any required field. Application will check the invalid data or left blank any field before search details. And if found then display the alert messages corresponding to related field. **2. Cancel** If Actor cancels the form then system will reach at home page.
Post Condition:	2. Actor shall successfully get the User id.
Special Requirements:	Form field shall be verify from both client and server end.
Unresolved Issues:	

4.4.7 View Agro Met Advisory

UC 4.4.7	**View Expert agro-met advisory**
Version:	00
Context:	This use case starts when any user wants to view advisories related any specific agricultural areas.
Priority:	Normal
Frequency:	As and when required
Primary Actor:	SAP user, farmer, general users
Preconditions:	a) System would active to fetch (Current and updated Weather data comes from all connected observatories from the entire country) from Delhi HQ sources b) System would active to fetch (data) from IMD sources c) System would active to fetch (data) from MET CENTRES sources d) System would active to fetch (data) from AFMU and Research stations e) State, district, block, village data are available in the system
Basic Flow	**Expert agro-met advisory** This use case starts when an actor selects to view the advisory related to weather through the SAP. Actor selects the option presented by the system for viewing local advisory. System presents with an interface that includes:

	a. State, displayed in a list, where actor has to select the desired state name. b. District, displayed in a list, where actor has to select the desired district that corresponds to the selected state name. c. Block, displayed in a list, where actor has to select the desired block that corresponds to the selected district name. d. Village, displayed in a list, where actor has to select the desired village that corresponds to the selected block name. This information is optional. 1) System will provide an option to provide the date and time, in DD/MM/YYYY format and 12 hour format, which actor may fill optionally. 2) System will provide an option to select language from a list of languages. 3) Actor will instruct to fetch data. I. System will furnish the following information on the interface: II. Area of advisory (such as Crop, fishery etc.) III. Date and time IV. Rainfall V. Temperature VI. And advisory based on above condition Use case ends. **2.Map based weather advisory** **System present with a map which can be pointed to** **Whenever pointing device is** **System will present information** **As and when pointing device is moved through the map.**
Alternative Flow:	Logout System will prompt for logout, upon confirmation, it will log out the user Cancel Data not found Reset
Post Condition:	1) No weather data will be saved into the system. 2) The system will record the number of hit. 3) If the user is not registered, system will prompt to register through SAP user registration. 4) System will ask for the mobile registration for SMS alert, if the user is not

	resisted.
Special Requirements:	Based on access of the request, the system will fetch IP address of the location, which would be determined to select default local language in the language list. However, English would be language always available.
Unresolved Issues:	

4.4.8 View Agro-met News

UC 4.4.8	View Agro-met News
Version:	00
Context:	This use case starts when any user wants to view Agro-met News related any specific agricultural areas.
Priority:	Normal
Frequency:	As and when required
Primary Actor:	SAP user, farmer, general users
Preconditions:	a) System would active to fetch (Current and updated Weather data comes from all connected observatories from the entire country) from Delhi HQ sources b) System would active to fetch (data) from IMD sources c) System would active to fetch (data) from MET CENTRES sources d) System would active to fetch (data) from AFMU and Research stations e) State, district, block, village data are available in the system.
Basic Flow	**Agro-Met News** This use case starts when an actor selects to view the Agro-Met News through the SAP. **Actor selects the option presented by the system for viewing local Agro-Met News.** System presents with an interface that includes: A. State, displayed in a list, where actor has to select the desired state name. B. District, displayed in a list, where actor has to select the desired district that corresponds to the selected state name. C. Block, displayed in a list, where actor has to select the desired block that corresponds to the selected district name. I. System will provide an option to provide the date and time in

	DD/MM/YYYY format and 12-hour format, which actor may fill optionally. II. System will provide an option to select language from a list of languages. **2.Map based Agro-Met News** **System present with a map which can be pointed to** **Whenever pointing device is** **System will present information** **As and when pointing device is moved through the map.**
Alternative Flow:	Logout System will prompt for logout, upon confirmation, it will log out the user Cancel Data not found Reset
Post Condition:	1) Agro-Met News data will be saved into the system. 2) The system will record the number of hit. 3) If the user is not registered, system will prompt to register through SAP user registration. 4) System will ask for the mobile registration for SMS alert, if the user is not register.
Special Requirements:	Based on access of the request, the system will fetch IP address of the location, which would be determined to select default local language in the language list. However, English would be language always available.
Unresolved Issues:	

4.4.9 Automatic Alerts on weather aberration

UC 4.4.9	**Automatic alerts on weather aberration**
Version:	00
Context:	This use case starts when any user wants to Subscribe to Newsletter Related any specific agricultural areas.
Priority:	High
Frequency:	Automatic

Primary Actor:	SAP user, farmer, general users
Preconditions:	a) System would active to fetch (Current and updated Weather data comes from all connected observatories from the entire country) from Delhi HQ sources b) System would active to fetch (data) from IMD sources c) System would active to fetch (data) from Remote Sensing weather stations
Basic Flow	**Automatic alerts on weather aberration** This use case starts when an actor **register on the portal,** Automatic alerts on weather aberration **through the SAP.** This is an automatic function System presents with an interface that includes: When the actor **Register their account with all respective fields, Actor will get the** Automatic alerts on weather aberration
Alternative Flow:	Logout System will prompt for logout, upon confirmation, it will log out the user Cancel Data not found Reset
Post Condition:	1. Automatic alerts on weather aberration will not be saved into the system. 2. The system will record the number of hit. 3. If the user is not registered, system will prompt to register through SAP user registration. 4. System will ask for the mobile registration for SMS alert, if the user is not register.
Special Requirements:	Based on access of the request, the system will fetch IP address of the location, which would be determined to select default local language in the language list. However, English will be default language.
Unresolved Issues:	

4.4.10 Subscribe to Newsletter

UC 4.4.10	Subscribe to Newsletter
Version:	00
Context:	This use case starts when any user wants to Subscribe to Newsletter Related any specific agricultural areas.
Priority:	Normal
Frequency:	As and when required
Primary Actor:	SAP user, farmer, general users
Preconditions:	d) System would active to fetch (Current and updated Weather data comes from all connected observatories from the entire country) from Delhi HQ sources e) System would active to fetch (data) from IMD sources f) System would active to fetch (data) from MET CENTRES sources g) System would active to fetch (data) from AFMU and Research stations h) State, district, block, village data are available in the system.
Basic Flow	**Subscribe to Newsletter** This use case starts when an actor **wants to Subscribe to Newsletter through the SAP.** Actor Choose the option presented by the system for wants to Subscribe to Newsletter. System presents with an interface that includes: Enter the **Registered email id and Password** for subscribes the Newsletter for their email accounts.
Alternative Flow:	Logout System will prompt for logout, upon confirmation, it will log out the user Cancel Data not found Reset
Post Condition:	1) Subscribe to Newsletter data will be saved into the system. 2) The system will record the number of hit. 3) If the user is not registered, system will prompt to register through SAP user registration. 4) System will ask for the mobile registration for SMS alert, if the user is not register.

Special Requirements:	Based on access of the request, the system will fetch IP address of the location, which would be determined to select default local language in the language list. However, English would be language always available.
Unresolved Issues:	

4.4.11 View Archives Newsletter

UC 4.4.11	View Archives Newsletter
Version:	00
Context:	This use case starts when any user wants to view old Newsletter Related any specific agricultural areas.
Priority:	Normal
Frequency:	As and when required
Primary Actor:	SAP user, farmer, general users
Preconditions:	a) System would active to fetch (Current and updated Weather data comes from all connected observatories from the entire country) from Delhi HQ sources b) System would active to fetch (data) from IMD sources c) System would active to fetch (data) from MET CENTRES sources d) System would active to fetch (data) from AFMU and Research stations e) State, district, block, village data are available in the system.
Basic Flow	**ARCHIVES NEWSLETTER** This use case starts when an actor **wants to see the Old Newsletter through the SAP.** ACTOR SELECTS THE OPTION PRESENTED BY THE SYSTEM FOR WANTS TO ARCHIVES NEWSLETTER System presents with an interface that includes: Enter the **Registered email id and Password** for **Archives** Newsletter
Alternative Flow:	Logout System will prompt for logout, upon confirmation, it will log out the user Cancel Data not found

	Reset
Post Condition:	1. Archives Newsletter data will be saved into the system. 2. The system will record the number of hit. 3. If the user is not registered, system will prompt to register through SAP user registration. 4. System will ask for the mobile registration for SMS alert, if the user is not register.
Special Requirements:	Based on access of the request, the system will fetch IP address of the location, which would be determined to select default local language in the language list. However, English would be language always available.
Unresolved Issues:	

4.4.12 View Agro climatic zone classification

UC 4.4.12	View **Agro climatic zone classification**
Version	00
Context:	This use case starts when any user wants to view **Agro climatic zone classification** related any specific agricultural areas.
Priority:	Normal
Frequency:	As and when required
Primary Actor:	SAP user, farmer, general users
Preconditions:	a) System would active to fetch (Current and updated Weather data comes from all connected observatories from the entire country) from Delhi HQ sources b) System would active to fetch (data) from IMD sources c) System would active to fetch (data) from MET CENTRES sources d) System would active to fetch (data) from AFMU and Research stations e) State, district, block, village data are available in the system.
Basic Flow	**Agro climatic zone classification** This use case starts when an actor selects to view the **Agro climatic zone classification** through the SAP. **Actor selects the option presented by the system for viewing Agro climatic zone classification.**

	System presents with an interface that includes: National, State and District displayed in a list, where actor has to select the desired National, State and District Zone. • National, displayed in a list, where actor has to select the desired National that corresponds to the selected National Zone. • State, displayed in a list, where actor has to select the desired State that corresponds to the selected National Zone. • District, displayed in a list, where actor has to select the desired district that corresponds to the selected state zone. • Block, displayed in a list, where actor has to select the desired block that corresponds to the selected district Zone. **2.Map based Agro climatic zone classification** **System present with a map which can be pointed to** **Whenever pointing device is** **System will present information** **As and when pointing device is moved through the map.**
Alternative Flow:	Logout System will prompt for logout, upon confirmation, it will log out the user Cancel Data not found Reset
Post Condition:	1. Agro climatic zone classification will be saved into the system. 2. The system will record the number of hit. 3. If the user is not registered, system will prompt to register through SAP user registration. 4. System will ask for the mobile registration for SMS alert, if the user is not register.
Special Requirements:	Based on access of the request, the system will fetch IP address of the location, which would be determined to select default local language in the language list. However, English would be language always available.
Unresolved Issues:	

4.4.13 View Weather based agro Advisory

UC 4.4.13	View Weather based agro Advisory
Version:	00
Context:	This use case starts when any user wants to view Weather based agro Advisory related any specific agricultural areas.
Priority:	Normal
Frequency:	As and when required
Primary Actor:	SAP user, farmer, general users
Preconditions:	a) System would active to fetch (Current and updated Weather data comes from all connected observatories from the entire country) from Delhi HQ sources b) System would active to fetch (data) from IMD sources c) System would active to fetch (data) from MET CENTRES sources d) System would active to fetch (data) from AFMU and Research stations e) State, district, block, village data are available in the system.
Basic Flow	**WEATHER BASED AGRO ADVISORY** This use case starts when an actor selects to view the **Weather based agro Advisory** related to weather through the SAP. Actor chooses the option presented by the system for viewing **Weather based agro Advisory**. System presents with an interface that includes A. **Ministry Policy**, displayed, where actor has to view the govt. Policy (Registered Users). B. **IMD-Pune**, displayed a weather-based agro advisory, where actor has to view the Agro-Met National Bulletin (Registered Users). C. **Met-Center**, displayed a weather-based agro advisory, where actor has to view the Agro-Met AAS Composite Bulletin (Registered Users). D. **Agro Met Field Unit** displayed a weather-based agro advisory, where actor has to view the Agro-Met District Level Bulletin (Registered Users). E. **KVK's** displayed a weather-based agro advisory, where actor has to view the Agro-Met Block Level Bulletin (Registered Users). I. System will provide an option to provide the date and time, in **DD/MM/YYYY format and 12 hour format**, which actor may fill optionally. II. System will provide an option to select language from a list of languages.

	III. Actor will instruct to fetch data. **IV. System will furnish the following information on the interface:** V. Area of advisory (such as Crop, Live and Livestock etc.) VI. Date and time VII. Seven parameters of weather VIII. And advisory based on above condition Use case ends. **2.Map based weather advisory** **System present with a map which can be pointed to** **Whenever pointing device is** **System will present information** **As and when pointing device is moved through the map.**
Alternative Flow:	Logout System will prompt for logout, upon confirmation, it will log out the user Cancel Data not found Reset
Post Condition:	1. No weather data will be saved into the system. 2. The system will record the number of hit. 3. If the user is not registered, system will prompt to register through SAP user registration. 4. System will ask for the mobile registration for SMS alert, if the user is not register.
Special Requirements:	Based on access of the request, the system will fetch IP address of the location, which would be determined to select default local language in the language list. However, English would be language always available.
Unresolved Issues:	

4.4.14 View National PRIORITY AREAS (common areas)

UC 4.4.14	**View National PRIORITY AREAS (common areas)**
Version:	00
Context:	THIS USE CASE STARTS WHEN ANY USER WANTS TO VIEW NATIONAL PRIORITY AREAS

	(COMMON AREAS) RELATED ANY SPECIFIC AGRICULTURAL AREAS.
Priority:	Normal
Frequency:	As and when required
Primary Actor:	SAP user, farmer, general users
Preconditions:	a) System would active to fetch (Current and updated Weather data comes from all connected observatories from the entire country) from Delhi HQ sources b) System would active to fetch (data) from IMD sources c) System would active to fetch (data) from MET CENTRES sources d) System would active to fetch (data) from AFMU and Research stations e) State, district, block, village data are available in the system.
Basic Flow	**NATIONAL PRIORITY AREAS (COMMON AREAS)** This use case starts when an actor selects to view the National PRIORITY AREAS (common areas) related to weather through the SAP. Actor chooses the option presented by the system for viewing National PRIORITY AREAS (common areas). System presents with an interface that includes: A. National PRIORITY AREAS (common areas), displayed, where actor has to view the National PRIORITY Zone, based on irrigation. I. System will provide an option to select language from a list of languages. II. Actor will instruct to fetch data. III. System will furnish the following information on the interface: IV. Area of PRIORITIES: Crops, Live and Livestock V. Date and time VI. PRIORITY Base**:** Rain fed, Irrigation (River/Canals), Dry land VII. And advisory based on above condition Use case ends. **2.Map based National PRIORITY AREAS (common areas)** **System present with a map which can be pointed to** **Whenever pointing device is** **System will present information** **As and when pointing device is moved through the map.**
Alternative Flow:	Logout System will prompt for logout, upon confirmation, it will log out the user

	Cancel Data not found Reset
Post Condition:	1. No weather data will be saved into the system. 2. The system will record the number of hit. 3. If the user is not registered, system will prompt to register through SAP user registration. 4. System will ask for the mobile registration for SMS alert, if the user is not register.
Special Requirements:	Based on access of the request, the system will fetch IP address of the location, which would be determined to select default local language in the language list. However, English would be language always available.
Unresolved Issues:	

4.4.15 View State priority areas (agro climatic zone wise)

UC 4.4.15	View State priority areas (agro climatic zone wise)
Version:	00
Context:	THIS USE CASE STARTS WHEN ANY USER WANTS TO VIEW STATE PRIORITY AREAS (AGRO CLIMATIC ZONE WISE) RELATED ANY SPECIFIC AGRICULTURAL AREAS.
Priority:	Normal
Frequency:	As and when required
Primary Actor:	SAP user, farmer, general users
Preconditions:	a) State, district, block, village data are available in the system. b) System would active to fetch (Current and updated Weather data comes from all connected observatories from the entire country) from Delhi HQ sources c) System would active to fetch (data) from IMD sources d) System would active to fetch (data) from MET CENTRES sources e) System would active to fetch (data) from AFMU and Research stations f) State, district, block, village data are available in the system.
Basic Flow	**STATE PRIORITY AREAS (AGRO CLIMATIC ZONE WISE)**

	This use case starts when an actor selects to view the State **priority areas (agro climatic zone wise)** related to weather through the SAP. Actor chooses the option presented by the system for viewing State priority areas (agro climatic zone wise) related to weather through the SAP. System presents with an interface that includes: A. State priority areas (agro climatic zone wise), displayed, where actor has to view the State priority areas (agro climatic zone wise), based on irrigation. I. System will provide an option to select language from a list of languages. II. Actor will instruct to fetch data. III. System will furnish the following information on the interface: IV. Area of PRIORITIES: Crops, Live and Livestock V. Date and time VI. PRIORITY Base**:** Rain fed, Irrigation (River/Canals), Dry land VII. And advisory based on above condition Use case ends. **2.Map based State priority areas (agro climatic zone wise)** **System present with a map which can be pointed to** **Whenever pointing device is** **System will present information** **As and when pointing device is moved through the map.**
Alternative Flow:	Logout System will prompt for logout, upon confirmation, it will log out the user Cancel Data not found Reset
Post Condition:	1. No weather data will be saved into the system. 2. The system will record the number of hit. 3. If the user is not registered, system will prompt to register through SAP user registration. 4. System will ask for the mobile registration for SMS alert, if the user is not register.
Special Requirements:	Based on access of the request, the system will fetch IP address of the location, which would be determined to select default local language in the language list. However, English would be language always available.

Unresolved Issues:	

4.4.16 Dissemination of advisories

UC 4.4.16	Dissemination of advisories
Version:	00
Context:	THIS USE CASE STARTS WHEN ANY USER WANTS TO VIEW DISSEMINATION OF ADVISORIES.
Priority:	Normal
Frequency:	As and when required
Primary Actor:	SAP user, farmer, general users
Preconditions:	a) System would active to fetch (Current and updated Weather data comes from all connected observatories from the entire country) from Delhi HQ sources b) System would active to fetch (data) from IMD sources c) System would active to fetch (data) from MET CENTRES sources d) System would active to fetch (data) from AFMU and Research stations e) State, district, block, village data are available in the system.
Basic Flow	**DISSEMINATION OF ADVISORIES** This use case starts when an actor selects to view the Dissemination of advisories related to weather through the SAP. Actor selects the option presented by the system for Dissemination of advisories related to weather through the SAP. System presents with an interface that includes: Dissemination of advisories displayed, where actor has to view the Dissemination of advisories on the list, (a) Email, (b) SMS, (c) Radio, (d) Doordarshan, (e) Newspaper If Actor chooses the option **email**, System presents with an interface that includes: 1) ENTER THE REGISTERED EMAIL ID AND PASSWORD FOR SUBSCRIBES FOR THE EMAIL SUBSCRIPTION. 2) If Actor chooses the option **SMS**, System presents with an interface that includes:

	3) Enter the Registered email id and Password Mobile no. Specific Areas are (Crop specific (4) Live and livestock, Plant And plant material, fertilizers, crop insurance) for subscribes the SMS subscription. If Actor chooses the option change mobile no., System presents with an interface that includes: 1) User has clicked on the link available at SAP for Change Mobile No. 2) Actor shall enter the old mobile no. 3) Actor shall enter the new mobile no and again enter the confirmed new mobile no. 4) Actor shall instruct to change mobile no. 5) System will display a message "Your mobile no. Has been modified." 6) System will return back to Home Page. If Actor chooses the option **Radio**, System presents with an interface that includes: 1. Dissemination of advisories displayed, where actor has to view the relay time and date of area specific agro-met advisories. If Actor chooses the option **Doordarshan**, System presents with an interface that includes: 1) Dissemination of advisories displayed, where actor has to view the relay time and date of area specific agro-met advisories and also can view the specific videos of the Advisories and the farmer awareness programs done by AMFU's, Met Centers and IMD-Pune. If Actor selects the option **Newspaper**, System presents with an interface that includes: 1) Dissemination of advisories displayed, where actor has to redirect the link of newspaper (Agro-Met Advisory Page/Column) website based on the IP address of the actor. System will provide an option to select language from a list of languages. Actor will instruct to fetch data. **System will furnish the following information on the interface:** 1) Area of advisory (such as Crop, Live and Livestock etc.) 2) Date and time 3) Seven parameters of weather 4) Weather based on Agro-Met advisory on above condition

	Use case ends.
Alternative Flow:	Logout System will prompt for logout, upon confirmation, it will log out the user Cancel Data not found Reset
Post Condition:	1) No weather data will be saved into the system. 2) The system will record the number of hit. 3) If the user is not registered, system will prompt to register through SAP user registration. 4) System will ask for the mobile registration for SMS alert, if the user is not register.
Special Requirements:	A. SMS process will be intervened by user events. B. All current and updated weather data will be integrated from Delhi HQ and Weather based agro-met advisory data directly connected to the IMD-Pune, Met Centers and 130 AMFU's, all registered users with their mobile number will be able to receive alert SMS'.
Unresolved Issues:	

4.4.17 View and Upload Best Practices (On the basis of agro climatic zone)

UC 4.4.17	View and Upload Best Practices (On the basis of agro climatic zone)
Version:	00
Context:	THIS USE CASE STARTS WHEN ANY USER WANTS TO VIEW BEST PRACTICES (ON THE BASIS OF AGRO CLIMATIC ZONE) RELATED ANY SPECIFIC AGRICULTURAL AREAS.
Priority:	Normal
Frequency:	As and when required
Primary Actor:	SAP user, farmer, general users
Preconditions:	a) System would active to fetch (Current and updated Weather data comes from all connected observatories from the entire country) from Delhi HQ sources b) System would active to fetch (data) from IMD sources c) System would active to fetch (data) from MET CENTRES sources

	d) System would active to fetch (data) from AFMU and Research stations e) State, district, block, village data are available in the system.
Basic Flow	**BEST PRACTICES (ON THE BASIS OF AGRO CLIMATIC ZONE)** This use case starts when an actor selects to view the Best Practices (On the basis of agro climatic zone) related to weather through the SAP. Actor chooses the option presented by the system for viewing Best Practices (On the basis of agro climatic zone) related to weather through the SAP. System presents with an interface that includes: A. Best Practices (On the basis of agro climatic zone) displayed, where actor has to view the Best Practices (On the basis of agro climatic zone) based on General, Extreme Condition and Contingency Plan. If Actor selects the option **General Condition**, System presents with an interface that includes: a) **General Condition** displayed, where actor has to view the best practice of farming done by the farmers on the basis of Agro-met Advisory. b) **Extreme Condition** displayed, where actor has to view the best practice of farming done by the farmers on the basis of Agro-met Advisory. **Actor can uploads their best practices and write their views in the Farmer Corner Section.** 1) If Actor uploads best practice example, System presents with an interface that includes: 2) Actor has to enter the **Registered email id and Password** for the upload the file in the upload box. (Condition Apply: Upload material will be check by the Area specific Nodal officer/Nodal Scientist of the AMFU's and return to the actor email account with unique code for uploading the best practice and Actor has to Enter the **Registered email id and Password and unique code** for the upload the file in the upload box) **If Actor wants write their views, System presents with an interface that includes:** 1. Actor has to enter the **Registered email id and Password** for the write in the farmer section box. (Condition Apply: write up material will be check by the moderator then it will publish on the website) **If Actor selects the option Contingency Plan, System presents with an interface that includes:**

	✓ List, open further, ✓ Extreme Rain ✓ Drought ✓ Extreme Cold ✓ Extreme Snowfall ✓ Extreme Heat ✓ Extreme Humidity ✓ Extreme Wind ✓ Extreme Fog I. **If Actor chooses any of these options,** where actor has to view the best plan for farming given by the IMD-Pune. II. System will provide an option to select language from a list of languages. III. Actor will instruct to fetch data. IV. System will furnish the following information on the interface: V. Area of PRIORITIES: (such as Crop, Live and Livestock etc.) VI. Date and time VII. PRIORITY Base: Rain fed, Irrigation (River/Canals), Dry land VIII. And advisory based on above condition Use case ends.
Alternative Flow:	Logout System will prompt for logout, upon confirmation, it will log out the user Cancel Data not found Reset
Post Condition:	1) No weather data will be saved into the system. 2) The system will record the number of hit. 3) If the user is not registered, system will prompt to register through No weather data will be saved into the system. 4) The system will record the number of hit. 5) If the user is not registered, system will prompt to register through SAP user registration. 6) System will ask for the mobile registration for SMS alert, if the user is not register.
Special Requirements:	Based on access of the request, the system will fetch IP address of the location, which would be determined to select default local language in the language list.

	However, English would be language always available.
Unresolved Issues:	

4.4.18 Upload End user and stakeholder feedback

UC 4.4.18	Upload End user and stakeholder feedback
Version:	00
Context:	THIS USE CASE STARTS WHEN ANY USER WANTS TO UPLOAD END USER AND STAKEHOLDER FEEDBACK RELATED ANY SPECIFIC AGRICULTURAL AREAS.
Priority:	Normal
Frequency:	As and when required
Primary Actor:	SAP user, farmer, general users
Preconditions:	a) System would active to fetch (Current and updated Weather data comes from all connected observatories from the entire country) from Delhi HQ sources b) System would active to fetch (data) from IMD sources c) System would active to fetch (data) from MET CENTRES sources d) System would active to fetch (data) from AFMU and Research stations e) State, district, block, village data are available in the system.
Basic Flow	**END USER AND STAKEHOLDER FEEDBACK** This use case starts when an actor selects to upload the End user and stakeholder feedback related to weather through the SAP. Actor chooses the option presented by the system for upload End user and stakeholder feedback related to weather through the SAP. System presents with an interface that includes: • End user and stakeholder feedback displayed, where actor has to give the End user and stakeholder feedback, based on given advice by the advisories. If Actor uploads the End user and stakeholder feedback, System presents with an interface that includes: • Actor has to enter the **Registered email id and Password** for the upload the file in the upload box. (Condition Apply: query will go to the Area specific Nodal officer/Nodal Scientist

	of the AMFU's and response of the query return to the actor email account and in the same time it will archive on the portal for the general purpose) Use case ends. 1) System will provide an option to select language from a list of languages. 2) System will furnish the following information on the interface: 3) Area of PRIORITIES: (such as Crop, Live and Livestock etc.) 4) Date and time Use case ends. **2.Map based State priority areas (agro climatic zone wise)** **System present with a map which can be pointed to** **Whenever pointing device is** **System will present information** **As and when pointing device is moved through the map.**
Alternative Flow:	Logout System will prompt for logout, upon confirmation, it will log out the user Cancel Data not found Reset
Post Condition:	1) End user and stakeholder feedback will be saved into the system. 2) The system will record the number of hit. 3) If the user is not registered, system will prompt to register through SAP user registration. 4) System will ask for the mobile registration for SMS alert, if the user is not register.
Special Requirements:	Based on access of the request, the system will fetch IP address of the location, which would be determined to select default local language in the language list. However, English would be language always available.
Unresolved Issues:	

4.4.19 Upload End user query redressal

UC 4.4.19	Upload End user query redressal
Version:	00
Context:	THIS USE CASE STARTS WHEN ANY USER WANTS TO VIEW END USER QUERY

	REDRESSAL RELATED ANY SPECIFIC AGRICULTURAL AREAS.
Priority:	Normal
Frequency:	As and when required
Primary Actor:	SAP user, farmer, general users
Preconditions:	a) System would active to fetch (Current and updated Weather data comes from all connected observatories from the entire country) from Delhi HQ sources b) System would active to fetch (data) from IMD sources c) System would active to fetch (data) from MET CENTRES sources d) System would active to fetch (data) from AFMU and Research stations e) State, district, block, village data are available in the system.
Basic Flow	**End USER QUERY REDRESSAL** This use case starts when an actor selects to view the End user query redressal related to weather through the SAP. Actors choose the option presented by the system for viewing End user query redressal related to weather through the SAP. System presents with an interface that includes: a) End user query redressal displayed, where actor has to give the **End user** query redressal**,** based on present weather condition and advice by advisories. If Actor uploads the End user query redressal, System presents with an interface that includes: a) Actor has to enter the **Registered email id and Password** for the upload the file in the upload box. (Condition Apply: query will go to the Area specific Nodal officer/Nodal Scientist of the AMFU's and response of the query return to the actor email account and in the same time it will archive on the portal for the general purpose) Use case ends.
Alternative Flow:	Logout System will prompt for logout, upon confirmation, it will log out the user Cancel Data not found Reset
Post Condition:	1. End user query redressal will be saved into the system.

	2. The system will record the number of hit. 3. If the user is not registered, system will prompt to register through SAP user registration. 4. System will ask for the mobile registration for SMS alert, if the user is not register.
Special Requirements:	Based on access of the request, the system will fetch IP address of the location, which would be determined to select default local language in the language list. However, English would be language always available.
Unresolved Issues:	

4.4.20 Scroll information on current day weather

UC 4.4.20	Scroll information on current day weather
Version:	00
Context:	THIS USE CASE STARTS WHEN ANY USER COMES TO THE WEB PAGE, ON THE BASIS OF THE IP ADDRESS THE LOCAL WEATHER INFORMATION SCROLL STARTS ON CURRENT DAY WEATHER.
Priority:	Normal
Frequency:	Automatic
Primary Actor:	SAP user, farmer, general users
Preconditions:	System would active to fetch (Current and updated Weather data comes from all connected observatories from the entire country) from Delhi HQ sources
Basic Flow	**SCROLL INFORMATION ON CURRENT DAY WEATHER** This is an automatic function. This use case starts when an actor comes to the web page, on the basis of the IP address the local weather information scroll starts on **current day weather.**
Alternative Flow:	When an actor comes out to the web page, it will disappear.
Post Condition:	1. No weather data will be saved into the system. 2. The system will record the number of hit. 3. If the user is not registered, system will prompt to register through SAP user registration.
Special Requirements:	Based on access of the request, the system will fetch IP address of the location, which would be determined the local weather in the seven weather Parameters.

Unresolved Issues:	

4.5 Non-Functional Requirements.

1. The home page of the State Agro-met Advisory System Portal will be accessible using a defined URL across the world by any user through Internet.
2. One should be able to navigate through the State Agricultural Portal Agro-met Advisory System Home page with or without mouse and Keyboard.
3. It will be supported across different O.S. and browser.
4. The home page of State Agricultural Portal and all pages and links across it will have beautiful appearance with good images and banners, links with obvious headings.

4.5.1 Scalability Requirements

Scalability refers to the how the proposed system will be scaled up with need and time. In the current scenario, there will be average 100,000 application users of the system at central, state and village level. At any point of time, no more than 25,000 simultaneous application users would be expected in the system. At any point of time, the software should support a peak load of 25000 concurrent users.

4.5.2 Response Time

The response time should be as follows:

- 90% of the responses should be within 5 sec.
- 5-10 second: For user operation on data (for e.g. sorting of data in a column) or (5 to 50 records per page up to max of 100,000 records)
- 10-20 second: For user awaiting response from the system upon executing a transaction (for e.g. a query/update).
- 1 minute – Unacceptable response time.
- The SMS alerts to reach the users mobile or handheld device in an acceptable time limit from the SMS gateway/applications. Ideally it is within 120 Seconds from information trigger, from central server to national jurisdiction.

4.5.3 Usability

The Screens should be designed for ease of use for non-technical users who do not have any computer knowledge. The GUI design shall be intuitive and task-based without any superfluous design. The design should adopt the following principles:

- Use relative font size so that a user can easily change overall font size from the browser interface.
- Text equivalents should be given for all graphics.
- Application should function even if JavaScript, CSS and Frames are turned off.
- **Navigability** –The user should be able to perform operations without having to navigate through multiple pages/links – No operation should require more than 2 to 3 clicks.
- **Familiarity –** The system's interfaces and navigations should be based on other systems that the users are familiar with.
- **Administration –** The system should not require any administration tasks at the user level. Interfaces should be available for administration/setup operations.
- **Help -** The system should come equipped with Computer based tutorial in English and ten other languages for users to "self-solve" any navigability or operational doubts.
- **Standards Adherence –** The system should adhere to commonly accepted standards of web-design (such as acceptable size of web pages, minimal images, small style sheets etc.)
- **Sever Maintenance Notification –** When any server maintenance operation is on progress, the prior meaningful notification will be provided to the window to inform the users.

4.5.4 Reliability

It is expected that there shall not be any bug and the system shall be tested on end cases to offer user a quality and reliable package. The system should work consistently.

4.5.5 Availability

PIFWAA application shall be up and running and must be available 24x7 and any one should be able to connect to it from anywhere. It should trap all errors and prevent users from accessing unauthorized areas of the application. In case of application or a hardware failure, the system should re-initiate immediately. In case of a possible hardware failure or corruption of database the system administrator should immediately restore the backup.

4.5.6 Security

The system should have protection against

- Unauthorized creation/modification of data - through user name and password authentication as defined for relevant user groups.
- Unauthorized viewing of data - through user name and password authentication as defined for relevant user groups.

- The software should adhere to security guidelines; standards and policies prescribed by NIC's Security Division and should be audited & certified for compliance to these standards by Security Division before it is hosted in Production Environment.
- The software should be protected against any unauthorized access to the software.
- System Administrator should moderate for the audio and video contents those are uploaded into the system to check any objectionable information is not uploaded.
- Configuration is secured with firewalls in place. Secure communication over SSL.
- **Zero Data Loss**: Data base server with clustering and back up with stand by server in case of failure will ensure No data loss.
- **Authentication/Authorization**: Assuming that application will have Single Sign On login feature; where user once logged in, will not have to login again to use other integrated application.

4.5.7 Maintainability

In order to ensure maintainability of the application, the following should be ensured:

- The application will be designed and developed using Open Source Tools and Technologies. Software Code must be modular and well documented
- All the artifacts related to the software such as code, design document, User Manual etc. should be well documented and self-explanatory for any programmer to understand. Detailed documentation shall be available at each stage for easy comprehensions of the application system.
- All documents shall be prepared as per the defined documentation standards.
- The system administrator shall take regular back up of the database.

4.5.8 Portability

The software will be hosted/installed in Linux RHEL 5 and above O/S based server and will be accessed through Windows (XP) based machines using I.E 6.0 or above OR Mozilla 3.5.11 or above browsers.

4.5.9 Language Support

- The system will support the entry and display of :

- Non-Latin scripts such as Hindi, Tamil
- The application will store data using Unicode representation.

- Only languages where Unicode font file and keyboard manager/driver are available will be supported.
- The software will provide local language support for all textual descriptions, help messages etc.
- The system will have an in built mechanism to represent localized languages and fonts.

4.5.10 Interoperability

The software will interoperate with other software applications, which are being developed under National e-Governance Program, Mission Mode Project, in particular Central Agriculture Portal and State Agriculture Portal. The following are the likely points of information exchange/reconciliation:

- State Codes/Names
- Panchayat Codes/Names
- Scheme Code/Names
- Agro met advisory nos. / date
- Agro met zone Name/ NOS.
- Authority list
- Registered Mobile nos.
- Registered emails

4.5.11 Design Constraints

- Localization of SMS services
- Handset compatibility for vernacular languages
- Established service oriented architecture for pulling agro-met data.
- Farmer's data linked with NARP zones for localized dissemination of advisories.

4.6 Logical Database Requirements

Sl.NO	Functions	Information Will Be Used
1.	Authorities	**Authority List Data Table**
2.	Latest Agro-Met News and Events	Result from the table of IMD Pune (7parametres Based upon the Agro zones) and their Agro Advise from the advisories. Final table is **News Data Table**
3.	Subscribe to Agro-met News Letter a) Agro-Met News Letter Archive	**User News Event Mapping Data Table**
4.	Agro-Met Climatic Zone Classification a) National Level b) State Level	**Zone Data Table** **a) National Agro Climatic Zone** **b) State Agro-Met Climatic Zone**
5.	Weather Based agro Advisory a) National Agro-met Advisory Bulletin) b) State Agro-met Advisory Bulletin) c) District Agro-met Advisory Bulletin d) Block/Panchayat Agro-met Advisory Bulletin	**Zone Data Table** **a) National Master Data** **b) State Master Data** **c) District Master Data** **d) Block Master Data** **e) Panchayat Data** **User Data Table**
6.	Dissemination Of Advisories Email/SMS/Radio/TV/Newspaper/ IVRS	**SMS Data Table** **SMS data Language Data Table** **SMS Trigger data** **User Data Table** and also use for emails.
7.	Best Practices a) General Condition b) Extreme Condition	**Html Page**
8.	Grievance Management a) Feedback b) Query	**Grievance Type Data** **Grievance Management Data Table**
9.	Scroll Information on Current day Weather	**Weather Information Table from Delhi HQ**
10.	External Useful Agro-Met Links	**Html Page**

11.	Service Provider (Telecom Partners)	**Html Page**

4.6.1 Data Store: Demographic State Master Data

Data Element	Data format	Remarks
State LRC (SLRC)	Numeric	Ref No of generic data element for its meta data: G02.01 (Annexure C) A unique land region code allocated by Office of RGI at National level, for Administrative unit, State for the purpose of interoperability among e-Governance applications, while exchanging the Land region related data
SNE	Numeric	Ref No of generic data element for its meta data: G02.02-01 (Annexure C) State Name in English
SNOL	Numeric	Ref No of generic data element for its meta data: G00.02-22 (Annexure C) Name of State in Recognized Official Language (Varchar)
SOLC	Numeric	Ref No of generic data element for its meta data: G00.05-01(Annexure C) State Recognized Official Language Code (Varchar Storage in UNICODE Standard UTF-8)
NSD	Numeric	Nomenclature of Sub-District in the State (Sub district, Tahsil, Taluk, Revenue circle etc.) (Refer CD02.02 in Annexure C for Complete list)
SAreaSKM	Numeric	Ref No of generic data element for its meta data: G00.02-22 (Annexure C) Area of the State in Sq.km
GS	Numeric	Ref No of generic data element for its meta data: G02.05 (Annexure C) Geocode of the state (to be taken up in Phase-II) (Decimal (15,3))
VNS	Character	Ref No of generic data element for its meta data: G00.08 (Annexure C) Defines Version number of the data record to be used for tracing history of changes in the values of the record related to the State data
DOUS	Date	Ref No of generic data element for its meta data: G00.01(Annexure C) Date of last Update of the record (dd/mm/yyyy)

4.6.2 Data Store: Sub-District Master Data

Data element	Data format	Description of Data element
Sub-District LRC (SDLRC)	Numeric	Ref No of generic data element for its meta data: G02.01(Annexure C) A unique land region code allocated by Office of RGI at National level, for Administrative unit, Sub-District for the purpose of interoperability among e-Governance applications, while exchanging the Land region related data
SLRC	Numeric	Ref No of generic data element for its meta data: G02.01 (Annexure C) Parent State Land Region code for Sub District
DLRC	Numeric	Ref No of generic data element for its meta data: G02.01(Annexure C) Parent District Land Region code
SDNE	Numeric	Ref No of generic data element for its meta data: G02.02-01(Annexure C) Sub- District name in English (Varchar Storage in UNICODE Standard UTF-8)
SDNL	Numeric	Ref No of generic data element for its meta data: G02.02-02 (Annexure C) Sub- District name in Recognized Official Language of the State
NSDT	Character	Nomenclature of Sub-District used in the state: -Tahsil -Taluk -C.D. Blocks -Sub Division -Circle -R.D Blocks -Mandal -Police Station (For the purpose of standardization, the above nomenclatures used by various states would mean Sub-District only)
SDAreaSKM	Numeric	Ref No of generic data element for its meta data: G00.02-22 (Annexure C) Area of the Sub District in Sq.km (Decimal (15,3))
GCSDC	Character	Ref No of generic data element for its meta data: G02.05 (Annexure C) Geocode of the Sub District (to be taken up in Phase-II)
VNSD	Numeric	Ref No of generic data element for its meta data: G00.08 (Annexure C) Defines Version number of the data record to be used for tracing history of changes in the values of the record related to the Sub-District data
DOUSD	Date	Ref No of generic data element for its meta data: G00.01 (Annexure C) Date of last Update of the record (dd/mm/yyyy)

4.6.3 Data Store: Directory of Rural Land Region

Data Element	Data format	Remarks
Village LRC (VLRC)	Numeric	Ref No of generic data element for its meta data: G02.01 (Annexure C) A unique code allocated by Office of RGI at National level, for administrative unit, Revenue Village for the purpose of interoperability among e-Governance applications, while exchanging the Land region related data
SLRC	Numeric	Ref No of generic data element for its meta data: G02.01 (Annexure C) Parent State Land Region code
DLRC	Numeric	Ref No of generic data element for its meta data: G02.01 (Annexure C) Parent District Land Region code
SDLRC	Numeric	Ref No of generic data element for its meta data: G02.01 (Annexure C) Parent Sub District Land Region code
VNE	Numeric	Ref No of generic data element for its meta data: G02.02-01 (Annexure C) Rural Land region (Revenue Village) name in English
VNL	Numeric	Ref No of generic data element for its meta data: G02.02-02 (Annexure C) Rural Land Region (Revenue Village) Name in Recognized Official Language of the State (Varchar Storage in UNICODE Standard UTF-8)
VStatus	Character	Ref No of generic data element for its meta data: (Annexure C) Current Status of Rural Land U- Un-inhabitant I- Inhabitant T- Notified as town Note: Reserve Forest Area (RFA) and Census Town (CT) also included with indication of RFA and CT suffixed with the name of the rural land region within brackets
VTLRC	Numeric	Ref No of generic data element for its meta data: G02.01 (Annexure C) In case of Vstatus = “T”, Land region code of the town in which revenue village got associated
VAreaSKM	Numeric	Ref No of generic data element for its meta data: G00.02-22 (Annexure C) Area of the Rural Land region (Revenue village) in Sq.km (Decimal (15,3))

GV	Numeric	Ref No of generic data element for its meta data: G02.05 (Annexure C) Geocode of the Rural Land Region Revenue village) (to be taken up in Phase-II)
VNV	Character	Ref No of generic data element for its meta data: G00.08 (Annexure C) Defines Version number of the data record to be used for tracing history of changes in the values of the record related to the Village data
DOUV	Date	Ref No of generic data element for its meta data: G00.01 (Annexure C) Date of last Update for record (dd/mm/yyyy)

4.6.4 Data Store: Directory of Urban Land Region (Town)

Data Element	Data format	Remarks
Town LRC (TLRC)	Numeric	Ref No of generic data element for its meta data: G02.01 (Annexure C) A unique code allocated by Office of RGI at National level, For Urban Land Region (Town) For the purpose of Interoperability among e-Governance applications, while Exchanging the Land region Related data Here, Town can be a Town Panchayat/Census Town/Municipality, Corporation or a Notified Area
SLRC	Numeric	Ref No of generic data element for its meta data: G02.01 (Annexure C) Parent State Land Region code
DLRC	Numeric	Ref No of generic data element for its meta data: G02.01 (Annexure C) Parent District Land Region Code (For Addressing, in the case of Town spanning across two or more Districts, it will be indicated by value 0, and detailing will be given through linkage with another code directory CD02.05-01 Annexure 7)
SDLRC	Numeric	Ref No of generic data element for its meta data: G02.01 (Annexure C) Parent Sub-District Land Region code (For Addressing, in the case of Town spanning across two or more Sub Districts, it will be indicated by value 0, and detailing will be given through linkage with another code directory CD02.05-01) (Annexure C)
TNE	Character	Ref No of generic data element for its meta data:

		G02.02-01 (Annexure C) Urban Land Region (Town) Name in English
TNL	Numeric	Ref No of generic data element for its meta data: G02.02-02 (Annexure C) Urban Land Region (Town) Name in Recognized Official Language of the State (Varchar Storage in UNICODE Standard UTF-8)
Town Status	Character	Status of Urban Land Region (Town) C.B. Cantonment board/Cantonment C.M.C City Municipal Council E.O Estate Office G.P Gram Panchayat I.N.A Industrial Notified Area I.T.S. Industrial Township M Municipality M.B. Municipal Board M.C Municipal Committee M.Cl Municipal Council M.Corp. Municipal Corporation/Corporation N.A. Notified Area N.A.C Notified Area Committee/Notified Area Council N.P Nagar Panchayat N.T Notified Town N.T.A Notified Town Area S.T.C Small Town Committee T.C. Town Committee/Town Area Committee T.M.C Town Municipal Council T.P Town Panchayat T.S. Township
TAreaSKM	Numeric	Ref No of generic data element for its meta data: G00.02-22 (Annexure C) Area of the Urban Land region (Town) in Sq.km
GT	Numeric	Ref No of generic data element for its meta data: G02.05 (Annexure C) Geocode of the Town (to be Taken up in Phase-II) (Decimal 15,3)
VNT	Character	Ref No of generic data element for its meta data: G00.08 (Annexure C) Defines Version no. of record
DOUT	Date	Ref No of generic data element for its meta data: G00.01 (Annexure C) Date of last Update for record (dd/mm/yyyy)

4.6.5 Data Store: Zone Master Data

The system shall provide for the following data elements:

Data Element	Data Format	Remarks
ACZ_Code (Agro-Climatic Zone)	Numeric	12
ACZ_Name	Character	ABC
State_Id	Numeric	123
State_Name	Character	Abcd
Region_Id	Numeric	123
Region_Name	Character	Abcd
District_Id	Numeric	1234
District_Name	Character	Abcd
Tehsil/Taluka_Id	Numeric	12345
Tehsil/Taluka_Name	Character	Abcd
Block_Id	Numeric	12346
Block_Name	Character	Abcd
Village_Id	Numeric	1234567
Village_Name	Character	Abcd
Pincode	Numeric	1234567
Regional_Language_Id	Numeric	1234567
Regional_Language	Character	Abcd

4.6.6 Data Store: Weather Master Data

Data Element	Data Format	Remarks

IMD_HQ_Id	Numeric	12
IMD_HQ_Name	Character	ABC
IMD_Regional_Centres_Id	Numeric	123
IMD_Regional_Centres_Id_Name	Character	Abcd
IMD_Met_Centres_Id	Numeric	123
IMD_Met_Centres _Name	Character	Abcd
AMFU_Id	Numeric	1234
AMFU _Name	Character	Abcd
Remote_Sensing_Station_Id	Numeric	12345
Remote_Sensing_Station _Name	Character	Abcd
ISRO_Id	Numeric	12346
IP_Address	Numeric	12346
Weather_Parameters_Id	Numeric	12346
Max_Temp_Value	Numeric	1234567
Min_Temp_Value	Numeric	1234567
Max_Humidity	Numeric	1234567
Min_Humidity	Numeric	1234567
Wind_Speed	Numeric	1234567
Wind_Direction	Numeric	1234567
Rainfall	Numeric	1234567
Weather_Agro_Met_Advisory_Id	Numeric	1234567
Weather_Agro_Met_Advisory	Character	Abcd
Warning_Alerts_Id	Numeric	1234567
Warning_Alerts	Character	Abcd

4.6.7 Data Store: User Data

The system shall provide for the following data elements:

Data Element	Data Format	Remarks
User_Id	Numeric	1
User_Name	Character	ABC
User_Address	Alpha-Numeric	ABCD-123
District_Id	Numeric	12
State_Id	Numeric	1234
Region_Id	Numeric	1234
District_Id	Numeric	1234
Tehsil/Taluka_Id	Numeric	1234
Block_Id	Numeric	1234
Village_Id	Numeric	1234
Pin Code	Numeric	1234
Regional_Language_Id	Numeric	1234
Local_Language	Character	ABCDE
Mobile_Number	Numeric	91-9811047974
Allow_SMS	Boolean	True/False
Telephone_number	Numeric	001-2345675
Email	Character	abc@def.....
Fax	Numeric	001-2345675
Status	Character	ABCDE
Role Id	Numeric	12345

4.6.8 Data Store: Login Audit Data

The system shall provide for the following data elements:

Data Element	Data Format	Remarks
Login Date_Time	Date Time	DD/MM/YYYY
Logout Date_Time	Date Time	DD/MM/YYYY
User_Id	Numeric	12
Record_Created_By	Character	ABC
Creation_Date	Date Time	DD/MM/YYYY
Last_Modified_By	Character	ABC

Last_Modified_Date	Date Time	DD/MM/YYYY
Ip_Address	Character	ABC
Session_Id	Character	ABCD

4.6.9 Data Store: User Role Data

The system shall provide for the following data elements:

Data Element	Data Format	Remarks
Role_Id	Numeric	12
User_role_name	Character	ABC
User_role	Numeric	12
State_ID	Numeric	12
State_name	Character	ABCDE
ACZ_ID	Numeric	12
ACZ_Name	Character	ABCDE

4.6.10 Data Store: Authority List Data

Data Element	Data Format	Remarks
Authority_Id	Numeric	12
State_ID	Numeric	12
Region_Id	Numeric	12
District_Id	Numeric	12
Tehsil/Taluka_Id	Numeric	12
Block_Id	Numeric	12
Authority_name	Character	ABC
Authority_designation	Character	ABCD
Authority_photo	Character	ABCDE
Authority_ Addressal	Character	ABCDEF
Authority_Email	Character	abc@def.....
Authority_Phone_No	Numeric	1234567890

4.6.11 Data Store: News Data

Data Element	Data Format	Remarks
News_Id	Numeric	12
User_id	Numeric	12
News_details	Character	ABC
News_map	Character	ABCD
News_timestamp	Date Time	DD/MM/YYYY
Status	Character	ABCDE

4.6.12 Data Store: Event Data

Data Element	Data Format	Remarks
Event_Id	Numeric	12
User_id	Numeric	12
State_id	Numeric	12
Region_Id	Numeric	12
District_id	Numeric	12
Tehsil/Taluka_ID	Numeric	12
Block_id	Numeric	12
Village_ID	Numeric	12
Pincode	Numeric	12
Event_details	Character	ABC
Event_map	Character	ABCD
Event_start_timestamp	Date Time	DD/MM/YYYY
Event_end_timestamp	Date Time	DD/MM/YYYY
Status	Character	ABCDE

4.6.13 Data Store: User News Event Mapping Data

Data Element	Data Format	Remarks
Event_Id	Numeric	12
User_id	Numeric	12
Status	Numeric	123

4.6.14 Data Store: Grievance Type Data

Data Element	Data Format	Remarks
Grievance_Id	Numeric	12
Grievance_type	Character	12

4.6.15 Data Store: Grievance Management Data

Data Element	Data Format	Remarks
Grievance_Id	Numeric	12
User_Name	Character	ABC
User_Mobile No	Numeric	12
User_Email_id	Character	ABCD
State_id	Numeric	123
Region_Id	Numeric	123
District_id	Numeric	1234
Tehsil/Taluka_ID	Numeric	1234
Block_id	Numeric	1234
Village_ID	Numeric	1234
Pincode	Numeric	1234
Grievance_type	Character	Abcde
Grievance_details	Character	Abcde
Submission_date	Date Time	DD/MM/YYYY

4.6.16 Data Store: SMS Data

Data Element	Data Format	Remarks
SMS_Id	Numeric	12
SMS_Details	Character	Not more then 160 character
User_id	Numeric	SMS details created by
Date	Date Time	DD/MM/YYYY

4.6.17 Data Store: SMS Language Data

Data Element	Data Format	Remarks
SMS_Id	Numeric	12
Region_Language id	Numeric	123
User_id	Numeric	12
Date	Date Time	DD/MM/YYYY

4.6.18 Data Store: Trigger SMS Data

Data Element	Data Format	Remarks
SMS_Id	Numeric	12
User_id	Numeric	12
Region_Language id	Numeric	123
Transaction_Id	Numeric	1234
Date	Date Time	DD/MM/YYYY
No_of_SMS	Numeric	1234s

4.7 Other Requirements

c. This section lists the other non-functional requirement related to installation/un-installation /upgrades of IDSQP application. A non-technical person shall be able to setup and run the IDSQP application.

4.7.1 Backup

d. An automated and scheduled data backup mechanism shall be provided which will write a backup of the data to one of the system's disks. From there, the backup date can be manually written to CD or tape if required. The data backup should cover data held in a database and any data held outside of the database such as files uploaded through the software.

4.7.2 Recovery

e. A simple manual data recovery procedure will be provided to recover the data from a data backup when required by the system administrator. The data backup will be used to recover the data in the event of a disk corruption or database corruption.

4.7.3 Data Retention

f. The latest data on the Server will be kept for the seasons of the two calendar years. The data for more than five years is to be backed up on to a CD and remove from the Server.

4.7.4 Customer/User Training

g. It is proposed that NIC will conduct a training programme for 5 days at NIC, HQ to fully train selected IDSQP Administrator on the installation, use, backup, recovery, plan creation/updation and problem diagnosis. These Administrators will become “IDSQSFP Master Trainers (also known as Trainers of Trainers) who will then train IDSQSFP users in the use of the software. (Consultation with NIC require on this point)

4.7.5 Audit Trail

The Software shall offer a comprehensive report on the user actions (changes made with time stamp) through audit trail and will be maintained in log server in identified government domain.

5 Web View of CAP

5.1 Home Page View

The Home page view of State Agriculture Portal is as shown below.

6 Agro-met Advisory Service View

6.1 The Agro-met Advisory Service Section view of State Agriculture Portal is as shown below.

7 Annexure A – Sample bulletins

7.1 National Level Advisory bulletin issued by IMD.

National Agro met Advisory Bulletin

Thursday, 15th December, 2011

(For the period 15th to 19th December, 2011)

Satellite image 0600 UTC dated 16th December, 2011

Issued by

National Agro meteorological Advisory Service Centre

Agricultural Meteorology Division

India Meteorological Department, Shivajinagar, Pune

Executive Summary

Rainfall occurred in some districts of Tamil Nadu and Kerala during last week. No significant rain occurred or dry weather prevailed over remaining parts of the country. Due to excess rainfall during last week of November in Tamil Nadu, some areas under rice and horticultural crops have been submerged in Tamil Nadu especially in Kanchipuram, Thiruvallur, Villupuram, Cuddalore, Nagapattinam, Thanjavur, Thiruvarur, Tirunelveli and Kanyakumari districts. Due to continuous submergence of rainwater and excess water released through dams, growth of rice crops is likely to be adversely affected in these areas. Farmers in flood affected areas of Thanjavur, Nagappattinam and Thiruvarur districts of the Cauvery Delta Zone of Tamil Nadu are advised to undertake top dressing of 22 kg urea, 18 gypsum and 4 kg neem cake mixed with 17 kg MOP to avoid nutrient deficiency.

As rain / snowfall would occur at many places over Jammu & Kashmir and Himachal Pradesh during next 24 hours, farmers are advised to postpone irrigation to the standing crops in these States. No significant rainfall will occur or dry or mainly dry weather is likely to prevail over the remaining parts of the country. In view of realized excess rainfall in Alappuzha, Kollam and Pathanamthitta districts in Kerala, farmers are advised to postpone irrigation to the standing crops. As mainly dry weather prevailed over most parts of the country, farmers are advised to apply irrigation to the crops in these regions.

Farmers are advised to undertake sowing of late wheat and transplanting of Onion, Tomato, Cauliflower, Cabbage, knolkhol and broccoli in Delhi, sowing of late wheat, cumin, fenugreek, palak, coriander, carrot, radish, turnip and beet, transplanting of tomato and planting of garlic and onion in Uttar Pradesh, nursery sowing of apricot and apple in Jammu & Kashmir, sowing late wheat, pea, carrot and radish and planting of

garlic in Madhya Pradesh, sowing of wheat, gram, pea, moong, sunflower, mustard and planting of potato in Chhattisgarh, sowing of linseed, gram, coriander, transplanting of cauliflower and cabbage and planting of onion, garlic and potato in Orissa, sowing of wheat, barley, linseed, gram, pea and lentil and planting of potato in Jharkhand, planting of potato and transplanting of cabbage and cauliflower in West Bengal, sowing of late wheat, maize and planting of potato in Gujarat and sowing of lentil and pea as *paira* crops in fields ready for harvesting of *aman* rice in Tripura.

Due to prevailing weather, incidences of wooly aphids in sugarcane and pod fly in red gram in Karnataka, bacterial leaf blight, bacterial leaf streak and leaf folder in *samba* rice in Tamil Nadu, pseudo stem weevil and leaf folder in rice in Kerala, *Heliothis* in red gram, *Fusarium* wilt in Bengal gram, aphids in safflower, thrips, mites, die-back, and powdery mildew in vegetables and fruits and powdery mildew in coriander in Andhra Pradesh, leaf eating insects and powdery mildew in pea in Jharkhand and semilooper in cauliflower in Madhya Pradesh are noticed below economic threshold levels. Farmers are advised to undertake appropriate plant protection measures to control the pests and diseases.

Distribution of rainfall of the country during week ending on 07.12.11

State/District	Actual (mm)	% Dep.
Kerala		
Alappuzha	**53**	**168**
Kannur	**1**	**-95**
Ernakulam	**25**	**115**
Idukki	**15**	**-7**
Kasaragod	**0.4**	**-94**
Kollam	**55**	**187**
Kottayam	**42**	**233**
Kozhikode	**5**	**-53**
Malappuram	**2**	**-77**
Palakkad	**6**	**-38**
Pathanamthitta	**60**	**202**
Thiruvananthapuram	**15**	**-32**
Thrissur	**2**	**-80**
Wyanad	**7**	**-4**
Tamil Nadu		
Chennai	**0**	**-100**
Coimbatore	**3.7**	**-78**
Cuddalore	**4.6**	**-94**

Dharmapuri	**0**	**-100**
Dindigul	**1.7**	**-94**
Erode	**0.9**	**-95**
Kanchipuram	**0**	**-100**
Kanyakumari	**26**	**27**
Karur	**0.1**	**-99**
Krishnagiri	**0**	**-100**
Madurai	**12.2**	**-34**
Nagapattinam	**3.1**	**-97**
Namakkal	**1.7**	**-89**
Nilgiris	**0.9**	**-97**
Perambalur	**1.5**	**-95**
Puducherry	**0**	**-100**
Pudukottai	**6.4**	**-83**
Ramanathapuram	**17.6**	**-59**
Salem	**0.6**	**-97**
Sivaganga	**10.7**	**-62**
Thanjavur	**4.6**	**-92**
Theni	**29.4**	**89**
Tirunelveli	**41.8**	**48**
Tiruvallur	**0**	**-100**
Tiruvannamalai	**0**	**-100**
Tiruvarur	**0.7**	**-99**
Toothukudi	**12.7**	**-59**
Trichy	**4.2**	**-85**
Vellore	**0**	**-100**
Villupuram	**0**	**-100**
Virudhunagar	**11.6**	**-40**

(20% or more) excess rainfall (-60 to -99 %) scanty rainfall

(-19 to +19%) normal rainfall (-100%) no rainfall

(-20 to -59%) deficient rainfall *Data not available

Contour maps for Mean Maximum, Minimum Temperature and their anomaly for the week ending on 14.12.2011

Actual Mean Maximum temperature ranged between 32 to 360C over most parts of Gujarat, Saurashtra & Kutch, Maharashtra (except Vidarbha), Andhra Pradesh, North Interior Karnataka, Lakshadweep Islands, some parts of West Rajasthan, West Madhya Pradesh, Coastal Karnataka, 24 to 280C over most parts of Uttarakhand, Punjab, Haryana, Delhi, Uttar Pradesh, Bihar, Jharkhand, Sikkim, Nagaland, Manipur, some parts of Jammu & Kashmir, Himachal Pradesh, Gangetic West Bengal, Arunachal Pradesh, Mizoram, Chhattisgarh, Madhya Pradesh, South Interior Karnataka, Kerala, 20 to 240C over most parts of Jammu & Kashmir, Himachal Pradesh, 16 to 200C over some parts of Jammu & Kashmir, Himachal Pradesh, 28 to 320C over remaining parts of the country. Actual Mean Maximum temperature 40C above over most parts of Andhra Pradesh, Karnataka, Tamil Nadu, Lakshadweep, Andaman & Nicobar Islands, some parts of Jammu & Kashmir, Himachal Chhattisgarh, Orissa, Madhya Maharashtra, Marathwada, East Madhya Pradesh, Kerala, 0 to 20C over most parts of Uttarakhand, Uttar Pradesh, Haryana, Delhi, Bihar, Jharkhand, West Bengal & Sikkim, Manipur, Mizoram, Tripura, some parts of Rajasthan, Punjab, Himachal Pradesh, Assam & Meghalaya, Orissa, Chhattisgarh, Konkan, Madhya Pradesh, Vidarbha, Gujarat, Saurashtra & Kutch, -2 to 00C over some parts of Haryana, West Uttar Pradesh, -4 to -20C over some parts of West Uttar Pradesh, 2 to 40C over remaining parts of the country.

Actual Mean Minimum Temperature ranged between 240C and above over most parts of Lakshadweep Islands, 20 to 240C over most parts of Tamil Nadu, Kerala, Andaman & Nicobar Island, some parts of Saurashtra & Kutch, Coastal Andhra Pradesh, Rayalaseema, 16 to 200C over most parts of Saurashtra & Kutch, Gujarat, Konkan & Goa, Madhya Maharashtra, Karnataka, Andhra Pradesh, Mizoram, Tripura, some parts of West Rajasthan, West Bengal, Coastal Orissa, Madhya Maharashtra, Marathwada, Tamil Nadu, Kerala, 8 to 120C over most parts of Punjab, Himachal Pradesh, some parts of Jammu & Kashmir, Uttarakhand, Uttar Pradesh, Haryana, Chhattisgarh, Orissa, East Madhya Pradesh, 4 to 80C over some parts of Jammu & Kashmir, Himachal Pradesh, 12 to 160C over remaining parts of the Country. Minimum Temperature anomaly between 40C and above over some parts of West Rajasthan, -2 to 00C over most parts of Jammu & Kashmir, Himachal Pradesh, Bihar, Jharkhand, Assam & Meghalaya Arunachal Pradesh, Nagaland, Manipur, Orissa, Chhattisgarh, North Interior Karnataka, some parts of East Rajasthan, Punjab, Haryana, Madhya Pradesh, Kerala, Maharashtra, Gujarat, South Interior Karnataka, -4 to -20C over some parts of Chhattisgarh, Orissa, Telengana, West Madhya Pradesh, North Madhya Maharashtra, 0 to 20C over remaining parts of the Country.

Weather Forecast

(Valid upto1430 hours of 11th December, 2011)

Major Feature of Weather Forecast upto1430 hours IST of 11th December, 2011

1. Very dense fog (visibility 50 m or less) would occur over many parts of Bihar, Uttar Pradesh and dense fog (visibility 200 m or less) over parts of Haryana, Delhi and Punjab in the morning / early morning hours during next 24 hours.
2. Rain/snowfall would occur at many places over Jammu & Kashmir and Himachal Pradesh during next 24 hours and decrease thereafter. Rain/snowfall would occur at a few places over Uttarakhand during next 48 hours and decrease thereafter.
3. Light rain/thundershowers would occur at a few places over Punjab and north Haryana and at one or two places over south Haryana and west Uttar Pradesh during next 24 hours and mainly dry thereafter.
4. Rain/thundershowers would occur at one or two places over Sub-Himalayan West Bengal & Sikkim, Assam, Arunachal Pradesh and south peninsular India during next 48 hours and increase thereafter.
5. Rain/thundershowers would occur at one or two places over Andaman & Nicobar Islands during next 24 hours and increase thereafter.
6. Mainly dry weather would prevail over remaining parts of the country.
7. No significant change in minimum temperatures over northwest and central India during next 24 hours and fall by 3-4°C thereafter.
8. Fog condition over Indo-Gangetic plains will improve from 10th onwards due to strong & dry northwesterly wind flow.

Weather Warning

- Visibility would reduce to 50 m or less in the morning/early morning hours over many parts of Uttar Pradesh and Bihar in very dense fog during next 24 hours.
- Visibility would reduce to 200 m or less in the morning/early morning hours over some parts of Haryana, Delhi and Punjab in dense fog during next 24 hours.

Weather Outlook up to 1430 hours IST of 13th December, 2011

- Rain/snow would occur at one or two places over western Himalayan region.
- Rain/thundershowers would occur at a few places over coastal Tamilnadu and northeastern states.

Aridity Anomaly Chart (Northeast Monsoon season)

Period from (03.12.11 to 09.12.11)

Areas having severe and moderate arid conditions are indicated below:

Areas affected by severe arid conditions:

- South Western part of South Interior Karnataka and adjoining northwestern part of Kerala.

- Isolated areas around Machilipatnam, Ongole (Coastal Andhra Pradesh), Cuddapah (Rayalaseema) and Tirupattur (Tamil Nadu).

Areas affected by moderate arid conditions:

- Northern and central part of Coastal Andhra Pradesh, adjoining southern part of Rayalaseema and southern part of South Interior Karnataka.
- Isolated area around Madurai (Tamil Nadu).

Zone wise Agro met Advisories

NORTHEAST INDIA [ARUNACHAL PRADESH, NMM&T, ASSAM, MEGHALAYA]

- **Realized Rainfall:** No significant rain occurred over the States of the region during last week.
- **Rainfall Forecast:** Rain / thundershowers would occur at one or two places over Assam and Arunachal Pradesh during the period. Mainly dry weather is likely to prevail over the remaining States of the region during the period.

Advisories

A. As there was no significant rain during last few weeks in most of the districts of the States of the region and no significant rain is likely to occur during the period, farmers are advised to apply irrigation to the standing crops.
B. In Assam, farmers are advised to complete sowing of Potato, Onion, Garlic, Tomato, Radish, *and Rabi* Pulses etc. Continue sowing of Ginger, Wheat, rapeseed and Mustard etc.
C. Farmers in Assam are also advised to continue harvesting of matured *Sali* Rice and advised to continue preparation of nursery beds for *boro* rice.
D. In the Hill Zone of Assam, farmers are advised to continue harvesting of matured *sali* rice and continue planting of potato.
E. Farmers in Upper Brahmaputra Valley Zone of Assam are advised to continue preparation of nursery beds for *boro* rice, sowing of tomato, rapeseed and mustard and planting of potato. Farmers in are also advised to undertake land preparation and sowing of *rabi* pulses like lentil, rajmah, pea, lathyrus etc.
F. As dry weather is prevailing, farmers in Barak Valley Zone of Assam are advised to undertake regular intercultural operation and irrigation in cauliflower, onion and garlic and to continue transplanting 4 to 6 weeks old tomato seedlings in the main field. Avoid water stress situation at head formation stage of early sown cabbage and knolkhol crops.
G. Farmers in Arunachal Pradesh are advised to undertake sowing of *rabi* crops like pea, mustard etc. and transplanting of vegetables like cabbage, cauliflower, knolkhol and other Cole crops.
H. Farmers in Mid Tropical Plain Zone of Tripura are advised to undertake planting of potato. Taking the advantage of dry weather, also undertake harvesting of *aman* rice. Farmers also advised to sow short duration legume crops like lenil, peas in between harvesting of *aman* rice and sowing of *boro*

rice, which also help to protect the soil health of the field by conserving nitrogen.

I. Farmers in Temperate Sub Alpine Zone of Meghalaya are advised to continue nursery bed preparation and sowing of *boro* rice, potato and *rabi* onion.

J. Farmers of Sub tropical Plain Zone of Manipur are advised to complete transplanting of tomato, onion, cabbage, cauliflower etc., sowing of pea, broccoli, rapeseed and mustard and planting of potato.

K. Farmers in Mizoram are advised sowing of lentil after harvesting of rice under zero tillage operation for utilization of residual soil moisture. Continue sowing of cole crops and tomato.

L. Suitable varieties of the crops for sowing or transplanting are mentioned in **Annexure II.**

M. In Mid Tropical Plain Zone of Tripura, due to prevailing weather there is infestation of pseudo stem weevils on banana. Farmers are advised for killing of weevils and removal of dried leaves. There is also chance of attack of aphids in toria due to prevailing cloudy weather condition. Farmers are advised to monitor the crops and spray Monocrotophos @ 2 ml per liter of water to control the attack.

N. In Kolasib region of Mizoram, decrease in sunshine hours with fluctuation of humidity is congenial for attack of the aphids in cole crops, tomato, pea and beans; farmers are suggested to take appropriate measures. Due to prevailing weather, there is chance of fruit fly and powdery mildew attack on cucurbits; to control powdery mildew on cucurbits, spray Karathane 0.5% or Carbendazim 0.1%. Spray molassess (10 %), insecticide (0.2 %) and yeast hydro lysate (0.1 %) against fruit fly. In green house weather is congenial for infestation of leaf miner on cole crops and tomato; spray Monocrotophos 1 ml / liter of water to control the attack. Weather is also congenial for attack of the aphids; to control the attack spray tobacco decoction or dust wood ash.

O. Stages of major crops are mentioned in Annexure I.

Animal Husbandry

A. The farmers in Upper Brahmaputra Valley Zone and North Bank Plain Zone of Assam and Kolasib region of Mizoram are advised to vaccinate cattle, goat and pigs against BQ, HS, foot and mouth disease and anthrax disease.

B. The farmers in Lower Brahmaputra Valley Zone of Assam are advised to protect poultry birds (Broiler) from cold by using electric bulb (300 Watt for 100 sq. feet) to prevent Coryza disease. In case of lacrimation and swelling of the head, treat the fowl with Sulphar drugs. Poultry birds in general should be regularly observed and fed with antibiotics and vitamins after consulting veterinary doctors.

C. The farmers in Central and Lower Brahmaputra Valley Zone of Assam are advised to vaccinate poultry birds against Ranikhet disease.

D. In Manipur, cattle farmers are advised to deworm and vaccinate cattle against B.Q. and H.S.;

vaccinate pigs and goats against Endoparasites, Ectoparasites etc.

E. The farmers in Arunachal Pradesh are advised to provide wooden sleeping box or wooden dry floor at night, as wet bedding and cold weather may cause pneumonia. Farmers are also advised to deworm goats.

F. The poultry farmers in Nagaland are advised to provide ample quantity of clean drinking water, avoid feeding of mouldy feed and overcrowding.

G. Poultry farmers in Tripura are advised to vaccinate the birds against Ranikhet disease and Fowl pox. Pigs can be infected with a number of worms, which results in poor weight gain in adults. In young pigs, infection with roundworms can cause diarrhea, weight loss, lung problems and death. Hence, the piglets should be dewormed at regular interval.

EAST INDIA [JHARKHAND, BIHAR, ORISSA, WEST BENGAL &SIKKIM]

- **Realized Rainfall:** Mainly dry weather prevailed over the States of the region during last week.
- **Rainfall Forecast:** Rain / thundershowers would occur at one or two places over Sub-Himalayan West Bengal & Sikkim during the period. Mainly dry weather is likely to prevail over the remaining States of the region during the period.

Advisories:

A. As there was no significant rain during last few weeks in most of the districts of the States of the region and no significant rain is likely to occur during the period, farmers are advised to apply irrigation to the standing crops.

B. Undertake sowing of oilseed crops like mustard, groundnut etc. in Western Undulating Zone, East and South Eastern Coastal Plain Zone and North Central Plateau Zone of Orissa.

C. Farmers in Western Undulating Zone of Orissa are advised to undertake transplanting of onion. In view of prevailing dry weather condition, farmers are also advised to apply irrigation to oilseed crops.

D. Farmers in North Central Plateau Zone of Orissa are advised to prepare land and undertake sowing of wheat, mustard, groundnut, pea etc. Farmers are also advised to undertake transplanting of onion, cabbage and cauliflower and sowing of carrot and radish.

E. Farmers in North Central Plateau Zone of Orissa are advised to harvest low land rice and undertake sowing of linseed, gram, coriander, cauliflower, cabbage, onion, garlic and planting of potato.

F. Farmers in North Eastern Coastal Plain Zone of Orissa are advised to undertake sowing of mustard, rapeseed, tomato, cauliflower, cabbage, knolkhol, broccoli, radish, marigold, groundnut etc.

G. Farmers in East and South Eastern Coastal Plain Zone of Orissa are advised to complete sowing of pluses, mustard, fodder oat, coriander, sunflower and planting of potato and banana. Farmers are also advised to undertake harvesting of rice crops taking the advantage of prevailing dry weather.

H. Farmers in the districts of North Bihar are advised to undertake sowing of irrigated wheat. As dry weather is prevailing, farmers are advised to apply light irrigation in the potato crops, which are in 10-20 days stage for proper germination of tubers and better crop growth and yield.

I. Farmers in the districts of North Bihar are advised to apply irrigation in wheat wherever crops are at crown root initiation stage and undertake planting of late varieties of cauliflower and late and medium varieties of cabbage. Farmers are also advised to complete sowing of *rabi* maize.

J. Farmers in the districts of South Bihar Alluvial Zone are advised to undertake planting of potato and sowing of irrigated wheat, other *rabi* crops and green fodder. Crops like cauliflower, cabbage, chilies, tomato, palak, carrot, radish, knol-khol, turnip, beet, garlic and other vegetable crops and spice crops such as coriander, fenugreek and Mangrailla should also be sown as early as possible. Also sow the seeds of onion in prepared nursery.

K. Farmers in the districts of South Bihar Alluvial Zone are also advised to harvest the rice crops and undertake sowing of pulses.

L. Farmers in Central, Western and North Eastern Plateau Zone of Jharkhand are advised to undertake sowing of wheat, barley, linseed, gram, pea, lentil and planting of potato.

M. Farmers in Central Plateau Zone of Jharkhand are also advised to sow onion, African marigold or French marigold.

N. In Western Plateau Zone of Jharkhand, farmers are advised to sow mustard after harvesting of *kharif* crops. It is also the time for sowing of winter vegetables like cauliflower, cabbage, chilli, tomato etc.

O. Farmers in South Eastern Plateau Zone of Jharkhand are advised to undertake sowing of wheat, pigeon pea, chickpea and raising seedlings of winter season vegetables like onion, brinjal, cabbage, cauliflower, tomato, capsicum etc.

P. Farmers in New Alluvial Zone and Red and Lateritic Zone of West Bengal are advised to undertake thinning and other intercultural operation in wheat. Also undertake nursery sowing of *boro* rice and planting of potato in New Alluvial Zone.

Q. Farmers in Old Alluvial Zone and Hill Zone of West Bengal are advised to undertake sowing of wheat, mustard, tomato and planting of potato.

R. Sowing of radish, carrot, and other leafy vegetables and transplanting of broccoli in Hill Zone of West Bengal should also be undertaken. Farmers are also advised to undertake harvesting of Ginger and Kodo Millet and complete the harvesting of soybean, black gram and rice bean. Also undertake transplanting of late varieties of cabbage and cauliflower.

S. Farmers in Coastal Saline Zone of West Bengal are advised to undertake sowing of Sunflower and planting of potato. Complete harvesting of *Kharif* rice as soon as possible.

T. Farmers in Terai Zone of West Bengal are advised to undertake transplanting of marigold.

U. Suitable varieties of the crops for sowing or transplanting are mentioned in Annexure II.

V. Due to cool and humid weather, infestation of leaf eating insects and powdery mildew in pea is noticed in South Eastern Plateau Zone of Jharkhand; spray concentrated neem or tobacco leaf extract diluted in the ratio of 1:10 liters or neem oil @ 5 ml per liter of water.

W. In Western Plateau Zone of Jharkhand, pea crop may be attacked by powdery mildew disease; spray Karathen @ 1 ml per liter of water or Sulfex @ 3 g per liter of water.

X. Cutworm is found in rice in Kendrapara district of Orissa; spray 2 ml Chloropyriphos in 1-liter water during afternoon. Apply Chloropyriphos dust around the bund to prevent the entry of caterpillar to the unaffected fields in early morning.

Y. In North Eastern Coastal Plain Zone of Orissa, due to use of overage seedlings, the crop is susceptible to blast disease. It may be effectively controlled by application of Tricyclazole @ 0.5 g / liter of water or Kasugamycin @ 1.5 g / liter of water.

Z. Due to cloudy weather in Terai Zone, there may be the chance of infestation of early blight in Potato. To prevent the attack, farmers are advised to spray Mancozeb @ 2 g / liter of water or Blitox @ 4 g / liter of water alternately at 10-12 days interval by completely wetting the leaves.

AA. Due to fluctuation of temperature and cloudy weather in Laterite and Red Soil Zone of West Bengal, white fly can attack the winter crops. Spray Asaterp @ 2 g per liter of water. For the fruit borer, use Spinosat @ 1 ml per liter of water.

BB. Stages of major crops are mentioned in Annexure I.

Animal Husbandry

1 In North Eastern Plateau Zone of Orissa, as the winter is initiated, there is a possibility of “EUS” disease in fish. Farmers are advised to apply ‘Cifax’ @ 400 ml mixed with 40 liters of water in one acre pond area as a preventive measure.

2 In North Eastern Plateau Zone of Orissa, due to the climatic conditions, the liver flukes infestations are common in an animal, which reduces the milk yield and fertility; to prevent from this infestation, undertake deworming in animals. In the present weather conditions the ticks and mites may affect the animals; spray Butox @ 2 ml / liter of water at skin.

3 The weather is favorable for attack of F.M.D. in milch animals in Western Plateau Zone of Jharkhand; farmers are advised to take preventive measures to control this disease and animals should be vaccinated twice in a year.

4 To prevent goat from pneumonia in Western Plateau Zone of Jharkhand, kids should be given tetracycline medicine in water and vaccinated as per recommendation of Veterinary Doctor.

5 Newly born baby goat should be prevented from morning and evening cold in South Eastern Plateau Zone of Jharkhand. Deworming should be done to all animals and birds. Supplementary minerals should be added to feed of lactating animals for healthy offspring’s and better yielding of milk.

NORTHWEST INDIA [JAMMU & KASHMIR, HIMACHAL PRADESH, UTTARAKHAND, PUNJAB, HARYANA, DELHI, UTTAR PRADESH & RAJASTHAN]

- **Realized Rainfall:** Mainly dry weather prevailed over the region during last week.
- **Rainfall Forecast:** Rain/snowfall is likely to occur at many places over Jammu & Kashmir and Himachal Pradesh during next 24 hours and at a few places over Uttarakhand during next 48 hours and decrease thereafter. Light rain/thundershowers would occur at a few places over Punjab and north Haryana and at one or two places over south Haryana and west Uttar Pradesh during next 24 hours and mainly dry thereafter. Mainly dry weather is likely over the rest period and rest part of the region.

Advisory:

A. As there was no significant rainfall in most of the districts over the region during last week in Punjab, Haryana, Delhi, Rajasthan, Uttar Pradesh and Uttarakhand, apply irrigation to the standing crops. Rain/snowfall would occur at many places over Jammu & Kashmir and Himachal Pradesh during next 24 hours, farmers are advised to postpone irrigation to the standing crops.

B. In view of present weather farmers in Delhi are advised to sow late wheat and apply irrigation to timely sown wheat, which is at CRI stage (about 21-25 days) and mustard. Apply second dose of fertilizer 3-4 days after irrigation to wheat. Harvest mature pigeon pea crop and transplant onion, tomato, cauliflower, cabbage, knolkhol and broccoli in the raised beds.

C. Farmers in Punjab and Haryana are advised apply need-based irrigation to sugarcane and timely sown gram crop. Complete transplanting of seedlings of tomato. Complete the harvesting of toria. Give second irrigation to raya crop at flowering stage to save the crop from frost if necessary.

D. In Sub Tropical Zone of Jammu & Kashmir, farmers are advised to continue sowing of barley, wheat under rain fed and irrigated areas with available soil moisture. Farmers are also advised to continue sowing of oats, vegetable crops like radish, carrot, turnip, garlic, spinach, methi and berseem without any further delay and undertake nursery sowing of tomato, chilli and brinjal and raising cucurbits in polythene bags under protection. In lower belts of cold arid zone of Leh, farmers are advised to go for nursery sowing of Apricot & Apple and to undertake harvesting of Chinese cabbage, lettuce and Beet. Farmers are advised to harvest toria crop if pods turn yellow.

E. In Sub Tropical Zone of Jammu & Kashmir, due to decrease in minimum temperature, farmers are advised to provide cover to young fruit plants with thatches prepared from sarkanda or any other material, however the eastern side should be open for sunshine and air for the plants.

F. Farmers in Himachal Pradesh are advised to complete sowing of wheat, vegetables (radish, turnip, coriander, cabbage, knol khol, broccoli, parsley, lettuce, fennel, cauliflower, onion, potato) and

sarson. It is optimum time for raising the nursery of winter flowers like Calendula, arctotis, dog flowers, sweet pea, dianthus, petunia, stock and flox in fields. Farmers in Mid Hills and Sub Humid region of Himachal Pradesh are advised to complete the sowing peas and cabbage.

G. In Uttar Pradesh, farmers are advised to complete sowing of onion, carrot, radish, turnip, beet, tomato, berseem, oat for green fodder, garlic, coriander, palak, sauf, mangarail, fenugreek and cumin etc.

H. In Bundelkhand zone of Uttar Pradesh, farmers are advised to apply light irrigation and top dressing in already sown wheat, pea, toria, etc. Farmers are advised to sow late sown improved varieties mentioned in Annexure I.

I. In Bhabar & Terai zone, Pantanagar of Uttarakhand, farmers having irrigation facilities are advised to give first irrigation to wheat crop at CRI stage. Due to expected dry weather condition and fall in temperature, farmers are advised to continue sowing of lentil from this week. Undertake weeding & thinning operations in other standing crops like pea, chickpea, rajmash etc. for their better growth and apply grass muching in between rows to conserve soil moisture.

J. Farmers in Sub humid sub tropic in Uttarakhand are advised to continue sowing of potato, wheat, also advised to irrigate all *rabi* vegetables like coriander, fenugreek, tomato, spinach, radish and carrot.

K. In hill zone of Uttarakhand, farmers are advised to give light irrigation to timely sown irrigated wheat crop and continue sowing irrigated and non-irrigated wheat, masoor, green pea, gram, sarson and fodder makka.

L. Farmers in Rajasthan are advised to complete land preparation and sowing of wheat, barley, potato, cumin, isabgol, ajwain, mustard, gram, lentil, oat, fenugreek, berseem, lucerne, toria, taramira, linseed (alsi), opium poppy, coriander and vegetables viz. tomato, brinjal, radish, chilli etc., transplanting cauliflower, cabbage, *rabi* onion, and undertake plucking citrus fruits late during afternoon hours.

M. In Bhabar & Terai zone, pantanagar of Uttarakhand, under dry weather conditions and fall in temperature, white rust in pea crop is possible. If the symptoms of white rust are seen, then farmers are advised to spray 0.5 % solution of Carbondazim at an interval of 10 days.

N. In Bhabar & Terai zone, pantanagar of Uttarakhand, under the foggy weather conditions, there are chances of incidence of aphids in toria and mustard crop at flowering & pod formation stage. If the aphids are seen in 10 % population per leaf or pod, then spray 200 SL Emidachlorepid @ 3 ml per 10 liter of water.

O. In Sub tropical zone of Jammu & Kashmir, weather is congenial for saw fly or flea beetle in mustard crop under such situations farmers are advised to go for spray the crop with Malathion 50EC @ 0.05% or Carbaryl 50WP @ 0.1%.

P. In Sub tropical zone of Jammu & Kashmir, farmers are advised to control damping off in cabbage, cauliflower, knol-khol, blight in spinach, wilt and root rot in peas and blotch in onion by treating seed before sowing with thiram/captan @ 3g/kg or carbendazim @ 2g/kg of seed.

Q. In Semi-Arid Eastern Plain Zone of Rajasthan, pod borer attack may be seen in the prevailing weather in pea crop at pod formation stage, farmers are advised to spray Malathion 50 EC @ 1.0 ml per litre water to control pod borer attack.

R. In Bundelkhand zone of Uttar Pradesh, due to prevailing weather, there are chances of incidence of caterpillar in gram. Farmers are advised to spray solution of Fenvelrate 0.4 % or Fenthoate 2.0 % @ 5 kg / acre if 1-2 caterpillar per meter is noticed.

S. Stages of major crops are mentioned in Annexure I.

Animal Husbandry

A. In semi-arid western plain zone of Rajasthan, Himachal Pradesh, in view of falling night temperature, livestock farmers are advised to protect their infant animals from pink cold. They are also suggested for deworming of animals except pregnant animals and deworming medicines like Albendazol, Fenbendazol may be given to animals under the guidance.

B. In Semi-Arid Eastern Plain Zone of Jaipur in Rajasthan, farmers are advised to cover the door of animal house, wrap jute bag around animal back and keep litter dry every day to protect milch & infant animals from cold.

C. In Bhabar & Tarai zone of Uttarakhand, due to expected cold conditions during this week in the night, farmers are advised to keep all types of animals inside the shed during nighttime. Put rice straw at the place of sitting of animals for their better comfort. Keep down curtains in Poultry farm in the night for safety of birds from these cold weather conditions. Vaccinate the animals for various diseases, as they are more prone to diseases in this weather. For the control of cough use piperazine citrate @50-30 ml/animal.

D. In Uttar Pradesh, in bundelkhand zone (Bharari) and also in western plain zone (Modipuram), it is advised to tie young cattle in closed shelter and feed them with big cardamom, ajwain and jaggery, keep cattle shelter clean and take special care of young ones to protect from cold in this season.

SOUTH INDIA [TN, AP, KERALA, KARNATAKA, LAKSHADWEEP, ANDAMAN & NICOBAR ISLANDS]

- **Realized Rainfall**: Theni and Tirunelveli in Tamil Nadu, Alappuzha, Ernakulum, Kollam, Kottayam and Pathananthitta in Kerala received good rainfall during last week. No significant rainfall occurred in the remaining states of the region.
- **Rainfall Forecast:** Rain/thundershowers would occur at one or two places over Kerala, Tamil Nadu and coastal Andhra Pradesh. Either dry or mainly dry weather would occur over remaining parts of the region.

Advisories:

i. As there was sufficient rainfall in the districts of Theni and Tirunelveli in Tamil Nadu, Alappuzha, Ernakulum, Kollam, Kottayam and Pathananthitta in Kerala, postpone irrigation to the crops. Apply irrigation to the crops in the remaining parts of the region.

ii. Farmers in all the Southern Telangana Zone of Andhra Pradesh are advised to raise irrigated dry crops like maize and sunflower as an alternative to irrigated rice under wells as the ground water is going to be scarce due to drought, take up sowing of *rabi* crops like maize and sunflower under irrigated dry conditions. Take up sowing of rice nurseries with short duration varieties, duly treating the seed with Carbendazim @ 1 g per kg seed.

iii. As there is no forecast for rain in the North Coastal Zone of Andhra Pradesh, farmers are advised to go in for harvesting of crops, if the crop is matured.

iv. Farmers in the Scarce Rainfall Zone of Rayalaseema in Andhra Pradesh are advised to undertake sowing of *rabi* groundnut up to December 15th.

v. Farmers in the Eastern Dry Zone of Karnataka are advised to sow sunflower, groundnut and watermelon, tomato, potato and carrot etc. As rainfall is not expected in the next coming four to five days, farmers are advised to harvest matured crops like ragi, paddy, groundnut, onion and others, keep harvested crops in dry place.

vi. Farmers in the North Transition Zone of Karnataka are advised to irrigate wheat, jowar, sunflower, black gram and maize to avoid moisture stress, due to dry weather and undertake plant protection measures.

vii. Farmers in the Southern Dry Zone of Karnataka are advised to harvest paddy crop, dry the grains of the harvested crops properly and drain out excess water from the paddy field one week before harvesting of paddy.

viii. Farmers in the Cauvery Delta Zone of Tamil Nadu are advised to give top dressing to *thaladi* rice (22 kg urea + 18 gypsum + 4 kg neem cake mixed well and keep it overnight and add 17 kg MOP before top dressing) to avoid nutrient deficiency after drainage.

ix. Farmers in the North Eastern Zone of Tamil Nadu are advised to undertake field preparation for the paddy nursery. Also advised to avoid water stagnation in the recently sown groundnut field.

x. Farmers in the High Altitude Zone of Kerala are advised to rogue out the off types from paddy field before harvest for seed purpose, plough the field after the harvest for taking next crop and allow the stubbles to decay, select short duration varieties for the summer crop, test their soils before the next crop and undertake plant protection measures.

xi. Since light rainfall is forecasted in the Problem Area Zone of Kerala, farmers are advised to undertake sowing of rice, thinning and gap filling of areas where crop is at 25-30 days after sowing and drain the field to enhance plant population in areas where crop intensity is sparse. Undertake

plant protection measures to protect crops from diseases.

xii. Farmers in the Central Zone of Kerala are advised to give propping to bunched rain fed banana, since speed of easterly winds is increasing. Priority should be given for propping for banana, which faces the easterly side.

xiii. Leaf folder attack is seen in isolated places in the Northern Zone of Kerala. Farmers are advised to unfold the leaves by rolling thorny wires/twigs over the canopy. If the attack is severe, spot spraying of carbaryl 85MS @ 4g/litre of water. Since high humidity prevailing in the zone is conducive for fungal multiplication and other disease occurrence and iron toxicity is found in paddy fields of midland lateritic belts of Kerala, farmers are advised to undertake plant protection measures.

xiv. To prevent the attack of leaf folder and stem borer in paddy, farmers in the Problem Area Zone of Kerala are advised to keep trichocards in the fields after 15 days of sowing

xv. Incidence of *Helicoverpa* is observed in red gram, fusarium wilt in Bengal gram, aphids in safflower, diamond back moth, thrips, mites, dieback, gemini virus and powdery mildew is noticed in vegetables and fruits, and powdery mildew in coriander in the Southern Telangana Zone of Andhra Pradesh. Farmers are advised to undertake plant protection measures to prevent attack of these pests and diseases and also monitor for the incidence of *Spodoptera* in groundnut.

xvi. Bacterial leaf blight, bacterial leaf streak and leaf folder incidences are noticed in samba paddy in the Cauvery Delta Zone of Tamil Nadu due to prevailing weather condition. To control bacterial leaf blight and bacterial leaf streak, farmers are advised to spray streptomycin 18 g + Copper oxy chloride 500 g mixture/acre or copper hydroxide at 500 g/ac in 200 litre of water and apply cartop hydrochloride 4 G at 6 kg/acre mixed with equal quantity of sand or spray choloripyriphos 400 ml/acre to control leaf folder.

xvii. Blast incidence is observed in paddy field in the Western Zone of Tamil Nadu. Farmers are advised to take proper plant protection measures (after observing initial infection of the disease, spray Edifenphos 50 EC @ 500 ml/ha) and avoid excess application of nitrogen fertilizer in the field.

xviii. There is a chance of incidence of fusarium wilt in cotton in the South Zone of Tamil Nadu. Farmers are advised to drench cotton with bavistin 1 g / l and monitor the incidence of *Spodoptera* and sphingid in pulses and follow appropriate plant protection measures.

xix. Farmers in the High Altitude Hilly Zone of Tamil Nadu are advised to adopt measure to manage blister blight in tea.

xx. Incidence of Wooly aphid was noticed in sugarcane and pod fly damage in pigeon pea in the North East Transition Zone of Karnataka. Farmers are advised to remove the infested leaves and burn them, spray 6 kg of phorate granules mixed in 20 kg of sand for one acre and spread this mixture uniformly on the soil to control wooly aphid and spray rogor (Dimethoate) 2 ml per liter of water to

avoid the pod fly damage.

xxi. Incidence of Wooly aphid was noticed in sugarcane in the North Dry Zone of Karnataka. Farmers are advised to remove the infested leaves and burn them, spray 6 kg of phorate granules mixed in 20 kg of sand for one acre and spread this mixture uniformly on the soil to control, if the height of the crop is suitable. If the height of the crop is not suitable to spray the pesticide, then for an area of one acre, mix 6 kg of phorate granules in 20 kg of sand and spread this mixture uniformly on the soil and then give light irrigation.

xxii. Due to prevailing, sucking pest problem is noticed in cotton in the North Transition Zone of Karnataka. Farmers are advised to spray one-month-old cotton crop with 1.7 ml Dimethioate 30 EC or 2.0 ml methyl demeton in one liter of water to control sucking insects.

WEST INDIA [GOA, MAHARASHTRA, GUJARAT]

- **Realised Rainfall:** Dry weather prevailed over the States of the region during last week.
- **Rainfall Forecast:** Dry or mainly dry weather is likely to prevail over the States during the period.

Advisories:

i. As there was no significant rain during last few weeks and mainly dry weather is likely during the period over the States, farmers are advised to apply irrigation to the standing crops.

ii. As mainly dry weather would prevail during the period, farmers in Madhya Maharashtra, Marathwada and Vidarbha are advised to continue third picking of fully opened cotton bolls.

iii. Farmers in Konkani region of Maharashtra are advised to complete sowing of *rabi* sunflower and mustard. Undertake sowing of short duration crops like cowpea, wal, kulthi etc., utilizing residual soil moisture in the harvested rice field. Also undertake preparatory tillage for nursery sowing of summer rice and sowing of summer groundnut.

iv. Present weather is suitable for planting of *kande* bag banana in Madhya Maharashtra and Marathwada.

v. Considering the prevailing minimum temperature farmers in Madhya Maharashtra are advised to undertake sowing of late varieties of wheat with seed rate 125 Kg per hectare. As there is no possibility of rain, apply 160 kg Nitrogen, 85 kg Phosphorous and 85 kg Potash per hectare to *adsali* sugarcane at the time of final earthing up after 16 to 20 weeks from planting followed by irrigation. Undertake sowing of lucerne and berseem grass for animal fodder purpose.

vi. Farmers in Middle Gujarat Zone are advised to undertake sowing of late varieties of wheat. Carry out sowing of *rabi* maize and planting of potato tuber.

vii. In view of prevailing dry weather, farmers in Middle Gujarat Zone are advised to apply irrigation to timely sown wheat at crown root initiation stage and to gram at branching stage.

viii. Taking the advantage of dry weather, in Bhal and Coastal Zone and North Gujarat Zone of Gujarat,

farmers are advised to undertake picking of cotton during morning hours.

ix. In North West Zone of Gujarat, farmers are advised to complete sowing of wheat crop. Give light Irrigation to the cumin crop and care should be taken that there is no water logging in the plots of cumin.

x. Farmers in South Gujarat Zone and South Gujarat Heavy Rainfall Zone are advised to undertake inter crops like groundnut and mung in between the sugarcane.

xi. Farmers in South Saurashtra Zone of Gujarat and South Gujarat Heavy Rainfall Zone are also advised to undertake sowing of wheat.

xii. In view of prevailing dry weather, farmers in South Saurashtra Zone of Gujarat and South Gujarat Heavy Rainfall Zone are advised to apply irrigation in cotton, castor and carry out picking of cotton.

xiii. Farmers in North Gujarat Zone are advised to carry out sowing of cumin.

xiv. As dry weather is prevailing, farmers in North Gujarat Zone are advised to carry out weeding, inter cultural operation and earthing up operations in transplanted *rabi* fennel and in vegetables like brinjal, chilli, tomato, cabbage and cauliflower. For effective control of weed in recently sown field of potato, spray herbicide like Metribuzin @ 400 g in 600 liters of water as a pre emergence or after emergence.

xv. Farmers in North Saurashtra Zone of Gujarat are advised to carry out sowing of wheat, coriander and cumin.

xvi. Suitable varieties of the crops for sowing are mentioned in Annexure II.

xvii. Due to cloudy weather during last week in Madhya Maharashtra, there may be incidence of pod borer on gram; spray 5% Neemark followed by Heliokill 500 ml per hectare after 10-15 days.

xviii. Prevailing weather is congenial for infestation of blight and thrips in onion in Madhya Maharashtra; spray Mancozeb @ 25 g or Carbendazim @ 10 g + Carbosulphan @ 10 ml or Deltamethrin + sticker 10 ml in 10 liters of water.

xix. Prevailing weather is favorable for infestation of aphids in jowar in Madhya Maharashtra; spray Dimethoate 34% @ 500 ml or Methyl Dimeton 25% @ 500 ml per hectare in 500 liters of water.

xx. There may be incidence of white woolly aphids in sugarcane in Kolhapur division of Maharashtra; apply Thimet @ 4 kg per acre followed by light irrigation.

xxi. Due to fall in minimum temperature there may be incidence of thrips in mango in Konkan region of Maharashtra; spray Stinosad @ 45 ml per 10 liters of water. Also there may be incidence of tea mosquito bug and thrips on new vegetative shoots of cashew; spray Monocrotophos 36% (15 ml in 10 liters of water) or Profenophos 15% (10 ml in 10 liters of water) or Lambda cyhellothrin 5% (6 ml in 10 liters of water).

xxii. Due to formation dew, there is a possibility of outbreak of Ramullaria blight in the fennel crop in North Gujarat Zone; farmers are advised to spray Mancozeb 0.2% @ 25 g plus 25 ml of

concentrated desi soap solution in 10 liters of water.

xxiii. Stages of major crops are mentioned in Annexure I.

Animal Husbandry

- In North West Zone of Gujarat, farmers are advised to clean udder of milking animals properly with insecticide. Farmers are also advised to cut the beaks of birds in the poultry under age of 15 weeks.
- Farmers in South Gujarat Heavy Rainfall Zone are advised to clean animal byres and spray Neon insecticide 1 to 1.5 ml per liter of water for controlling ecto-parasites in animal house.

CENTRAL INDIA [M.P., CHHATTISGARH]

- **Realized Rainfall:** Dry weather prevailed over the region.
- **Rainfall Forecast**: Dry weather is likely to prevail over the region.

Advisories:

I. Farmers in Kymore Plateau and Satpura Hill Zones of Madhya Pradesh are advised to prepare field for sowing wheat crops in both rain fed and irrigated conditions, potato and fenugreek and also prepare nursery for cauliflower and cabbage. Intercultural operation may be undertaken controlling weeds in crops like mustard, toria, chickpea, and lentil.

II. Farmers in Jhabua Hills Zone of Madhya Pradesh are advised to give first irrigation to wheat crop after 21 DAS (fully irrigated) and 30-35 DAS (semi-irrigated condition). Apply remaining ½ nitrogen dose by broadcasting to wheat. As cotton crop is at boll opening stage keep the field weed free and maintain proper moisture by irrigating the field.

III. Farmers in Gird Zone and Satpura Plateau regions of Madhya Pradesh are advised for sowing of wheat and also give irrigation to mustard crop.

IV. Farmers in Malwa Plateau Zone of Madhya Pradesh are advised for sowing of wheat and transplanting of onion, brinjal, chilli and tomato may be done. Mulching may be done to conserve the soil moisture.

V. Farmers in Vindhyan Plateau of Madhya Pradesh are advised to transplant chilli, brinjal, tomato, onion and cauliflower, give irrigation to fruit plants.

VI. Farmers in Central Narmada Zone of Madhya Pradesh are advised to prepare field for irrigated wheat, sowing of pea, garlic, potato, carrot and radish may be done also weed control may done in rabi crops like chickpea, lentil and linseed.

VII. Farmers in Satpura Plateau of Madhya Pradesh are advised to prepare nursery for vegetable crops like cauliflower and cabbage and transplanting of seedling in main field at optimum moisture level may be done. Sowing of potato and pea may be done.

VIII. Farmers in Nimar Valley of Madhya Pradesh are advised to sow wheat and gram after proper seed treatment.

IX.	Farmers in Bundelkhand region of Madhya Pradesh are advised to sow wheat (late varieties) crop @120kg/ha seeds, treat the seed with fungicide thirum @ 2.5g/kg before sowing and also do hoeing and weeding in early sown *rabi* crops.
X.	Farmers in Central Narmada region of Madhya Pradesh are advised to prepare land for irrigated wheat and sugarcane crop. Sow vegetables like pea, garlic, carrot and radish; also control weeds in *rabi* crops like chickpea, lentil and linseed.
XI.	Farmers in Chhattisgarh Plain Zone are advised for the sowing of *Rabi* crops specially wheat, gram, pea, *Rabi* moong, and sunflower, mustard due to favorable weather conditions for sowing of potato and autumn sugarcane.
XII.	Due to prevailing weather condition in the past few days' infestation of insects in vegetable crops may occur. Hence, farmers are advised to monitor these crops and if the infestation is above normal spray the insecticides in Chhattisgarh Plain Zone.
XIII.	Due to mainly dry weather condition, farmers are advised for proper sun drying and post harvest operations of rice crops and farmers who have sown *Utera* crops are advised to shift the harvested produce of rice from their field for the better growth of the crops in the field.
XIV.	Farmers in Bastar Plateau Zone of Chhattisgarh are advised to prepare field for sowing of wheat, gram, mustard, linseed and lentil crops and sowing should be completed as early as possible. Sugarcane planting should be completed at the earliest and earlier planted sugarcane should be irrigated. Mustard sowing should be completed at the earliest.
XV.	Farmers in Kymore Plateau and Satpura Hill Zones and Satpura Plateau of Madhya Pradesh are advised that weather is congenial for insect attack in pigeon pea crop. For control spray Quinalphas at 2.0 ml. per litre also pheromone or light traps may be used for monitoring these pests.
XVI.	Farmers in Malwa Plateau Zone of Madhya Pradesh are advised to prune the newly planted plant for good erect growth. Apply fertilizer in fruit plants. In papaya if there is attack of yellow Mosaic disease than apply Rogar 30 EC @ 1-2 ml/liter or apply confodore @0.33 ml/lit.
XVII.	Farmers in Gird zone of Madhya Pradesh are advised, to control early blight of tomato and potato, two sprays of 2.5g mencozeb per litre of water should be done at the interval of ten days.
XVIII.	Due to forecast of Humid and cloudy weather in Vindhyan Plateau of Madhya Pradesh farmers are advised that there is possibility of blight disease on gram. For control spray carbodenzim 1gm/litre or 1.5kg/Ha using sticky material.
XIX.	Chickpea is affected by wilt in some area of Bundelkhand region hence for its control; drench the crop with solution of bavistin @1.5 gm. per liter of water. If irrigation facility is available then apply one irrigation for its management, also there is attack of semi looper in cauliflower crop, for control spray with Malathion 50 E.C. @ 2ml/l of water.
XX.	In Bastar plateau zone of Chhattisgarh monitoring of Cashew Stem and Root Borer insect (CSRB)

incidence may be done and apply pesticides if required.

Animal Husbandry & Poultry

I. Farmers in Jhabua hills, Malwa Plateau Gird Zone regions of Madhya Pradesh are advised to vaccinate their animals to FMD, BQ, and HS via Raksha Triback vaccine. For control of Ranikhet disease in chicks vaccinate with F-1 or Lasota or R2B Strain vaccine.

II. Temperature is going to decrease in Kymore Plateau, Satpura Hill, Central Narmada and Bundelkhand zones of Madhya Pradesh therefore farmers are advised to provide 4 hour light in poultry houses during night otherwise, insufficient light may affect eggs production.

III. As humid weather condition is prevailing cattle should be kept in dry and clean places. Create neem leaves smoke in night to save them from mosquitoes and bees.

Annexure I

Major Crops

NORTHEAST INDIA [ARUNACHAL PRADESH, NMM&T, ASSAM, MEGHALAYA**]**

I. Sugarcane (elongation), *sali* rice (harvesting), *boro* rice (nursery preparation / sowing / seedling / transplanting), wheat (sowing), tomato (transplanting / vegetative/flowering / fruiting), *rabi* pulses (sowing / seedling), cauliflower, cabbage and knoll khol (transplanting / vegetative / head formation), brinjal (early variety) (vegetative / flowering / fruiting), country bean (vegetative / flowering), winter vegetables, pea (sowing / transplanting / vegetative), onion, garlic (sowing / seedling / vegetative), khasi mandarin (fruit maturity / harvesting), niger and lentil (sowing/ seedling), potato (planting / vegetative / stolon formation), rapeseed and mustard (sowing / vegetative), and cole crops (transplanting / vegetative) in Assam.

II. Rice (Mipun cultivar) (maturity / harvesting), Khampti variety of rice (maturity), cabbage, cauliflower, knolkhol etc. (vegetative / head formation), maize (sowing / vegetative) and pea, mustard (sowing / germination / vegetative) in Arunachal Pradesh.

III. *Kharif* rice (maturity / harvesting), potato, pea (planting / sowing / vegetative), rapeseed / mustard (sowing / vegetative), tomato (transplanting / vegetative), cauliflower and cabbage (transplanting / vegetative / head formation), onion (nursery raising / transplanting / vegetative), broccoli (transplanting / vegetative), brinjal (flowering / fruiting) in Manipur.

IV. *Boro* rice (nursery sowing / seedling / transplanting), wheat, pea, garlic and lettuce (germination / seedling), *toria* (vegetative / pod formation / maturity), *rabi* onion (sowing), *kharif* onion (maturity), potato (planting / vegetative), Khasi mandarin (flowering / fruiting), banana (vegetative), lentil, mustard, rapeseed (vegetative / flowering / maturity), *rabi* onion (sowing /

vegetative), winter vegetable (maturity), peach (vegetative) in Meghalaya.

V. Ginger and turmeric (rhizome formation / maturity / harvesting), khasi mandarin (fruiting / harvesting), banana (vegetative / fruiting / maturity / harvesting), cucurbits (fruiting / harvesting), cole crops and tomato (transplanting / vegetative), pea, bean (vegetative) and lentil (sowing) in Mizoram.

VI. Okra (flowering / fruiting), lowland rice (harvesting), banana (vegetative / fruiting), cabbage (transplanting / vegetative), pea (early sown) (vegetative / flowering / pod formation / flowering), pea (germinating), pigeon pea (pod filling), rapeseed, mustard (sowing / vegetative), French bean (sowing), *rabi* crops (sowing), broccoli (transplanting / vegetative) and papaya (transplanting) in Nagaland.

VII. Low land rice (maturity / harvesting), *Aman* rice (harvesting), *boro* rice (sowing), cucurbits and other vegetables (flowering / fruiting), ginger and turmeric (rhizome formation / harvesting), banana (vegetative / fruiting / harvesting), toria (vegetative / flowering), cole crops (sowing / vegetative), potato (planting / vegetative) in Tripura.

EAST INDIA [JHARKHAND, BIHAR, ORISSA, WEST BENGAL &SIKKIM**]**

A. Sugarcane (vegetative), rice (maturity / harvesting), *kharif* arhar (pod formation / seed formation), sorghum, jowar (harvesting), sesame (harvesting), lobia for green fodder (sowing), mishrikand (vegetative), onion, radish (sowing), cauliflower (sowing / transplanting / vegetative), fruit trees (transplanting), potato, sweet potato (planting / vegetative), mustard, wheat, vegetables, maize, pulses (sowing) in Bihar.

B. Rice (harvesting), pigeon pea (pod formation / seed formation), pulses (urd bean, moong bean) (maturity / harvesting), turmeric and ginger (vegetative / rhizome formation), elephant foot yam (tuber elongation), potato (planting / vegetative / tuber formation), sweet potato (vegetative / stem elongation / tuber elongation / maturity / harvesting), mustard, linseed (sowing / vegetative), toria (flowering), green pea (sowing / vegetative), cauliflower, cabbage, chilli, tomato (transplanting / vegetative), wheat, niger (sowing), papaya (transplanting), gram, chick pea, onion, African or French marigold (sowing) in Jharkhand.

C. Arhar (pod formation / seed formation), papaya, marigold, tuberose (planting), *kharif* vegetables (fruiting / harvesting), sugarcane (vegetative), *kharif* rice, *kharif* groundnut (maturity / harvesting), turmeric and ginger (planting / early vegetative), yam (sowing), Bengal gram, lentil, green pea, mustard (sowing / vegetative) , wheat (sowing / crown root initiation), mango, banana, lemon, cashew nut, potato and marigold (planting), sunflower, garlic, groundnut (sowing) in Orissa.

D. *Boro* rice (nursery bed preparation), mango, coconut, guava, banana (planting), *kharif* vegetables (harvesting), winter vegetables (sowing / transplanting / vegetative), wheat, mustard (sowing /

vegetative), potato (planting / vegetative) in West Bengal.

E. Large cardamom (new) (transplanting of suckers from nursery), large cardamom (old) (capsule formation / seed maturity / harvesting), *rabi* vegetables (vegetative), orange (fruit maturity / harvesting), ginger (maturity / harvesting), rice (maturity / harvesting), wheat (sowing / seedling / crown root initiation), mustard (sowing / germination / vegetative) in Sikkim.

NORTHWEST INDIA [JAMMU & KASHMIR, HIMACHAL PRADESH, UTTARAKHAND, PUNJAB, HARYANA, DELHI, UTTAR PRADESH & RAJASTHAN]

A. Wheat (sowing), lentil (pod formation), sugarcane (planting), *rabi* onion, cauliflower, cabbage, broccoli, tomato, knolkhol (transplanting), radish, spinach, coriander (vegetative / fruiting) in Delhi.

B. Wheat (sowing/emergence), vegetables (sowing), garlic, ginger (planting), bhindi, cucurbits (sowing), Khira, summer squash, bitter gourd, tur, brinjal, Shimla mirch, and tomato (sowing / transplanting), Apple (maturity), pomegranate (fruit development), strawberry (land preparation), arbi, amaranthus, turmeric, rice, maize, barley, radish, onion, pea, garlic, coriander, cabbage, knol khol, parsley, lettuce, fennel, cauliflower, broccoli (sowing / planting) in Himachal Pradesh.

C. Wheat (sowing / emergence / tillering), early/normal sown barley (CRI stage), late sown barley (sowing / emergence), onion (seed bed preparation), winter vegetable crops viz. potato, radish, carrot, turnip, garlic, spinach, methi (various stages i.e. sowing / vegetative), cole crops viz. early cauliflower, cabbage, knoll khol, broccoli (nursery sowing / transplanting), *Rabi* oilseeds i.e. toria (reproductive / physiological maturity), Gobi sarson, mustard normal sown (vegetative) and early sown (flowering), late sown (sowing / emergence), brown sarson (rosette stage), *rabi* pulses i.e. lentil (sowing / emergence-(germination)/ vegetative), gram (vegetative), pea (sowing / emergence (germination) / vegetative)], fodder crops like oats (sowing / emergence / tillering), berseem (vegetative (1st cutting)), Apricot, Apple (nursery sowing), early Chinese cabbage, lettuce (transplanting / vegetative / maturity / harvesting), beet root (planting / vegetative / maturity / harvesting in green house) in Jammu & Kashmir.

D. Chilli, capsicum, cauliflower, broccoli (transplanting), lahi (flowering / fruiting), sugarcane (planting), rice (maturity/harvesting), litchi, loquat, peach, citrus (flowering / fruiting), mango (early varieties) (flowering), foxtail millet, okhra, bottle gourd, bitter gourd, ginger, turmeric, (germination / vegetative), mustard, toria (flowering/pod formation), papaya (planting), sorghum, pigeon pea (vegetative), vegetable pea (vegetative/pod maturity/ harvesting), urd, potato, and pearl millets (germination), barley, fodder barseem, sarson (germination/ vegetative), onion (nursery sowing), wheat (germination/crown root initiation), lentil (sowing) in Uttarakhand.

E. Rice (harvesting), wheat (sowing/emergence/crown root initiation), winter sugarcane (vegetative growth), summer sugarcane (grand growth), cucurbits like gourd, bitter gourd, cucumber, etc. and

another vegetables like lady's finger, tomato, brinjal, chilli etc. (flowering/fruiting), arhar, toria (flowering/seed formation), tomato, brinjal, bhindi (vegetative / fruiting), cabbage, garlic, cauliflower (flowering / fruiting), barley, gram, alsi, maize, rai, mustard, berseem, potato, sarson, masoor, pea and chick pea (sowing/ germination) in Uttar Pradesh.

F. Spring sugarcane (sprouting), berseem (vegetative), sugarcane (maturity / harvesting), Sugarcane autumn (planting), cotton (boll maturity/picking), fodder lucerne, oats (sowing), gram, potato, peas (sowing), radish, carrot, turnip, cauliflower (sowing/ transplanting), rape seed, mustard (sowing / emergence), barley, lentil (sowing/emergence), wheat (sowing) in Punjab.

G. Sugarcane (spring season) (planting/emergence/early vegetative), barseem (vegetative), pulses, moong, mash, pigeon pea (vegetative), cauliflower, cabbage, carrot, potato (transplanting), mustard (sowing / vegetative), sarson, raya, radish, turnip (sowing), wheat (sowing) in Haryana.

H. Wheat (sowing / germination), sweet potato, chilli and cluster bean (vegetative), mustard (vegetative/ flowering), gram (sowing / germination), coriander (sowing / germination), barley, oats, lentil, lucerne, taramira, linseed (alsi), opium poppy, vegetables (potato, fenugreek, tomato, brinjal, radish, chilli, carrot, phalak, green pea, berseem, cumin, isabgol, ajwain, garlic (land preparation/sowing), cauliflower, cabbage, *rabi* onion (transplanting) in Rajasthan.

SOUTH INDIA [TN, AP, KERALA, KARNATAKA, LAKSHADWEEP, ANDAMAN & NICOBAR ISLANDS]

A. Rice - Samba (tillering/panicle initiation stage), Rice-Thaladi (tillering), cotton (vegetative/boll formation), vegetables (flowering / fruiting), sugarcane (vegetative/ grand growth/maturity), maize (vegetative/ harvest), millets (vegetative/ harvest), sorghum (vegetative/harvest), Bengal gram (sowing), groundnut (flowering/harvest) and pulses (vegetative/pod formation/flowering) in Tamil Nadu.

B. Sugarcane (vegetative), cotton (flowering/boll opening), maize (harvesting), ragi, sunflower (heading/sowing), Bengal gram (flowering/fruiting), red gram (pod formation/ maturity), *rabi* jowar (sowing), late planted paddy (harvest), *rabi* sorghum, wheat (sowing/vegetative) and safflower (sowing), pigeon pea (pod filling) and horticultural crops (vegetative growth/ flowering/ fruit development) in Karnataka.

C. Groundnut (sowing), Bengal gram (vegetative), red gram (pod development), green gram (flowering), castor (development of third spikelet), sunflower (vegetative), paddy (grain hardening/ harvesting), cotton (boll formation) in Andhra Pradesh.

D. Rice (harvesting), arecanut (harvesting), pepper (maturity), ginger (maturity), cardamom (harvesting), nutmeg (maturity), vegetables (planting/seedling), banana (planting), mundakan paddy (tillering / panicle initiation) in Kerala.

WEST INDIA [GOA, MAHARASHTRA, GUJARAT]

1. Sugarcane (*Adsali*) (grand growth), sugarcane pre-seasonal (elongation / cane maturity), sugarcane (*suru*) (elongation), sugarcane (new *adsali*) (early vegetative), sugarcane (new pre-seasonal) (sprouting / early tillering), cotton (boll maturity / picking), red gram (pod development / pod maturity), *rabi* jowar (vegetative / flag leaf initiation / ear head emergence), safflower (vegetative), irrigated gram (branching / flowering), wheat (sowing / crown root initiation / early tillering), sunflower, maize (early vegetative) in Maharashtra.
2. Wheat (sowing / crown root initiation), gram (sowing / early vegetative / branching), *rabi* maize (sowing), *kharif* vegetables (fruiting / harvesting), sugarcane (planting / vegetative), jowar (seedling), cotton (maturity / picking) , castor (capsule formation / spike initiation), mustard (vegetative), cluster bean, cauliflower, cabbage, sweet corn (sowing / vegetative), potato (planting / emergence) and spices (sowing) in Gujarat.

CENTRAL INDIA [M.P., CHHATTISGARH]

1. Sugarcane (vegetative), vegetables (flowering/fruiting), Mustard (branching/flowering), wheat, maize, gram, toria (sowing/early vegetative/tillering), onion, garlic, tomato, brinjal, chilli (sowing/transplanting) cotton (boll development / maturity) in Madhya Pradesh.
2. Rice (Harvesting), sugarcane (planting), groundnut, arhar, green gram and sesame (vegetative), ginger, turmeric, papaya, mango and guava (vegetative) cauliflower, potato (sowing), tomato, brinjal, chilli, niger, horsegram, ramtil, toria, cauliflower, cabbage, niger, kulthi and wheat (sowing) in Chhattisgarh.

Annexure II

List of Varieties

Assam

***Boro* rice:** Boro 1, Boro 2, Mashuri, Proagro-6444, KRH-2, IR-50, Bishnuprasad, Jyotiprasad, Kanaklata, Cauvery, Banglami, Joymati and Dinanath.

Wheat: Sonalika, UP 262, K 7410, WH 291, HDR-77, DBW-14, HUW - 468.

Lentil: B-77, L-9-12, PL 406 and PL 81-4.

Tomato: Punjab Suhara, Avinash, Pusa Ruby, Arka Alok, Sioux, Punjab Keshri, Arka Abhijit, BT-1.

Onion: Pusa Red, Pusa Ratnar, Pusa White, N-53.

Garlic: Eknalio, T-56-4 and other local varieties.

Rapeseed and mustard: M-27, TS-36, TS-38 and TS-46.

Potato: Kufri Chandramukhi, Kufri Jyoti, Kufri Sindhuri.

Niger: NG-1, GA-5.

Manipur

Pea: Arkel, Azad, Rachana.

Potato: Kufri Megha, Kufri Jyoti.

Rapeseed / mustard: M-27.

Tripura

Cauliflower: CFL-4048, Pusa Early Synthetic, Kamaya, Suhasihi.

Cabbage: BC-76, Pusa Drum Head, Pusa Synthetic.

Broccoli: Everest, Ayeshwaria.

Mizoram

Cabbage: Golden Acre, Ryozeki, Harnil; late varieties – Pusa Drumhead, Drumhead Late.

Broccoli: Pushpa, Pusa Broccoli, Aishwarya and Fiesta.

Cauliflower: Snowball -16, Pusa Early Synthetic-1 and 2, Pusa Shubhra, Pant Gobhi – 2 and Patna Ageti.

Meghalaya

***Boro* rice:** NEH Megha Rice-1, NEH Megha Rice-2.

Potato: Kufri Chandramukhi, Kufri Jyoti, Kufri Megha, Kufri Badshah, Kufri Sindhuri.

Orissa

Sunflower: Morden, Sunrise, Surya and Hybrid varieties like KBSH-1, KBSH-3 and MSFH.

Groundnut: Smruti, TAG-27, TAG – 24, JL-24, AK-12-24 and TMV-2.

Wheat: Sonalika, Kalyansona, UP-262, HD 2733, HD 2824, PBW 343, PBW 443, UP 262, RW 346, HP 1761, HP 1731, K 9107.

Mustard: Parbhat, Anuradha, TS-294, M-27, Pusa Jaikisan, Pusa Bold.

Green pea: Rachana, Arkel, T-163.

Onion: Nasik Red, Patna Red, Pune Red, Bellary Red, Pusa Ratnar, Pusa Madhavi, Arka Niketan, Arka Pragati, Agri found Light Red, Agrifound Dark, Punjab Selection, Patna White, Bombay White, Pusa White Round, PKM-1.

Banana: Cavendish and Robusta.

Potato: Kufri Chandramukhi, Chamatkar, Kufri Jyoti, Kufri Sinduri and Kufri Alankar.

Bengal gram: Gourav, Annegiri, Radhey.

West Bengal

Banana: Mortoman, Chapa, Kathali, Singapuri.

Cauliflower: Pusa Dipali, Pusa Chetaki.

Tomato: Baisali, Indam 1116, Akash.

Mustard: Sita, Vagirathi, Baruna, Agrani, Panchali, Sarama, B-54, M-27, Sanjukta etc.

Boro Rice: Supriya, Jamini, Bhupen, IET-2233.

Wheat: PBW-343, K-307, UP-262, Janak, C-306, Raj-911.

Potato: Kufri Jyoti.

Sunflower: Mordent, Sideshow (80-85 days), Pack-36 (104 Days), M.F.S.H.-17 (104 Days), Sungin-85 (80-90 days), B.S.H.-1 (85-90 days).

Jharkhand

Lentil: P.L.-406, P.L.- 639, D.P.L.- 15, D.P.I.-62 etc.

Green Pea: Swarn Rekha, Arkel, Azad Pea, Kashi Nandini, PE-6, Birsa Matar, Rachna, D.D.R. etc.

Potato:

Short duration: Kufri Ashoka and Kufri Pukhraj.

Long duration: Kufri Surya and Kufri Puskar.

Niger: Birsa Niger-1, Birsa Niger-2.

Tomato: Pusa Ruby, Swarna Sampda, Swarn Lalima.

Cabbage: Golden Acre, Pride of India, Early Drum Head.

Cauliflower: Pusa Deepali, Patna Early, Hazipur Extra Early, Pusa Ketki.

Papaya: Pusa Giant, Pusa Dwarf, Honey Dew, Pusa Majesty.

Mustard: Shivani, Pusa Jaikisan, Pusa Bold, Vardan.

African marigold: Pusa Narangi, Pusa Basanti.

French marigold: Petite Orange, Petite Yellow, Rusty Red, Lemon Drop.

Onion: Pusa Red, Pusa Ratnar, N-53, Arka Niketan, Arka Kalyan, Agri found Dark Red.

Chick Pea: Birsa Chana – 3, B.G. – 372, B.G. – 256, K.W.R. – 108, Pant G. – 108, 114 and Kabuli type varieties like B.G. 1053, 1003, H.K.-94-134 and Kak 2.

Linseed: Shubhra, T. – 397, Sweta.

Wheat:

Irrigated varieties: K-9107, HUW-468, HD-2733 and Birsa Genhu-3.

Unirrigated varieties: H.D.R.-77, K.-8027, C.-306, K.-8962, K.-8027etc.

Bihar

Cauliflower: Aghani, Pusa Dipali, Pusi, Patna Main, Pusa Shuvra, Late variety - Maghi, Snow King, Pusa Snow

King 1, Pusa 2, Pusa Snow ball 16.

Cabbage: Late Drum Head and Pusa Drum Head.

Rapeseed: RAUTS-17, PT-303, Panchali and Bhawani.

Mustard: Rajendra Sarson-1 and Swarna.

Potato: Kufri Lalima, Kufri Kuber, Kufri Alankaar, Kufri Jyoti, Kufri Chandramukhi, Ranjendra Aloo 1, 2 and 3, Kufri Badshah.

Gram: Rajendra Chana, Uday, Pusa 256, RAU 52, SG2.

Lentil: BR 25, Pant L406, 639, Malika, Arun.

Peas: Ratna, Arpana, Harbhajan, Malbai, Malviyamator 15, Pusa Prabhat.

Maize: Saktiman 1, 2, 3, 4; Laxmi, Rajendra Shankar Makka 1 and 2, Ganga 11, Deoki, Safed Laxmi, Suwan Peela.

Rai: Baruna, Pusa Bold and Kranti.

Sunflower: Morden, Surya, Paradovic, KBSH 1, 44.

Delhi

Wheat (Late sown): P.B.W.373, WR-544, U.P.2338, U.P.2425.

Himachal Pradesh

Lettuce: Iceberg

Brinjal: Arka Nidhi, PPC

Ageti bhindi: P-8, Prabhini kranti, Arka anamika

Frenchbean: Contender

Pepper: Surjmukhi

Broccoli: Palam Samridhi

Rajmash: Triloki,Jwala,baspa Kailash

Raddish: japani white and early mino white.

Turnip: PTWG-1.

Cabbage, coriander: Snowball K-1 Palam uphar, golden acre.

Knol khol: White Bina.

Cauliflower: Pride of India

Jammu & Kashmir

Wheat: VL-738, PBW-396, PBW-175, IWP-72 and RSP-81 (jitto) for rain fed areas and VL-804 and HS-240, HD2428, HD2329 and CPAN3004 under rain fed and irrigated area PBW-550, PBW-343, Raj-3077, RSP-303, DBW17, PBW 502, HD2687 and WH 542) under irrigated areas and PBW 175,PBW 396 and RSP81

Barley : var. Ratna, Jyoti and Sonu

Mustard: RSPR-01, RLM-514, RLM-619, Pusa-Basant, Pusa-Bahar, Kranti, Varuna, RH –30 and RL 1359.

Gram : C-235, K-468, Gourav and PBG-1

Field pea : T-163, PG-2, Rachna, HFP-3

Vegetable crop like radish (var. Pusa chetki, Japanese white & Pusa reshmi), carrot (var.Pusa kesar), turnip (var PTWG), garlic (var. local, large segmented), spinach (prickly seeded) and methi (P.E.B.K methi), Cauliflower (var. Pusa Dipali), knoll khol (White Vienna), Broccoli (Early green).

Berseem : mascavi, pusa giant, BL-1.

Lentil: L-9/12, PL-406 and L-4147.

Punjab

Wheat: PBW 621, DBW 17, PBW 550, PBW 502, PBW 343, WH 542, PDW 291, PDW 274 and PDW 233

Gobhi sarson: GSC-5, GSL-1, GSL-2, PGSH-51, Hyola (PAC-401)

African sarson: PC-5,

Radish: Japanese White, white Icicle,

Turnip: Golden Ball,

Raya: PBR-210 and PBR 91 for South Western regions only. 23

Haryana

Wheat: PBW 621, DBW 17, PBW 550, PBW 502, PBW 343, WH 542, PDW 291, PDW 274 and PDW 233.

Barley: PL807, DWRUB52, VJM 205, PL 419 (Kandi Area),PL 426, PL 172

Gobhi sarson: GSC-5, GSL-1, GSL-2, PGSH-51, Hyola (PAC-401)

African sarson: PC-5,

Raya: PBR-210 and PBR 91 for South Western regions only.

Radish: Japanese White, white Icicle,

Turnip: L-1, Carrot: Selection 21 and PC-34

Sugarcane: CoJ85.CoJ64, CoJ83

Uttarkhand:

Barley: Jyoti, Vijaya, or Jagrati and Oat varieties like UPO-50, UPO-212, JHO-822, Kent etc.

Potato: Kufri Bahar, Kufri Jawahar, Kufri Ashok, Kufri Anand.

Wheat: UP-2338, UP-2425, UP-2526, PBW-373, UP-2565, UP2572, UP2584, UP1109, PBW343

Sarson: BLJ 56, 85, 01, Pant JS 01, Pant Masoor 4, 5, BL masoor 125, 126, BL matter 3, 7,

Potato: Kufri badshah, Kufri lalimaa, Kufri sindhuri, Kufri Sutlej and K.bahar

Chickpea: Avrodhi, Radhey, Pant G-114 or Uday

Pea : Pant Matar-5, Type-163 or Aparna ; for Rajmash PDR-14 or VL Jamash-63.

Uttar Pradesh:

Gram: K-850, Avarodhi, Radhey, Pant G-144, K.W.R.-108, K.D.G.-1168, Kabuli chana- Sadabahar, Pragati L-550, Pusa-267, 362, BG-244, C-214, Uday, GD1168, KWR108, JG315, Pusa-256, K-5, QR-108, Pragati, Pusa-267, L-550, Kabuli.

Linseed : T-397, Nilam, Heera, Garima, Sweta, Subhra, Kiran, Sheetal, Gourav, Padmini,

Lentil: 7, Narendra Masoor-1, K-75, Pant Masoor, 406, 4, L-4076, DPL-15, IPL-81,

Safflower: K-65, Malaviya-305

Pea: Rachana, Pant Matar-5, Aparna, Shikha, Malviya,Pea-15,KPMR-400, 522, Pant Pea-5, Sapna, Orkel, Azad-2, 3, P-3, Malviya Matar -2, 15, K.F.P.D.-103, Sapna

Jai: Kent U.P.O.-94, 50, O.S.-6, J.H.O.-822, 851, U.P.O.-212, 822, 851, bundle jai-99-2, FOS-1/29, Algerian.

Rabi Mustard:-Vaibhav, Varuna (Ta-59), Vardan, Kranti, Rohini, Pitambari

Berseem: Bundelkhand berseem(J.H.T.B.-146), Vardan, Meskavi, V.S.-1.

Sugarcane : KBHA-8436, 88230, 96268, 98231, KS-95436, 00235, 03234, 01235, KJ-64

Tomato-Azad type-5,6

Potato : Ku-Lalima, Ku- Chandramukhi, Ku-Ashok, Ku-Chipsona-1, 2, Ku- Bahar, Ku- Pokharaj, Ku- Ashoka

Wheat: Malviya – 234, UP-2338, PVW-373, UP-2425, Narendra wheat-2036, 1014, K-9533, K-9162, HD-2428, HD-2189, HD -2733, UP.-2425, PBW-343, HD-2428, Raj-3765, HI-1077, UP-2425, PBW-435

Barley : irrigated var. (Jyoti, Manjula, Preeti, Jagriti, NDV-940, R.S.-6, Narendra J-1,2,3,), non-irrigated var.(K-144), Lakhan, Haritama, K-603, Gitanjali)

Garlic: Jeevan, G-50, 282, 41

Fodder berseem: JHDB-146.

Cumin : RS1,NC43

Rajasthan

Wheat: HD-2329, H.D. 2009 (Arjun), WH147, PBW502, Raj-3765, Raj-3077, Raj-3777, Raj.4037, Raj-3765, Raj-3077, Raj-4037, Raj-4083, Raj-4120, Raj-1482 & Lok-1 are improved varieties, WH-147, GW-190, GW-322 and GW-273.

Un-irrigated: Sujata, A.9-30-1, D.134, Mukta, H.W. 2004, H.D.4672, J.W.S. 17, HI-1500 and HI-1531

Barley: RD-2052, RD-2508, RD-2503, RD-2660, RD-2035, RD-2592, RD-2624, RD 2035, RD 2052, RD 2503, RD 2668, BL 2 & RD-2552 are improved varieties, irrigated: R.D.B. 1, R.D. 103, R.D. 57 unirrigated – R.D.-31 salted soil : B.L.2

Taramira:-T-27 and RTM-314,

Oat: kent,

Gram: GNG-663 (Vardan), GNG-469 (Samrat), GNG-1581 (Gangaur), GNG-1499 (Gauri), GNG-1292 (Kabuli), C-235,G130, GNG 16, RSG 44, C235, H 208, Dahod yellow ICCV 10, RSG 888 (Anubhav), RSG-963, RSG-973, CSJD-884 (Aakash), RSG-802, Pusa-209, B.G.256, Phule and Pratap chana 1, .

Onion: Pusa Red, Pusa Madhavi, Arka, Niketan, Local Red and Pusa white.

Radish: Pusa Deshi, Japani white and Hill queen

Autumn vegetables: Tomato: Pusa Rubi, Pusa Earli and Vihar, Brinjal: Pusa Summer Prolific Round, Pusa Summer Prolific Long, Meghdoot and Arka Bahar, Cauliflower: Pusa Snowball 1 and Hissar 1, Cabbage: Pusa Drum Head and Hybrid 10, Radish: Japanese White and Hill Queen

Opium poppy : Chetak.

Karnataka

Green gram: PS-16

Black gram: T-9, TAU-1

Cow pea: C-152, TVX-944

Horse gram: PHG-9

Bengal gram: Annigeri 1 and JG-11, ICCV-10, GBS-964, ICCV-2(Kabuli)

Sunflower-KBSH-1, KBSH-42, KBSH-44.

Groundnut-ICGS-11, K-134, Chinthamani-2

Andhra Pradesh

Red gram: LRG-38,LRG-41,WRG-27,ICPL-84031,PRG-100,PRG-158

Green gram:LGG-407, LGG-410, LGG-450,TM-92,PU-31

Black gram: LBG-752, LBG-623, LBG-20,T-9

Bengal gram: JG-11, Annegiri, Jyothi, ICCV-2(Svetha), 10, 37, JG-130 and JAKI- 9218

Groundnut: Kadiri-3,4,5,6; Tirupati-4, Narayani, Vemana and Greeshma Kadiri-3,4,5,6; tirupati-4,Narayani, Vemana and Greeshma

Paddy: BPT-5204

Gujarat:

Wheat: GW- 496, 503, 273, 322, 190, 276, Lok-1.

Wheat (late sown): Lok-1, GW-120, GW-173, GW-405.

Rabi Maize: Ganga Safed-2.

Irrigated gram: Gujarat Chick pea-1, Dahod Pila, ICC-4.

Gram: Gujarat Chick pea-2 (for dry farming).

Cluster bean: GC-1, 2.

Cauliflower: Pusa Early, Pusa Dipali, Pusa Kartiki, Early Kuvari, Pusa synthetic, Early Snowball, Jayayant Snowball, Pusa Snowball, Super Snowball, Snowball-13.

Cabbage: Kranti, Golden Acre, Pride of India, Coppen Market.

Onion: Pusa Red, Nashik Lal, N 53 and H 48.

Potato: Kufri Badsaha, Kufri Pokhraj, Kufri Lokar.

Spices: Methi kasuri or Pusa early branching (Fenugreek), Guj. Coriander 1 or 2 (Coriander), Guj. Cumin 1, 2, 3, 4 (Cumin).

Maharashtra:

Irrigated wheat: NIAW-34 (Sarbati) variety in Madhya Maharashtra for late sowing.

Rabi Sunflower: Modern, S.S.56, B.S.H-1 in Konkan.

Banana: Basrai, Shrimanti, Grandnaine.

Rabi tomato: Dhanashri, Bhagyashri, Phule Raja (hybrid).

Rabi groundnut: TG-26, TAG-24, TPG-41, Konkan Gaurav, Konkan Tapora.

Mustard: Pusa bold, Varuna.

Lucerne: R.L. 88, Sirsa-9, Anand-2.

Barseem: Vardan, J. B.-1, Meskawi.

Madhya Pradesh

Wheat- Early sown varieties: Sujatha, HW 2004 or HI 1500 HI -1500, HI-1531 and HD 2004, JWS- 17, HD-4672. Jaki 9218 MP-1142, MP-4010, MP-1201, MP-1202, Lok-1 Time Sown Varieties: GW-173, GW-273, GW-322, GW-366, HI- 8498, HI -1418, HI, 1479, HI – 1544

Bengal gram -JG 1

Sugarcane- Jawahar-86141, Ko-Jawahar-86141, Ko-Jawahar-86572, Ko-Jawahar8632, Ko-6304, Ko-C-671

Garlic-G-283, G-1, G-41 or G-323

Gram-JG-14, JG-06, JG-63, JG-11, JG-11, JG-130, JG-16, JG-322 and JG-01

Mustard-Pusa Mahak, Pusa Agrani, Pusa Jaikisan, Pusa Bold, Jaggannath

Linseed-PKDL-21, JL-1, JL-3, Mallika, JLS-1, IPL-81

Lentil-JLS-03

Maize-JVM -421, JM-16

Pea- Jawahar pea1and 2

Chhattisgarh

Wheat-GW-273

Potato-Kufari Lalima, Kufari Pukhra

Sugarcane- Co 86032, Co 86141

Annexure III

Contour maps for Relative Humidity, Cloud Amount and Wind speed for the week ending on14.12.2011 Relative humidity ranged between 80% and above over most parts of Uttarakhand, Sub-Himalayan West Bengal & Sikkim, Lakshadweep, Andaman Nicobar Islands, some parts of Punjab, Haryana, Uttar Pradesh, Bihar, Jharkhand, Assam, Gangetic West Bengal, Tamil Nadu, Kerala, 40 to 60% over most parts of Rajasthan, West Madhya Pradesh, Gujarat, Saurashtra & Kutch, Madhya Maharashtra, Marathwada, North Interior Karnataka, some parts of Jammu & Kashmir, Vidarbha, south Interior Karnataka, Telangana, East Madhya Pradesh, 60 to 80% over remaining parts of the country. Cloud amount 6 okta and above over some parts of Andaman & Nicobar Islands, 4 to 6 okta over most parts of Tamil Nadu, Andaman Nicobar Islands, some parts of Arunachal Pradesh, Assam, Kerala, South Interior Karnataka, Lakshadweep, 2 to 4 okta over most parts of Sikkim, Assam & Meghalaya, Nagaland, Manipur, Mizoram, Kerala, South Interior Karnataka, Coastal Karnataka, Raylaseema, Lakshadweep Island, some parts of Himachal Pradesh, Uttarakhand, West Uttar Pradesh, Sub-Himalayan West Bengal, Coastal Andhra Pradesh, Tamil Nadu, North Interior Karnataka, 0 to 2 okta over remaining parts of the country.

Wind speed ranged between 10 knots and above over west Madhya Pradesh, 6 to 8 knots over some parts West Madhya Pradesh, 4 to 6 knots over some parts West Madhya Pradesh, Orissa, Coastal Andhra Pradesh, Tamil Nadu, Kerala, 2 to 4 knots over some parts of Saurashtra & Kutch, Gujarat, West Madhya Pradesh, Konkan & Goa, Karnataka, Kerala, Tamil Nadu, Lakshadweep, Andaman & Nicobar Islands, 0 to 2 knots over remaining parts of the country.

7.2 State agro-met advisory bulletin

AAS Composite Bulletin

Issued by

Meteorological Centre Shimla

In collaboration with

CSK Agriculture University and Dr. YS Parmar University of Horticulture & Forestry

Himachal Pradesh

Dated 03rdFebruary2012

FRUITS

Apply FYM during January along with phosphorus and potash.

Fertilizers should be applied 30 cm away from the trunk in old trees and not to be applied in too wet or too dry soils.

Planting of new plants is done from December to March.

Irrigation to newly planted trees is necessary for getting high survival rate.

While planting, the roots should be intact and properly spread in their natural position before covering with soil.

Trees should not be planted deeper than their natural position in the nursery. The graft union should be 25-30 cm above ground level to avoid collar rot.

Before planting, the nursery plants with bare roots should be sprayed or dipped in copper fungicide solution for destroying fungal pathogens.

Young plants, if needed, should be provided with stakes, which should not damage the roots.

Pruning can be done during winter. Young and old trees can withstand little more pruning but bearing trees need only

Corrective pruning.

While pruning remove all the dead, diseased, insect infected, and intermingled branches from the tree.

All the pruning cuts should be covered with a fungicidal paint after pruning.

Vegetable

After irrigating the peas digging may be carried out.

Harvest ginger and store it.

Add second dose of nitrogen at the rate of 7 kg per bigha in cabbage and cauliflower sown during October & November.

Cereals and Others

Rainfall is expected in next seven days.

In the late planted wheat crop where weeds are 2-3 leaves stage, Spray

isoproturon @80 gram per 30-32 liters of water in one kanal for the control of weeds.

Skip irrigation. is advised.

In wheat crop remaining dose nitrogen may be applied.

Aphids attack is expected more after rains, for control spray 30 ml

cypermethrin 10 EC per 30 liter of water per kanal area.

Spray glyphosate 1% solutions in the grasslands/pastures having lantana bushes with 2-3 leaves stage.

Yellow, brown and black rust is expected in this weather for control spray Dithane M-45 @ 2g per liters of water at

15 days interval.

Termite affected plots may be treated with 80 ml chloropyrophos mixed

With 1kg of sand and spread over one kanal area of plot.

Spray glyphosate 1% solutions in the grasslands/pastures having lantana bushes with 2-3 leaves stage on bushes only.

Apply urea to irrigated crop of oat where first cut has taken.

Remove and cut bushes from grassland for good crop in next season.

Stored Wheat and potato;

These days weather is conducive for attack of stored grains pests like rice weevil, lesser grain borer and rice moth.

In Grain store bins put one pouch of celhpos (3g) or quickphos (12g) or Fumino pouch in a wet cloth in the middle of bin and keep the bin airtight for some time. This will protect the wheat grains from stored grains pests.

To protect the potato from tuber moth spray cypermethrin@8ml mix with

One kg sand and spread on one quintal potato or make 2 cm layer of dry

Leaves of phulunu on floor.

Vegetables

It is optimum time for nursery sowing of Tomato, Brinjal, chilies and capsicum crops in poly house.

Summer squash crop should be raised in poly tubes in the poly house so

that plant may be ready after 15 days for transplanting in the field.

Ensure the treatment of formalin into soil before nursery sowing for damping off as recommended by CSKHPKV, Palampur.

Downy mildew in Cole crops is appearing, as weather is conducive, for the control spray Dithane M-Z 2-3 g per liters of water at the interval of 10-15 days.

If yellow color eggs are seen in Cole crops then spray rogur @1 ml per liters of water.

For control of powdery mildew in peas spray celfex@25 g per 10 liters of water of karathane@5 ml per 10 liters of water.

Rains are expected so skip the irrigation to crops.

French bean Bhindi sowing can be done.

Floriculture

- The intercultural operations and weeding can be done in the flowerbeds.

- Burn the dried leaves or grass or inert material in the garden so that ill effects of frost can be avoided.
- The flowers affected with aphids, spray malathion/metasystox @0.1% for the control.

Horticultural Crops/ Tea

Horticultural Crops:

- Protect the plants of mango and litchi from frost.
- Put polythene grass thatch on north side of the plant.
- Pruning works in peach pear plum almonds can be taken up.
- Also apply FYM and phosphorus and potassium fertilizers to plants.
- Rains are expected so skip the irrigation to crops.

Tea:

Sniffing and pruning work can be carried out in the tea orchards.

The large trees causing shadow may be lopped so that tea plants can receive enough sunshine.

Start the seed stratification of tea seeds so that it can be planted during February and March.

Animals

Feed pregnant and lactating cows and buffalos with balance feed including mineral mixture.

The night temperature is falling and the newly born calves may be protect from the cold .As the weather is conducive for white scour, naval ill and pneumonia.

To compensate the green fodder animals should be give uromin bricks for 5 minutes in the morning and evening to avoid the vitamins deficiency and to maintain the reproductive capacity of the animals.

For milch animals follow schedule of 1 kg feed+50g mineral mixtures per 2 liters of milk. This schedule will maintain the reproductive ability of animals.

Ensure cleanliness in cows having advanced pregnancy to avoid mastitis.

The newly born calves should be dehorned within one month of their birth and feed them with colostrum's.

Poultry

- Protect the birds from cold and increase the feed by 10%.
- Raise the temperature of the poultry enclosures using bhukhari otherwise Chances of death of birds increases as the birds mount each other and increase the poultry Feed by 10%.
- For the attack of cocksedia disease consult the nearby veterinarian.
- Replace the poultry houses with fresh litter to avoid wetting.
- Put marble (calcium) grits for calcium for layers.

Mushroom Cultivation

- It is good time for taking white button mushroom and Dingri in the closed room.
- For harvesting a good crop fill the 20kg bag with compost and mix the span in it.

- Maintain room temperature 18-22 0C and relative humidity around 85% for successful Cultivation.

Honeybees

The temperature has fallen and expected to fall further, so give the winter packing immediately to colonies.

Check the colonies for nectar and Give artificial food to honey bees, as there is scarcity of flowers during these days.

Keep colonies in sun on clear day.

Fisheries

It is time to disinfect the fish tank by draining out the water and exposing the bottom floor of the tank to direct sunlight

Apple & Other

1.There are good moisture in the soil due to good rainfall and snowfall during the last week. Prepare the basins of the plants. For new orchard plantation of the nursery should be done in the already dug pits.

2.Mix the FYM in the basin of apple tree @ 100 kg, Super phosphate (2 kg once in two years) and Potash @ one

Kg per plant. The FYM should be well rotten. Fertilizers should be mixed in the basin at one foot distance from the

Stem and under the whole canopy of the plant.

3. Do training and pruning in the stone fruits and pomes fruits. In temperate fruits the Canker affected parts of the

Plant should be removed and the removed end should immediately be applied with Fungicide paste. The Removed parts should be buried or burn out.

4. Do necessary operation and management to protect the young plants and vegetables from ground frost

5. Give packing of grass, gunny bags etc. in apiaries.

Vegetables/Floriculture

Polyhouse

- Stage; Vegetative Growth
- Close polyhouse
- Can use the polyhouse for keeping the apple plants under protection
- Irrigate crops only once in week

Apple, Seabukthorn & other temperate fruits

STAGE dormant Pest/Diseases rats Protect the plants from damage of snow by removing the snow. If Damaged used chopati paste.

For the control of rats use carbofuron granules (25g/tree) near trunk.

Do not go for fresh apple planting at present.

The apple plants damaged by snow need to be treated with chopati paste/fungicides and remove heavy snow from branches particularly in orchards where pruning is yet to be done.

Pits for new plants can be made and plantations in some areas can be done.

Animals

Fever in animals keep watch

Do not allow the animals for grazing

Protect the small animals.

Give concentrates to lactating animals.

Energy rich diets to animals is must

Field crops

Wheat,peas,french bean

Saffron,kala zira ,rajmas

7.3 District Level Agro met advisory bulletin

Example Agro-met Advisory Service **District Kangra, Una, Hamirpur & Chamba**

Agro met Advisory Service bulletin for the District Kangra, Una, Hamirpur & Chamba

IAAS, Palampur, CSK Himachal Pradesh Agricultural University, Palampur-176062, H.P. India & India

Past Weather								Weather Forecast						
Temperature	Max temperatures were normal.							**Weather Parameter/Date**		**24th h**	**25th**	**26th**	**27th**	**28th**
	Highest Temp	Saloni: 11.0 on 18th Dec.						**Rainfall** (mm)		0	0	0	0	0
	Min temperatures were normal							**Temp** (C)	**Max**	8	9	9	9	9
	Lowest Temp	Saloni (-) 0.5on 22nd Dec.							**Min**	0	1	1	0	1
Precipitation in (mm)	The weather was mainly dry..							**Cloud** (Octa)		0	2	2	1	0
	Date	17th h	18th h	19 h	20th	21 st	22nd	**Humidity (%)**	**Morning**	49	31	51	38	43
	Chamba	0.0	0.0	0.0	0.0	0.0	0.0		**Evening**	10	9	10	12	15
	Tissa	0.0	0.0	0.0	trace	0.0	0.0	**Wind speed** (kmph)		7	7	9	7	9
	Saloni	0.0	0.0	0.0	0.0	0.0	0.0	**Wind direction**		SE	ENE	ENE	ENE	ENE
	Kheri	0.0	0.0	0.0	0.0	0.0	0.0	7days **Cumulative r/f** (mm): from 24th Dec. To 30th Dec.					**0mm**	

Meteorological Department, New Delhi

Tel: +91-1894230392, 232245; Fax: 91-1894230406; e-mail: rsrana@hillagric.ernet.in;

Bulletin No. December/6/2011 **Dated: 23 December 2011**

Forecast and past Weather for district Chamba

Vegetables: Agro Advisory Bulletin

Cereals and Others: *No rainfall is expected in next seven days*. ***In the timely planted wheat crop where weeds are***

2-3 leaves stage, spray isoproturon @80 gram per 30-32 litters of water in one kanal for the control of weeds.

Skip irrigation to crops.

One-month-old transplanted cole crops may be applied with first dose of urea along with earthing up operation. For the sowing of potato treat the tubers with Dithane M-45 @ 0.5% for 20-25 minutes. The downy mildew is expected in cruciferous vegetables, for control spray redomil M-Z @ 25 g per liters of water at 15 days interval. For control of powdery mildew in peas spray celfex@25 g per 10 liters of water of karathane@5ml per 10 liters of water. **Apply irrigation to crops. Frost is expected so, protect vegetables crops.**

Floriculture: Planting of the winter flowers annuals Viz. Calendula, Aster, larkspur, and dianthus, African daisy. Stasis, lupines, petunia flox, nicotiana, vanadium and torinia should be done. Flowers can be raised in the pots, hanging pots rocks eyc. Keep the flowers beds free from the weeds, The flowers affected with aphids, spray malathion @0.05% for the control.

Horticultural Crops: Delay the planting the winter fruit plants Viz. Peacanut, Walnut, almonds, plum Peach persimmon, pear and kiwi. Weather condition is also conducive for cleaning and preparation of basins in the orchards.

Tea: Training, skiffing and cleaning work can be completed in the tea. In nursery of tea plants irrigation me ensured. Do lopping of the tree in the tea orchards to have more sunlight. The skiffed material may be used to prepare compost so that it could be applied in next season.

Animal: Feeding pregnant and lactating cows and buffalos with balance feed including mineral mixture. The night temperature is falling and the newly born calves may be protected from the cold. To compensate the green fodder animals should be give uromin bricks for 5 minutes in the morning and evening to avoid the vitamins deficiency and to maintain the reproductive capacity of the animals. For milch animals follow schedule of 1 kg feed+50g mineral mixtures per 2 liters of milk. This schedule will maintain the reproductive ability of animals. It has been observed that dairy animals are deficient in minerals elements, which are the sole reason of repeat breeding, and other gene related diseases in animals. So ensure to give 50 g mineral mixture to animals daily. Ensure cleanliness in cows having advanced pregnancy to avoid mastitis. **Poultry:** Protect the birds from cold and increase the feed by 10%. For the attack of cocksedia disease consult the nearby veterinarian. Replace the poultry houses with fresh liter to avoid wetting and keep the houses clean and ensure clean drinking water to the birds. Put marble (calcium) **grits for calcium for layers**

Mushroom cultivation: For harvesting a good crop fill the 20kg bag with compost and mix the span in it. Maintain room tempearture18-22 o C and relative humidity around 85% for successful cultivation. For Oyster mushroom crop 16-22 o C temperature may be maintained.

Honeybees: the temperature has fallen and expected to fall further, so give the winter packing immediately to colonies. Check the colonies for nectar and Give artificial food to honeybees, as there is scarcity of flowers during these days. And keep colonies in sun on clear day.

Fisheries: It is time to disinfect the fish tank by draining out the water and exposing the bottom floor of the tank

to direct sunlight.

Nodal Officer

Department of Agronomy

7.4 Block/Panchayat Level agroment advisory bulletin

INDIA METEOROLOGICAL DEPARTMENT
MULTIMODEL ENSEMBLE BASED DISTRICT LEVEL WEATHER FORECAST
ISSUED ON: 15-01-2012
VALID TILL 08:30 IST OF THE NEXT 5 DAYS

DISTRICT : KULU STATE : HIMACHAL PRADESH

PARAMETERS	ENSEMBLE FCST				
	DAY-1 16/01	DAY-2 17/01	DAY-3 18/01	DAY-4 19/01	DAY-5 20/01
Rainfall (mm)	19	4	0	0	0
Max Temperature (deg C)	8	7	9	7	7
Min Temperature (deg C)	1	0	-3	-4	-5
Total cloud cover (octa)	4	1	0	0	0
Max Relative Humidity (%)	83	82	81	77	67
Min Relative Humidity (%)	57	57	46	44	34
Wind speed (kmph)	013	011	007	009	013
Wind direction (deg)	120	110	110	100	110

8 Annexure B – State wise agro climatic zone

Sr.No.	Forecast Issuing Authority	Agro climatic Zone	Receiving Station	District weather forecast to be communicated
1	MC, Hyderabad Andhra Pradesh	North Coastal Zone	Anakapalle	Srikakulam Vizianagaram Visakhapatnam
		Scarce Rainfall Zone of Rayalaseema	Anantpur	Anantpur, Kurnool
		High Altitude Tribal Zone	Chintapalle	East Godavari Khammam
		Southern Telangana Zone	Hyderabad	Hyderabad Mahabubnagar Nalgonda Rangareddy
		Northern Telangana Zone	Jagtiyal	Karimnagar Nizamabad Warangal Medak Adilabad
		Krishna Godavari Zone	Lam(Guntur)	West-godavari Krishna Guntur Prakasam
		Southern Zone	Tirupati	Chittoor Cuddepah Nellore
2	RMC, Guwahati, Assam	Hill Zone	Diphu	Karbi Anglong North Cachar Hills
		Lower Brahmaputra Valley Zone	Gosaigaon*	Goalpara Kamrup (Rural) Nalbari Barpeta Bongaigaon Kokrajhar

				Dhubri
		Upper Brahmaputra Valley Zone	Jorhat	Golaghat Jorhat Sibasagar Dibrugarh Tinsukia
		Barak Valley Zone	Karimganj	Karimganj Hailakandi Cachar
		Central Brahmaputra Valley Zone	Shillongani	Nagaon Marigaon
		North Bank Plain Zone	Sonitpur	Dhemaji Lakhimpur Sonitpur Darrang
3	MC, Itanagar, Arunachal Pradesh	Sub Tropical Hill Zone	Basar	Anjaw East Kameng Lohit Papumpara East Siang West Siang Changlang Upper Siang Lower Dibang valley Tawang Upper Subansiri Lower Subansiri Dibang Valley Kurung Kume Tirap West Kameng
4	MC, Patna, Bihar	North West Alluvial Plain Zone	Pusa	West Champaran East Champaran Gopalganj Siwan

				Saran Sitamarhi Muzzaffarpur Madhubani Darbhanga Samastipur Sheohar Begusarai Vaishali
		South Bihar Alluvial Zone	Sabour	Sheikhpura Luckeesarai Jamui Munger Banka Bhabua Rohtas Aurangabad-bihar Buxar Bhojpur Jahanabad Gaya Nalanda Nawada Patna Arwal
		North East Alluvial Zone	Agwanpur	Saharsa Purnia Katihar Supaul Khagaria Madhepura Kishanganj Araria Bhagalpur
5	MC, Raipur,	North Hill Zone of	Ambikapur	Surguja

	Chhattisgarh	Chhattisgarh		Koriya Jashpur Ambikapur
		Bastar Plateau Zone	Jagadalpur	Jagdalpur Dantewara
		Chhattisgarh Plain Zone (including Balaghat District)	Raipur	Raipur Korba Raigarh Bilaspur Kabirdham Kawardha Rajnandgaon Durg Mahasamund Dhamtari Janjgir Kanker
6	MC, Ahmedabad, Gujarat	Middle Gujarat Zone	Anand	Panch mahal Dahod Vadodara Kheda Anand
		Bhal and Coastal Zone	Arnej	Ahmedabad Bhavnagar
		North West Zone	Bhachau	Kutch
		North Gujarat Zone	Dantiwada	Banaskantha Sabarkantha Gandhinagar Patan Mehsana
		South Sourashtra Zone	Junagadh	Junagadh Porbandar
		South Gujarat Zone	Maktampur	Surat Narmada Bharuch

		South Gujarat Heavy Rainfall Zone	Navasari	Dangs Valsad Navsari
		North Sourashtra Zone	Targhadia	Jamnagar Rajkot Amreli Surendra nagar
7	MC, Chandigarh, Haryana	Eastern Zone	Kaul	Panchkula Ambala Yamuna nagar Kurukshetra Kaithal Karnal Panipat Sonipat Gurgaon Faridabad Rohtak Mewat
		Western Zone	Hissar	Sirsa Fatehabad Hissar Bhiwani Mahendragarh Rewari Jind Jhajjar
8	MC, Shimla, Himachal Pradesh	Mild Hills Sub Humid Zone	Seobagh	Kullu Mandi Bilaspur-hp
		High Hill Temperate Dry Zone	Kukumsheri	Kinnaur Lahaul Spiti
		Sub-Montane & Low	Palampur	Una

		Hills Sub-Tropical Zone		Hamirpur-hp Kangra Chamba
		Mid Hills Sub-Humid	Nauni (Solan)	Solan Shimla Sirmaur
9	MC, Srinagar, J & K	Sub Tropical Zone	Chatha (Jammu)	Jammu Kathua Raisi
		Cold Arid Zone	Leh	Ladakh Kargil
		Intermediate Zone	Pahalgam(Rajo uri)	Doda Punch Rajouri Udhampur
		Valley Temperate Zone	Srinagar	Srinagar Badgam Kupwara Baramula Pulwama Anatnag
10	MC Ranchi, Jharkhand	Central & North Eastern Plateau Zone	Dumka	Sahebganj Godda Pakaur Dumka Devghar Jamtara Giridih Dhanbad Koderma
		Western Plateau Zone	Ranchi	Garhwa Palamau Latehar (not in map) Lohardaga Gumla

				Simdega(not in map) Ranchi Bokaro Hazaribagh Chatra
		South Eastern Plateau Zone	Darisai	Saraikela **(not in map)** West Singhbhum East Singhbhum
11	MC Bangalore, Karnataka	Eastern Dry Zone	Bangalore	Bangalore rural Bangalore Urban Kolar Ramnagar Chickballapura**r**
		North East Transition Zone	Bidar	Bidar
		North Dry Zone	Bijapur	Bijapur Bellary Gadag Bagalkot Koppal
		Coastal Zone	Brahamavar	Udupi Dakshin Kannad
		North Transition Zone	Dharwad	Dharwad Belgaum Haveri
		Hill Zone	Hiriyur	Chitradurga Kodagu Tumkur Davangere
		Southern Dry Zone	Naganhalli	Mysore Mandya Chamrajnagar
		Southern Transition Zone	Neveli	Shimoga Hassan
		North East Dry Zone	Raichur	Gulburga

				Raichur
		Central Dry Zone	Sirsi	Uttar Kannad Chikmangalur
12	MC Thiruvananthapuram, Kerala	High Altitude Zone	Ambalavayal	Wayanad Idukki
		Problem Areas Zone	Kumarakom	Alappuzha Kottayam
		Northern Zone	Pillicode	Malappuram Kozhikode Kannur Kasargod
		Central Zone	Trissur(Vellanikara)	Palakkad Thrissur Ernakulam Malappuram (North Part)
		Southern Zone	Vellayani	Thiruvananthapuram Kollam Pattanamthitta
13	MC Bhopal, Madhya Pradesh	Satpura Plateau Zone	Chhindawara	Betul Chhindwara
		Malwa Plateau Zone	Indore	Mandsaur Ratlam Ujjain Dewas Indore Shajapur Rajgarh Neemuch
		Kymore Plateau and Satpura Hill Zone	Jabalpur	Rewa Satna Panna Jabalpur Seoni

				Siddhi Katni Shahdol Umaria Mandla Dindori Balaghat Singrauli Anuppur
		Jhabua Hills Zone	Jhabua	Jhabua Dhar Alirajpur
		Nimar Valley Zone	Khargone	Khandwa Khargaon Harda Burhanpur Badwani
		Gird Zone	Morena	Gwalior Bhind Morena Shivpuri Guna Sheopur Asoknagar
		Central Narmada Valley Zone	Powerkheda	Narsingpur Hoshangabad
		Vindhya Plateau Zone	Sehore	Bhopal Sagar Damoh Vidisha Raisen Sehore
		Bundelkhand Zone	Tikamgarh	Chhatarpur Datia Tikamgarh

14	RMC, Nagpur, Maharashtra	Central Vidharba Zone	Akola	Akola Amaravati Wardha Buldana Washim Yawatmal
15	RMC, Mumbai	North Konkan Coastal Zone	Dapoli	Thane Raigarhmh Ratnagiri Mumbai
16	RMC, Mumbai	Western Ghat Zone	Igatpuri	Nasik
17	RMC, Mumbai	Sub Mountain Zone	Kolhapur	Satara Kolhapur Sangli
18	RMC, Mumbai	South Konkan Coastal Zone	Mulde(Kudal)	Sindhudurg
19	RMC, Nagpur	Scarcity Zone	Parabhani	Beed Osmanabad Parbhani Latur Jalna Hingoli Aurangabad Nanded
	RMC, Mumbai	Western Maharashtra Plain Zone	Pune	Solapur Pune Jalgaon
	RMC, Mumbai	Central Maharashtra Plateau Zone	Rahuri	Dhule Ahmednagar Nandurbar
20	RMC, Nagpur	Eastern Vidharba Zone	Shindewahi	Bhandara Gadchiroli Chandrapur Nagpur Gondia

21	RMC, Guwahati Manipur	Sub Tropical Plain Zone	Lamphelpat (Imphal)	bishnupur west Imphal east Imphal Tamenglong Chandel Thoubal Churachandpur Senapati Ukhrul

22	RMC, Guwahati Meghalaya	Temperate Sub Alpine Zone	Umiam (Barapani)	Ri-bhoi East Khasi hills West Khasi hills East Garo hills West Garo hills South Garo hills Jaintia hills
23	RMC, Guwahati Mizoram	Mild Tropical Hill Zone	Kolasib	Aizwal Lawngtlai Chimtuipui Champhai Lunglei Serchip Kolasib Mamit
24	RMC, Guwahati Nagaland	Mild Tropical Hill Zone	Jharanapani	Dimapur Mon Wokha Kohima Phek Zunheboto Mokakchung Tuensang
25	MC, Bhubaneswar,	East and South Eastern Coastal Plain Zone	Bhubaneshwar	Kendrapara Khurda

	Orissa			Jagatsinghpur Puri Nayagarh Ganjam Cuttack
		Western Undulating Zone	Bhawanipatna	Kalahandi Nauparha
		North Eastern Ghat Zone	G.Udaigiri	Phulbani Rayagada Gajapati
		North Central Plateau Zone	Keonjhar	Mayurbhanj Keonjhar
		North Eastern Plateau Zone	Keirei	Sundergarh Deogarh
		North Eastern Coastal Plain Zone	Ranital	Balasore Bhadrak Jajpur
			Malkangiri	Malkangiri

		Eastern Ghat High Land Zone	Similiguda	Koraput Nawarangapur
		West Central Table land Zone	Chiplima	Bargarh Bolangir Bauda Sonapur Sambalpur Jharsuguda
		Mid Central Table Land Zone	Mahisapat	Angul Dhenkanal
26	MC, Chandigarh, Punjab	Western Zone	Bhatinda	Moga Bhatinda Mansa Muktsar

				Sangrur Barnala
		Western Plain Zone	Faridkot	Ferozepur Faridkot
		Undulating Plain Zone	Gurudaspur	Hoshiarpur Gurdaspur
		Central Plain Zone	Ludhiana	Amritsar Kapurthala Jalandhar Ludhiana Fatehgarh Sahib Taran Tarn Navanshahar Mohali
		Sub-Montane Undulating Zone	Kandi	Rup nagar Patiala
27	MC, Jaipur, Rajasthan	Arid Western Plain Zone	Bikaner	Jaisalmer Bikaner
		Flood Prone Eastern Plain Zone	Bharatpur(Sewar)	Bharatpur Alwar Dholpur Sawai Madhopur Karauli
		Southern Humid Plain Zone	Banswara	Dungarpur Banswara
		Transitional Plain Zone of Inland Drainage	Fatehpur(Sikar)	Nagaur Jhunjhunu Sikar
		Semi Arid Eastern Plain Zone	Jaipur(Durgapura)	Jaipur Ajmer Tonk Dausa
		Arid Western Plain	Jodhpur	Barmer

		Zone	(CAZRI)	Churu Jalore Jodhpur Pali
		Southeastern Humid Plai Zone	Kota	Jhalawar Kota Bundi Baran
		Irrigated North Western Plain Zone	Sriganganagar	Sriganganagar Hanumangarh
		Sub Humid Southern Plain and Aravali Hill Zone	Udaipur(CTAE)	Udaipur Sirohi Bhilwara Rajsamand Chittaurgarh Pratapgarh
28	RMC, Chennai, Tamil Nadu.	North Eastern Zone	Chennai	Chennai Kancheepuram Tiruvallur Vellore Tiruvannamalai Cuddalore Villupuram
		Western Zone	Coimbatore	Coimbatore Erode Thiruppur
		Southern Zone	Kanniwadi	Pudukottai Madurai Dindigul Theni Ramanathapuram Sivaganga
		Southern Zone	Kovilpatti	Tuticorin Virudhunagar Tirunelveli

		Coastal Zone	Karaikal (Pondicherry)	Karaikal Puducheri Mahe
		Cauvery Delta Zone	Aduthurai	Thanjavur Nagapattinam Thiruvarur Karur Perambur Trichy
		North Western Zone	Namakkal	Salem Namakkal Dharmapuri Krishnagiri
		High Rainfall Zone	Pechiparai	Kanyakumari
		High altitude hilly zone	Ooty	Nilgiris

29	MC, Agartala, Tripura	2.1..1.1 Mild Tropical Plain Zone	Lembuchera (Agaratala)	North Tripura West Tripura South Tripura Dhalai
30	MC, Lucknow, Uttar Pradesh	Central Plain Zone	Allahabad	Fatehpur Pratapgarh Allahabad Chitrakut Kaushambhi
		Central Plain Zone	Varanasi	Varanasi Azamgarh Gazipur Chandauli Sonbhadra Mirzapur Sant Ravidas nagar Jaunpur Maunath

		North Eastern Plain Zone	Bharaich	Bahraich Shravasti nagar Balrampur Gonda Kushinagar Sidharth nagar Maharajganj
		Bundelkhand Zone	Bharari	Jalaun Jhansi Lalitpur Mahoba Banda Hamirpur
		Central Plain Zone	Kanpur	Kannauj Hathras Mathura Agra Etah Mainpuri Etawah Auraiya Kanpurdehat Kanpurcity Unnao Lucknow Sitapur Hardoi Lakhimpur Farrukhabad
		Western Plain Zone	Modipuram	Meerut Pillibhit Saharanpur Muzaffarnagar Bagpat Ghaziabad

				Noida Aligarh Bulandshahar Moradabad Jyotibaphulenagar Bijnore Badaun Bareilly Rampur Shahjahanpur Firozabad
		South Western Semi Arid Zone	-	-
		Eastern Plain Zone	Faizabad	Barabanki Raibareli Sultanpur Faizabad Basti Ambedkarnagar Sant Kabir Nagar Gorakhpur Deoria Ballia
31	MC, Dehra Dun, Uttarakhand	Bhabar and Tarai Zone	Pantnagar	Udham Singh Nagar Nainital
		Hill Zone	Ranichauri	Uttarkashi Chamoli Rudraprayag Pithoragarh Bageshwar Champawat Almora Tehri
		Sub humid sub tropic	Roorki	Dehradun

				Pauri Haridwar
32	RMC, Kolkata, West Bengal	Hill Zone	Kalimpong	Darjeeling
		New Alluvial Zone	Kalyani	Murshidabad Burdwan Nadia Hooghly North 24 Parganas Howrah
		Laterite and Red Soil Zone	Kharagpur	West Midnapore Bankura Puruliya Birbhum
		Terai Zone	Pundibari	Jalpaiguri Cooch bihar North Dinajpur
		Coastal Saline Zone	Kakdwip	South 24 Parganas West Midnapore
		Old Alluvial Zone	Majhian	South Dinajpur Malda
33	RMC, New Delhi,	Western Semi Arid Zone	New Delhi	Delhi
34.	Sikkim			East district west district north district south district
35.	Andman Nicobar		Port blair	Cari

9 Annexure C – Specifications of Generic Data Elements

Illustrations of Codification Scheme

a. Data element "Date" has three parts like: Day, Month, Year
Hence, reference numbers for Generic data element "date", and its parts would be as follows:

Domain name (xx): Common for all domain applications	**G00**
Data Element: Date (in dd/mm/yyyy) format)	G00.01
1st Part of Date : Day	G00.01-00-01
2nd Part of Date : Month	G00.01-00-02
3rd Part of Date : Year	G01.01-00-03

b. Reference number of data element "Measurement" and its instances (different ways of a measurement) like:

- Measurement of Distance in **Meters/ Kilometers/ Centimeters/ Millimeters**
- Measurement of Area in **Square Meters/ Kilometers/ Centimeters/ Millimeters /Hectares**
- Measurement of Volume in **Cubic Meter/ Cubic Centimeter / Cubic Milliliters**
- **Measurement of Weight in Gram / Kilogram**

Hence the data element "measurement" will have difference instances, which would have reference numbers as follows:

Domain name (xx): Common for all domain applications	**G00**
Generic Data element: Measurement	**G00.02**
Measurement- Distance in **Meters**	G00.02-11
Measurement- Distance in **Kilometers**	G00.02-12
Measurement- Distance in **Centimeters**	G00.02-13
Measurement- Distance in **Millimeters**	G00.02-14
Measurement- Area in **Square Meters**	G00.02-21
Measurement- Area in **Square Kilometers**	G00.02-22
Measurement- Area in **Square Centimeters**	G00.02-23
Measurement- Area in **Square Millimeters**	G00.02-24
Measurement- Area in **Hectares**	G00.02-25
Measurement- Volume in **Cubic Meters**	G00.02-31
Measurement- Volume in **Cubic Kilometers**	G00.02-32
Measurement- Volume in **Cubic Centimeters**	G00.02-33
Measurement- Volume in **Cubic Millimeters**	G00.02-34
Measurement- Weight in **Grams**	G00.02-41
Measurement- Weight in **Kilograms**	G00.02.42
Measurement – Weight in Quintal	G00.02.43

5.2 List of Identified Generic Data Elements

Three types of generic data elements have been identified in the present version of MDDS standard, as listed below:

- Domain No. 00 - Generic data elements Common across all Domain applications
- Domain No. 01 - Generic data elements specific to Person Identification
- Domain No. 02 - Generic data elements specific to Land Region codification

Note:

a. *With time, list of these domains would increase with standardization of generic data elements within the domains by using the above mentioned procedure of allocation of reference numbers to the identified data elements.*

b. *Storage format for all the Generic data elements in recognized Official language would be UTF-8, as recommended by Expert Committee on Indian Languages.*

5.2.1 Generic Data Elements Common across all the Domain Applications

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
G00.01 G00.01-00-01 G00.01-00-02 G00.01-00-03	Date - Day of the Month - Month - Year	Calendar date having three sub divisions like day, month and year	Date (dd/mm/yyyy)	10
G00.02 Measurement				
G00.02-11	Distance in **Meters**	The process of ascertaining dimensions (Distance, Area, and Volume) & quantity (Weight) in Metric system of measurement. ***Note: For the purpose of uniformity, three decimal places have been standardized for this generic data element across the domain applications, and maximum size has been marked as "p", which can be customized / standardized by domain applications as per their specific requirements.***	Decimal (p,3)	p
G00.02-12	Distance in **Kilometers**		Decimal (p,3)	p
G00.02-13	Distance in **Centimeter**		Decimal (p,3)	p
G00.02-14	Distance in **Millimeters**		Decimal (p,3)	p
G00.02-21	Area in **Square Meters**		Decimal (p,3)	p
G00.02-22	Area in **Square Kilometers**		Decimal (p,3)	p
G00.02-23	Area in **Square Centimeters**		Decimal (p,3)	p
G00.02-24	Area in **Square Millimeters**		Decimal (p,3)	p
G00.02-25	Area in **Hectares**		Decimal (p,3)	p
G00.02-31	Volume in **Cubic Meters**		Decimal (p,3)	p
G00.02-32	Volume in **Cubic Kilometers**		Decimal (p,3)	p
G00.02-33	Volume in **Cubic Centimeters**		Decimal (p,3)	p
G00.02-34	Volume in **Cubic Millimeters**		Decimal (p,3)	p
G00.02-41	Weight in **Grams**		Decimal (p,3)	p
G00.02-42	Weight in **Kilograms**		Decimal (p,3)	p
G00.02.43	Weight in Quintal		Decimal (p,3)	p
G00.03	**Financial year**	Financial year	Char	7 nnnm-(mm+1)
G00.04	**Amount**	Amount in Rupees	Decimal (p,2)	p

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
		Note: For the purpose of uniformity, two decimal places have been standardized for this generic data element across the domain applications, and maximum size has been marked as "p", which can be customized / standardized by domain applications as per their specific requirements. #		
G00.05-01	Language Code	Language codes for 22 State Recognized Official Languages and a code for English language Refer to code directory no. CD00.02	Integer	2
G00.06 Telephone Number				
G00.06-00-01	International Access Code	This is the code to be used for dialing a telephone number internationally, which is sometimes referred as exit number also. For India its value is "00", when dialing a telephone number of some other country from India. For dialing a telephone number in India from some other country, International Access Code of that country and Country code of India will have to be prefixed to Landline number /Mobile number.	Varchar[1]	3
G00.06-00-02	Country Code	Country code to be	Varchar	3

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
		prefixed to the Landline number / Mobile number for dialing internationally For India its value is "91" when dialing from some other country.		
G00.06-00-03	Trunk Code	Trunk code to be prefixed with the Landline number / Mobile number while dialing from the place other than local area within the country; Its value is "0"	Char	1
G00.06-00-04	Area Code	Area code to be prefixed with Landline number while dialing from the place other than local exchange The size may be between 2-4 digits ***Note: Area code prefixed with trunk code is STD code in the terminology used by BSNL***	Varchar	4
G00.06-00-05 Phone Number (Landline number / Mobile number allocated by a service provider)				
G00.06-01-05	Landline number	Landline number allocated by a service provider within an area when communication signal travels through a solid medium, either metal wire or optical fiber) The size may be between 6-8 digits in such a way that size of area code + Landline code is 10 digits	Varchar	8
G00.06-02-05	Mobile number	Mobile number allocated by a mobile network operator, when communication signal travels through radio waves	Char	10

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
G00.07	Calendar Year	Calendar year	Char	4
G00.08	Version no	A unique number or set of numbers assigned to a specific release of an entity	Varchar	5
G00.09	Email	Email of a Person/ Organization	Varchar	254

Objective of Person Identification Codification

To describe / identify each and every Person **Uniquely** at the National level to ensure interoperability of information related to individuals collected by various Government /non Government organizations. Also to ensure data integrity and smooth horizontal and vertical data exchange related to the individuals across the domain applications. Usually, following attributes are required to uniquely describe characteristics of a Person.

- Unique number for Identification of a Person
- Name of the Person including titles to be suffixed/ prefixed, in different ways
- Details about Father, Mother and Spouse
- Gender
- Marital Status
- Educational qualification & Occupation
- Religion
- Date of Birth & Place of Birth, Age
- Present Residential Address
- Permanent Residential Address
- Biometric data like face image, fingerprints, iris etc.
- Visual identification marks
- Specimen Signature / Thumb Impression
- Relationship with the head of household
- Telephone Number etc.

The following Generic data elements have been identified to meet the requirements of the above objective:

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
G01.01	Unique Identification (UID)	Unique Person identification number at National level as per algorithm of UID devised by UIDAI	Integer (UIDAI has used Number, which is synonymous with Integer as per ANSI 92 data type)	12
G01.02 Name of the Person				
G01.02-01	Short Name in English	Short Name in **English** as desired to be displayed in the documents / forms. (It is a set of character strings / Initials each separated by a "blank space", representing surname / given name/ middle name/….etc. The sequencing of the strings / initials has to be in the order, in which the Person desires the short name to be displayed in the documents / forms)	Varchar	30
G01.02-02	Full Name in English	**Full Name in English** as expanded and captured in natural order, for the purpose of searching records and data sharing by name strings (It is a set of expanded character strings, each separated by a "blank space", representing surname / given name/ middle name/, etc. in any order as per cultural practices. In the full name, it is mandatory to include all character strings and the expanded strings of initials reflected in the short name. However, the full name can	Varchar	99

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
		have additional character strings also, which might not have been included in the short name. The full name string should not include Appellation / title)		
G01.02-03	Short Name in Recognized Official Language	**Short Name in Recognized Official language as desired** to be displayed in the documents / forms. (It is a set of character strings / Initials each separated by a "blank space", representing surname / given name/ middle name/….etc. The sequencing of the strings / initials has to be in the order, in which the Person desires the short name to be displayed in the documents / forms)	Varchar Storage in UNICODE Standard UTF-8	30
G01.02-04	Full Name in Recognized Official Language	Full Name in **Recognized Official language** as expanded and captured in the natural order, for the purpose of searching records by name strings (It is a set of expanded character strings, each separated by a "blank space", representing surname / given name/ middle name/….etc in any order as per cultural practices. In the full name, it is mandatory to include all character strings and the expanded strings of initials reflected in the short name. However, the full name can have additional character strings also, which might not have been included in the short name. The full name string should not include Appellation / title)	Varchar Storage in UNICODE Standard UTF-8	99

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
G01.03	Gender Identification Code	M - Male F - Female T - Transgender	Char	1
G01.04	Marital Status	1 - Never married 2 - Currently married 3 - Widow / Widower 4 - Divorced 5- Separated	Integer	1
G01.05-01	Appellation Code	An **Appellation** is a title for a Person like Mr., Dr. etc. to be prefixed with the name to indicate person's gender, marital status, Professional status etc. Values as per code directory (CD01.04) ***Note: Maximum of two Appellations allowed for a person***	Integer	2
G01.06-01	Suffix Code	**Suffix** to the name of the Person to indicate person's positional status like IAS, IPS etc. Values as per code directory (CD01.05)	Integer	2
G01.07-01	Relation Type	H- Head of house hold N- Not head of household (Default value "N")	Char	1
G01.08-01	Relationship Code	**Relationship** of the Person, with head of the family like self, sister, brother etc. Values as per code directory (CD01.06)	Integer	2
G01.09 Face Image				
G01.09-00-01	Face Image Record Header	Information about: -Format identifier -Version number -Length of record -Number of face images	Bytes	14

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
G01.09-00-02	Face Image Record data	**Information about:** -Facial information - Feature point -Face Image information - Resolution	Bytes Minimum 300 ppi (pixels per inch)	32
		- Aspect ratio(W:H)	1:1.25 to 1:1.34	
		- Width & Height of the image	420 pixels (W) x 525 pixels (H) i.e. 1.4" /3.5cm (W) x1.75" /4.37cm (H)	
		- Image color space	24 Bit RGB	
G01.09-00-03	Face Image data	Face image data acquisition	Loss less (Raw/PNG /Lossless JPEG2000/TIFF/ DNG) PNG	
		Storage /archival in normal memory device	JPEG 2000 with compression ratio up to 1:15	
		Storage for verification in restricted memory device like smart card, mobile phone for the purpose of verification		
		Note: For other specifications and best practices refer to GoI published Biometric standard for Face Image (http://egovstandards.gov.in/standardsandFramework/biometric-standards/view)		
G01.10 Fingerprint Image				
G01.10-00-01	Fingerprint General Record header	Information about : - Format identifier - Version no - Record length - Capture device ID - Image acquisition level - Number of fingers - Scale units	Bytes	32

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
		- Scan resolution - Scan resolution (vertical) - Image resolution - Image resolution(vertical) - Pixel depth - Image compression algorithm - Rotation angle estimation flag - Rotation uncertainty angle		
G01.10-00-02	Fingerprint Image Record Header	Information about: - Length of finger data block - Finger position - Count of views - View number - Fingerprint image quality - Impression type - Horizontal line length - Vertical line length - Rotation angle	Bytes	14
G01.10-00-03	Fingerprint Image Data	Fingerprint Image Data Acquisition Storage / Archival on Normal Memory Device Storage on Restricted memory devices like smart card, mobile phone for the purpose of verification ***Note: For other specifications and best practices refer to GoI published Biometric standard for Fingerprint image data. (http://egovstandards.gov.in/standardsandFramework/biometric-standards/view)***	loss less (Raw/PNG /Lossless JPEG2000) PNG JPEG 2000 with compression ratio up to 1:15	
G01.11 Iris Image				
G01.11-00-01	Iris Record Header	Information about: - Format ID "IIR" - Format version	Bytes	45

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
		- Length of entire record - Capture device id - No. of iris biometric sub types - Record header length - Image property bit field - Horizontal orientation - Vertical orientation - Scan type - Iris occlusions - Boundary extraction - Expected Iris diameter - Image format - Image width - Image height - Image intensity depth - Transformation to polar image - Device unique identifier		
G01.11-00-02	Iris Image Sub type Header	Information about: - Biometric subtype identifier - Number of iris images	Bytes	3
G01.11-00-03	Iris Image Header	Information about: - Image sequence number - Image quality - Rotation angle - Rotation uncertainty - Size of image data	Bytes	11
G01.11-00-04	Iris Image Data	Iris Image data acquisition Storage / Archival on Normal memory device ***Note: For other specifications refer to GoI published Biometric standard for Iris Image data (http://egovstandards.gov.in/standardsandFramework/biometric-standards/view)***	Loss Less (Raw/PNG /Lossless JPEG2000) PNG	

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
G01.12	Specimen Signature/ Thumb impression	Scanned Image of Person's own hand written Signature /Thumb impression - Storage / Archival format - Resolution - Aspect Ratio - Dimension of Image	 PNG Minimum 300 ppi (118 ppcm) 4:1 (W:H) 256 pixels (W) x 64 pixels (H) i.e. 1.4"/3.5cm (W) x 0.44"/ 1.06 cm (H)	
G01.13-01	Education Attained Code	Code of Education attained by the Person Values as per code directory (CD01.03)	Integer	3
G01.14-01	Religion Code	Religion code of the Person Values as per code directory (CD01.01)	Integer	2
G01.15-01	Occupation Type Code	Current Occupation code of the Person. Values as per code directory (CD01.02)	Integer	2
G01.16	Date of Birth Type	Date of Birth capturing status - Verified (Date verified with document evidence) - Declared (Date as declared & not verified with documentary evidence) - Approximate (Date derived from mentioned age in years as on a particular date	Char	1
G01.17	Live Status	It represents live status of a person like: - Alive - Dead	Char	1

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
		Default value is "A"		
G01.18	Visible Identification marks	Description of any other physical identification marks on body for visual inspection	Varchar	50

Note: The other characteristics like Date of Birth, Permanent Residential Address, and Present Residential Address would be derived from the list of Common Generic data elements & list of generic data elements for Land Region codification.

Refer Annexure- II for an illustration of Person Identification data elements derived from the Generic Data elements.

A. Objective of Land Region Codification

- To uniquely codify / describe geographically, a Land region and location of various Premises like buildings, establishments, residential /non-residential units, commercial units, institutes, land marks etc.
- To identify Generic data elements associated with land regions, standardization of their metadata (business formats, validation checks, values, declarations, version, and ownership etc.), to meet requirements of interoperability for vertical / horizontal data exchange between various domain applications in e-Governance.
- To identify data elements / attributes associated with Address Location.
- To geographically represent the Address of a Premises to be taken up in (Phase - II)

B. Specification of Data Elements for Land Region Codification

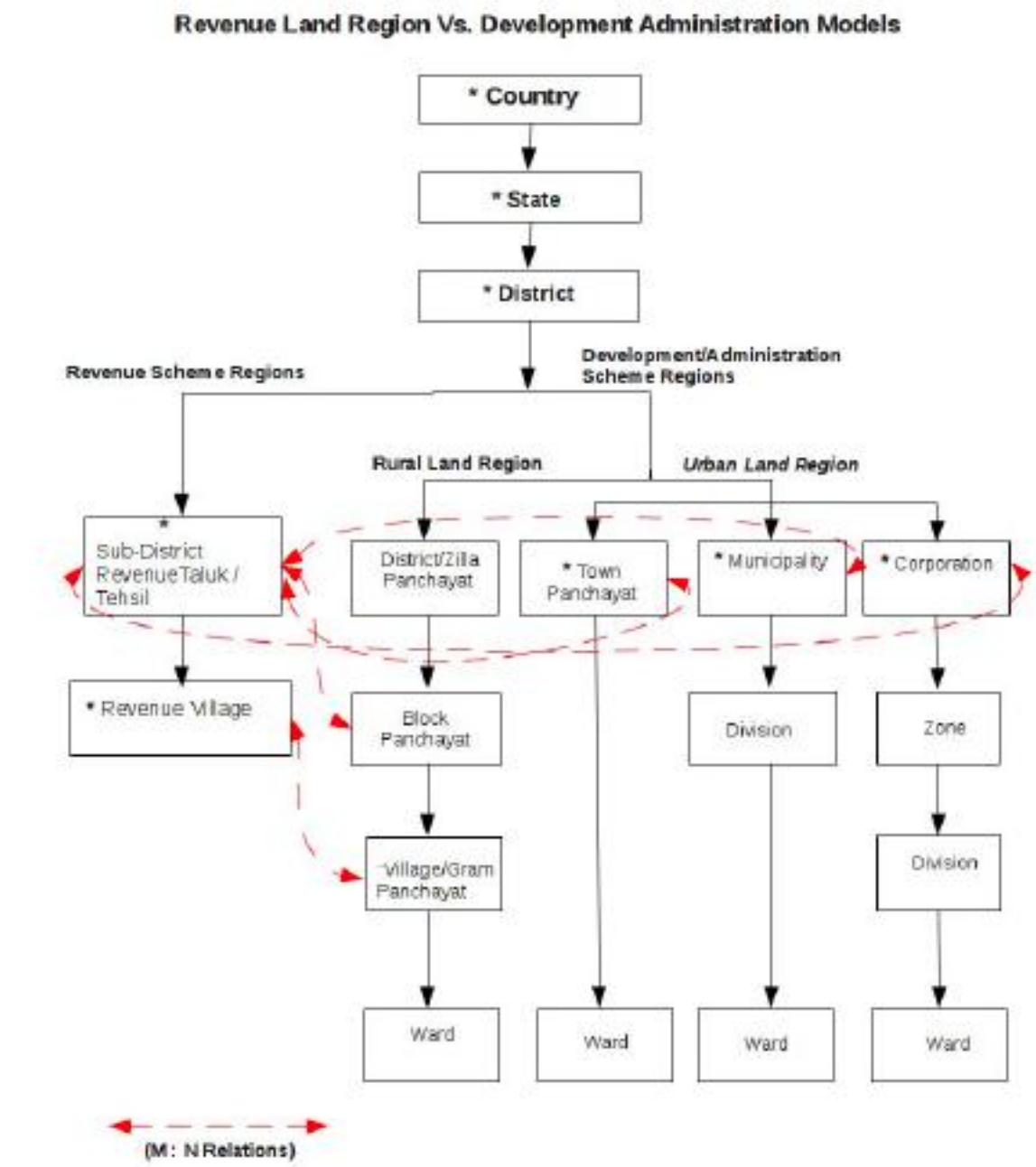
Two Types of Land Region models in India

a. Based on **Revenue Land Region**, which is adopted by Office of Registrar General of India for the purpose of Census.

b. Based on **Development Administration** like Village/ Block / District Panchayat, Town Panchayat, Municipality, Corporation etc, as depicted below:

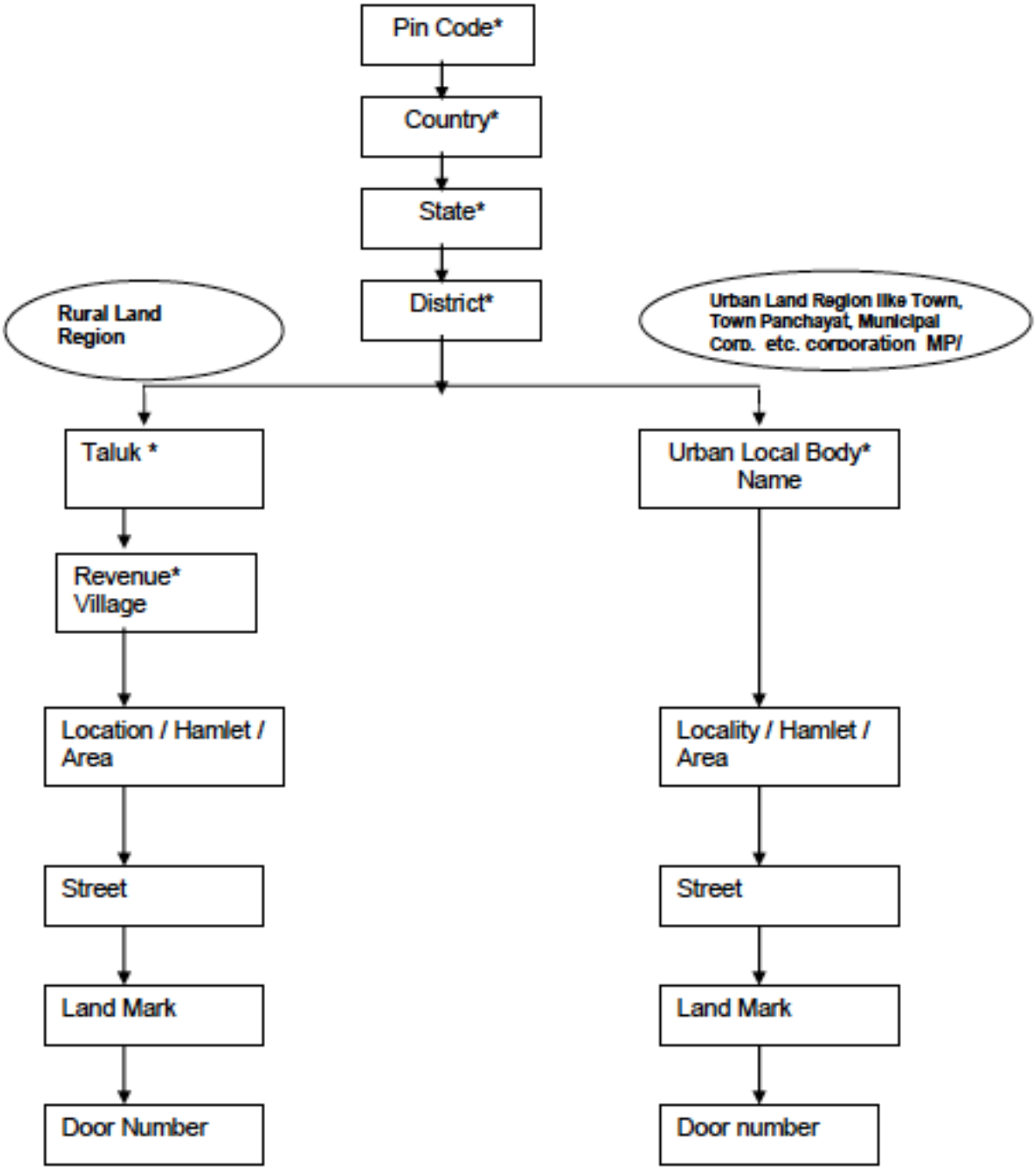
Note: Revenue Land Region model has been adopted for Land Region codification by the Expert Committee for MDDS.

Revenue village has been taken as smallest unit of Land region, for the purpose of standardization in the present version of the document.



*** Land Region Codified in the present version of the document**

C. Codification of Address of Premises



* Land Region Codified in the present version of the document

5.2.3.2 Data Elements to describe Premises

The following structure is applicable for Address of Premises representing a Commercial unit or a Residence in an Urban Land Region (Town) as well as Rural Land Region (Revenue Village).

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
G02.03 Address of a Premises				
G02.03-00 Premises Identifier				
G02.03-00-01	Address Type	Address type - Residential - Commercial	Varchar	15
G02.03-00-02	Premises Identifier	-House Number. / Door Number / House Identifier /Flat Number - Building Number. / Plot Number - Building Name / Building Identifier - Stairwell / Lift Number	Varchar	60
G02.03-00-03 Sub Locality / Locality Identifier				
G02.03-01-03	Sub Locality-1	-Block Name/Number or any other qualifier -Street Number /Name/ Mohalla/ Sector Number /any other qualifier	Varchar	60
G02.03-02-03	Sub Locality -2	**Major / Minor Land mark** In Urban Land region (Town) or Rural Land region (Revenue village) for easy location of Premises	Varchar	60
G02.03-03-03	Locality	Area Number/ Area Name / Suburb / Sub district in case of Village/ any other qualifier	Varchar	60

The Address of premises has mainly two components:

- House / Locality Details (Coding not Standardized in this document)
- Land Region Details (Coding Standardized in this document)

Note: There could be a requirement of storing the address of a premises bilingually (English and Recognized Official language of the State). In such cases, usually, the data is captured in local language, and stored in English also. For this purpose, either the data will have to be captured in both the languages or there should be a mechanism to transliterate / translate the data from local language to English or vice versa, accurately without losing its meaning. This issue is NOT addressed in this document.

D. Segmented Approach for Address of Premises would be as follows:

- Segment 1 – Premises Identifier
- Segment 2 - Sub-locality Identifier
- Segment 3 - Land Region Identifier (Revenue Village / Town / District / State)
- Segment 4 - Additional data elements / attributes for internal storage only, which may be required for different purposes and interoperability with other domain applications.

The above has been diagrammatically explained below along with recommended printing of address lines:

G02.04 Generic data elements for Postal Services				
Ref no. of Generic data element for its Metadata	**Name of Data element**	**Description of Data element**	**Data format**	**Maximum Size**
G02.04-01	PIN	Postal Index Number	Integer	6
G02.04-02	POST	Post Office Service Type: PO box / GPO box/Free Post / Post Bag / e-Post service	Varchar	20
G02.04-03	POSNO	Post Office Service Number: PO box / GPO box/Free Post / Post Bag / e-Post number	Integer	6
G02.04-04	DPON	Delivery Post Office Name	Varchar	30
G02.04-05	BTNO	Beat Number	Integer	2
G02.05 Generic Data Elements for Geo referencing (to be taken up in Phase- II)				
G02.05-00-01	Longitude			
G02.05-00-02	Latitude			
G02.05-00-03	Altitude			

Refer Annexure- III for an illustration of recommended data elements of Residential Address along with examples of printing sample addresses.

5.3.1.1 State Recognized Official Language Code Directory (CD00.02)

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
G00.05-01	Language code	Unique code for Language	Integer	2
G00.05-02	Name of State language	Name of State Recognized Official Language	Varchar	20
G00.05-03	ISO Language code	Language code as per ISO 639-3	Char	3

5.3.2 Code Directories specific to Person Identification

Ref. No. of Code Directory	Name of Code Directory	Proposed Owner of the Code Directory	Ref number for Code Directories values
CD01.01	Religion	Anthropological Survey of India / Office of RGI	Annexure IV of the document
CD01.02	Occupation	Ministry of Labour	Annexure IV of the document
CD01.03	Education	Department of Higher Education	Annexure IV of the document
CD01.04	Appellation	Ministry of Home Affairs	Annexure IV of the document
CD01.05	Suffix	Ministry of Home Affairs	Annexure IV of the document
CD01.06	Relationship	Anthropological Survey of India	Annexure IV of the document

5.3.2.2 Code Directory for Occupation Type (CD01.02)

Generic data element Ref no. for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
G01.15-01	Occupation Type Code	Unique code for Occupation	Integer	2
G01.15-02	Name of Occupation type in English	Name of the Occupation like: Corporate Manager, Teaching Professional	Varchar	50

5.3.2.3 Code Directory for Education Attained (CD01.03)

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
G01.13-01	Education Attained Code	Unique code for Education	Integer	3
G01.13-02	Name of Education Attained in English	Name of the Education like: Engineering and Technology, Medicine	Varchar	30

5.3.2.4 Code Directory for Appellation (CD01.04)

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
G01.05-01	Appellation Code	Unique code for Appellation	Integer	2
G01.05-02	Name of Appellation in English	Appellation to be prefixed with name of the Person like: Mr., Mrs.	Varchar	15

Note: It is recommended that Appellation codes equivalent in all Recognized Official languages should be tabulated and standardized.

5.3.2.5 Code Directory for Suffix attached with name (CD01.05)

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
G01.06-01	Suffix Code	Unique code for Suffix	Integer	2
G01.06-02	Name of Suffix in English	Suffix to be used with Person's Name to indicate positional title like: IAS, IFS, etc.	Varchar	15

5.3.2.6 Code Directory of Relationship (CD01.06)

Ref no. of Generic data element for its Metadata	Name of Data element	Description of Data element	Data format	Maximum Size
G01.08-01	Relationship Code	Unique code for Relationship	Integer	2
G01.08-02	Name of Relationship in English	Name of Blood Relationship with the Head of family like Sister, Husband, Wife, Self , Spouse etc.	Varchar	20

5.3.3 Code Directories specific to Land Region Codification

Ref. No. of Code Directory	Name of Code Directory	Ownership (Owner of Code directory having update rights on the basis of notifications issued by Competent Authorities)	External reference for values of Code Directories
CD02.01	Country	ISO 3166-1 alpha-3 Standard	http://en.wikipedia.org/wiki/ISO_3166-1_alpha-3
CD02.02	State	Office of RGI	http://www.censusindia.gov.in/
CD02.03	District	Office of RGI	http://www.censusindia.gov.in/
CD02.04	Sub-District	Office of RGI	http://www.censusindia.gov.in/
CD02.05	Rural Land Region (Revenue Village)	Office of RGI	http://www.censusindia.gov.in/
CD02.06	Urban Land region (Town)	Office of RGI	http://www.censusindia.gov.in/
CD02.07	Police Station	NCRB (National Crime Record Bureau)	
CD02.08	Geo-code	To be addressed in Phase- II	

Note:

a. ***Over the years Office of Census Commissioner, India while conducting the decadal census, has developed code directories for a number of variables and standardized definitions etc. These are available on their web site also. Moreover, a number of Departments / Organizations have become conversant with these parameters. The committee recommends that this practice can continue till the identified code directories owners review the values in the code directories and decide to revise them.***

b. ***Responsibility of maintenance of Centralized Repository Code Directory including allocation of new Land Region codes would be with Office of Registrar General of India (ORGI) on the basis of notification of changes for the same issued by Competent State Authorities from time to time.***

c. ***Refer to Annexure IV for values in the Code Directories, as on date. The Standards website may be visited on regular basis to get latest updations.***

A. List of Code Directories

Ref. No. of Code Directory	Name of Code Directory	Proposed Ownership (Owner of Code Directory having update rights)
CD00.01	Measurement units	Department of Land Records
CD00.02	State Recognized Language	Department of Official Language , Ministry of Home Affairs
CD01.01	Religion	Anthropological Survey of India / Office of RGI
CD01.02	Occupation	Ministry of Labour
CD01.03	Education	Department of Higher Education
CD01.04	Appellation	Ministry of Home Affairs
CD01.05	Suffix	Ministry of Home Affairs
CD01.06	Relationship	Anthropological Survey of India
CD02.01	Country	ISO 3166-1 alpha-3 Standard
CD02.02	State	Office of RGI
CD02.03	District	Office of RGI
CD02.04	Sub-District	Office of RGI
CD02.05	Rural Land Region (Revenue Village)	Office of RGI
CD02.06	Urban Land region (Town)	Office of RGI
CD02.07	Police Station	NCRB (National Crime Record Bureau)
CD02.08	Geo-code	To be addressed in Phase- II

B. Sample Values in Code Directories

CD00.01- Measurement conversion Table
Owner: Department of Land Records

Conversion table of Common generic data element Measurement

1) Conversion table for Distance

Meter	Kilometer
1	.001
1000	1

2) Conversion table for Area

Square meter	Square Kilometer	Hectare
1000 000	1	100
1	.01	.0001
10000	.01	1

3) Conversion table for Volume

Cubic Meter	Cubic Centimeter
1	1000000
.01	1

Recommendation: In existing Land Record databases, attribute "area" is used to capture information about the area of a land parcel. Different traditional units like Karla, Marla, Cents, decimal is used for recording the area of a land parcel. At present, it is represented as a Numeric data type up to three decimal place. ***It is now recommended to have the area only in Metric Units as depicted in Table 1.2, given below.*** The codes for various area units in practice in land records are shown in Table 1.2. Conversion factors are locally available from different unit to metric system and it is depicted in Table 1.3

Table 1.1-Area units in metric system

Code	Description
001	Hectares

Table 1.2-Units in practice for Land Record Areas

Code of "Area" unit	Name of "Area" unit
001	Hectares
002	Ares
003	Centi-are
004	Sq. meters
005	Sq yards
006	Sq. feet
007	Acres
008	Cents
009	Guntas
010	Bigha
011	Biswa
012	Biswansi
013	Kanal
014	Marla
015	Karam
016	Sarsaai
017	Kila
018	Bigha(Assam)
019	Katha (Assam)
020	Lessa
021	Shatak
022	Sq cm

Table 1.3- Conversion Factors

1 centi-are = 1 Sq metre
1 centi-are = 10.76 Sq.feet
100 Centi-are = 1 Are
100 Are = 1 hectare
100 Sq metre = 1 Are
1 hectare = 100m x 100m = 10000 Sq metre
1 hectare = 404.68458 Acre (Tripura)
40 Are = 1 Acre
1 Lessa = 144 Sq feet
1 Katha = 5 Lessa or 720 Sq feet
1 Bigha(Assam) = 4 Katha or 20 Lessa or 2880 Sq feet
1 Sq metre = 10000 Sq cm (Gujarat)
2.47105 Acres = 1 Hectare (Kerala)
1 Are = 2.47105 cents (Kerala)
1 Acre = 100 cents (Kerala,Tamil nadu)
1 Cent = 40 Sq metres or 435 Sq feet
1 Acre = 40 Guntas(Andhra Pradesh and Karnataka)
1 Gunta = 100 Sq metres (around 1100 sq feet)
1 Acre = 121 Sq yards
1 Kuncham = 10 cents(Andhra Pradesh)
1 Sq link = 0.0404687 Sq metre (Kerala)
Shahjahani Jarib(165 feet) (Rajasthan)
1 Bigha = 1 Jarib x 1 Jarib = 165' x 165' = 27225 Square Feet
1 Bigha(Shahjahani Jarib) = 0.253 Hectare

Gantari Jarib(132 feet) (Rajasthan)
1 Bigha = 1 Jarib x 1 Jarib = 132' x 132' = 17424 Square Feet
1 Bigha(Gantari Jarib) = 0.16 Hectare
1 Bigha = 20 Biswansi (Rajasthan)
1 Acre = 4046.94 Sq metre (Jharkhand)
1 Dismil = 40.46 Sq metre (Jharkhand)
1 Katha(Jharkhand) = 66.89 Sq metre (Jharkhand)
1 Dur = 10 Sq metre (Jharkhand)

Before Bandobust (Settlement)

1 Karam = 57.157" (Haryana)
1 Biswansi = 1 Karam x 1 Karam (Haryana)
20 Biswansi = 1 Biswa (Haryana)
1 Bigha = 20 Biswa (Haryana)
4 Bigha-16 Biswa = 1 Acre (Haryana)
2.47 acre = 1 hectare(CG)

Government Settlement

1 Karam = 57.157" (Haryana)
20 Biswansi = 1 Biswa (Haryana)
1 Bigha = 20 Biswa (Haryana)
4 Bigha = 1 Kila (Haryana)
1 Kila = 40 Karam x 40 Karam (Haryana)

After Bandobust (Settlement)
1 Karam = 66" (Haryana)
1 Sarsaai = 1 Karam x 1 Karam (Haryana)
9 Sarsaai = 1 Marla (Haryana)
20 Marla = 1 Kanal (Haryana)
8 Kanal = 1 Acre (Ghuman) (Haryana)
1 Acre = 36 Karam x 40 Karam (North to South, East to West) (Haryana)
2.5 Acre = 1 Hectare (CG)

Source: http://www.dolr.nic.in - AREA UNIT/EXTENT with digital coding scheme

CD00.02- Recognized Official Languages

Owner- Office of Registrar General of India (ORGI)

Recognized Official Language Code	Values	As per ISO 639-3
1	Assamese	asm
2	Bengali	ben
3	Bodo	brx
4	Dogri	doi
5	Gujarati	guj
6	Hindi	hin
7	Kannada	kan
8	Kashmiri	kas
9	Konkani	kok
10	Maithili	mai
11	Malayalam	mal
12	Manipuri	mni
13	Marathi	mar
14	Nepali	nep
15	Oriya	ori
16	Punjabi	pan
17	Sanskrit	san
18	Santali	sat
19	Sindhi	snd
20	Tamil	tam
21	Telugu	tel
22	Urdu	urd
99	Other language (English)	eng

CD01.01- Religion Codes and Values

Owner: - Office of Registrar General of India (ORGI)

Religion Code	Values
1	Buddhism
2	Christianity
3	Hinduism
4	Islam
5	Jainism
6	Sikhism
99	Other

CD01.02- Occupation type Codes and values

Owner:-Ministry of Labour

Occupation Code	Values
1	Legislators and Senior officials
2	Corporate Manager
3	General Manager
4	Physical, mathematical and engineering science professional
5	Life sciences and health professional
6	Teaching professional
7	Other professional
8	Physical and Engineering Science associate professional
9	Life sciences and health associate professional
10	Teaching associate professional

Occupation Code	Values
11	Other associate professional
12	Office Clerks
13	Customer services clerks
14	Personal protective services workers
15	Models, sales Persons and demonstrators
16	Market oriented skilled agricultural and fishery workers
17	Subsistence agricultural and fishery workers
18	Extraction and building trades workers
19	Metal, machinery and related trades workers
20	Precision, handicraft, printing and related trade workers
21	Other craft and related trades workers
22	Stationary plant and related operators
23	Machine operators and assemblers
24	Drivers and mobile plant operator
25	Sales and services elementary occupations
26	Agricultural, fishery and related labour
27	Laborers in mining, construction, manufacturing and transport
28	New workers seeking employment
29	Workers reporting occupation unidentifiable or inadequately described
30	Workers not reporting any occupations

CD01.03- Education Attained Codes and Values

Owner: Department of Higher Education

Education code	Education Group Values	Education Sub Group Values
1	Illiterate	
2	Literate (Without Education Level)	
3	Below Primary	
4	Primary	
5	Middle/Lower Secondary	
6	Matriculation/Junior School Certificate/Secondary	
7	Higher Secondary/ Intermediate/ Pre-University/Senior Secondary	
8	Non- Technical Diploma/Certificate not equal to Degree	
Non- Technical Diploma/Certificate not equal to Degree		
21		Diploma/Certificate in ENGINEERING
22		Diploma/Certificate in MEDICAL
23		Diploma/Certificate in Technology
24		Diploma/Certificate in Agriculture, Dairying, Forestry
25		Diploma/Certificate in Veterinary
26		Diploma/Certificate in Teaching of General Science
27		Diploma/Certificate awarded by Industries deptt.
28		Trade certificate in General Science
29		Teaching Certificate
30		Diploma in City and Guides of London Institute
31		Certificate in Journalism
32		P.L.
33		Technical Diploma

Education code	Education Group Values	Education Sub Group Values
34		Photography / Photo Mechanic conversion course
35		Diploma in Occupational Therapy /Physiotherapy
36	Graduate Degree other than Technical Degree	
37	Post Graduate Degree other than Technical Degree	
Technical Degree or Diploma Equal to Degree or Post-Graduate		
51		Engineering and Technology
52		Medicine
53		Agriculture and Dairying
54		Veterinary
55		Teaching
98		Others
99	Literate, but educational level Unclassified/not stated	Unclassified, Blank, NA, Not Stated

Note: Gap given for provision to add new codes in a category for future purpose.

CD01.04- Appellation Codes and Values

Owner:-Ministry of Home Affairs

Appellation Code	Values in English
1	Mr.
2	Mrs.
3	Ms.
4	Shri
11	Dr.
12	CA
13	Er.
14	Prof.

Note: Gap given for provision to add new codes in a category for future purpose.

CD01.05- Suffix Codes and values

Owner -Ministry of Home Affairs

Suffix Code	Values
1	IAS
2	IPS
3	IFS
4	MBBS
5	BDS
6	MD
7	MS
8	MDS

CD01.06- Relationship Codes and Values

Owner: Anthropological Survey of India

Relationship Code	Values
1	Self
2	Spouse
3	Father
4	Mother
5	Son
6	Daughter
7	Brother
8	Sister
9	Father- In- Law
10	Mother- In- Law
11	Brother-In-Law
12	Sister-In-Law
13	Nephew
14	Niece
15	Grandson
16	Granddaughter
17	Grandfather
18	Grandmother
19	Other (Including any other blood relation and non-blood relations like visitor, guardians)

CD02.02- State Code Directory

Owner:-Office of Registrar General of India

State Land Region Code(SLRC)	State Name	Sub-District nomenclature in the State	Recognized Official Language	
			Code	Name
01	Jammu and Kashmir	Tahsil	22	Urdu
02	Himachal Pradesh	Tahsil	6	Hindi
03	Punjab	Tahsil	16	Punjabi
04	Chandigarh	Tahsil	6	Hindi
05	Uttrakhand	Tahsil	6	Hindi
06	Haryana	Tahsil	6	Hindi
07	Delhi	Tahsil	6	Hindi
08	Rajasthan	Tahsil	6	Hindi
9	Uttar Pradesh	Tahsil	6	Hindi
10	Bihar	C.D. Block	6	Hindi
11	Sikkim	Sub-Division	14	Nepali
12	Arunachal Pradesh	Circle	6	Hindi
13	Nagaland	Circle	99	English
14	Manipur	Sub-Division	12	Manipuri
15	Mizoram	R. D. Block	99	English
16	Tripura	Development Block	2	Bengali
17	Meghalaya	C.D. Block	99	English
18	Assam	Circle	1	Assamese
19	West Bengal	C.D. Block	2	Bengali
20	Jharkhand	C.D. Block	6	Hindi
21	Orissa	Police Station	15	Oriya
22	Chhatisgarh	Tahsil	6	Hindi
23	Madhya Pradesh	Tahsil	6	Hindi
24	Gujarat	Taluka	5	Gujarati
25	Daman & Diu	Taluka	5	Gujarati
26	Dadra & Nagar Haveli	Taluka	5	Gujarati
27	Maharashtra	Tahsil	13	Marathi

State Land Region Code(SLRC)	State Name	Sub-District nomenclature in the State	Recognized Official Language	
			Code	Name
28	Andhra Pradesh	Mandal	21	Telugu
29	Karnataka	Taluka	7	Kannada
30	Goa	Taluka	9	Konkani
31	Lakshadweep	Sub-Division	11	Malayalam
32	Kerala	Taluka	11	Malayalam
33	Tamil Nadu	Taluka	20	Tamil
34	Puducherry	Commune Panchayat	20	Tamil
35	Andaman & Nicobar Islands	Tahsil	6	Hindi