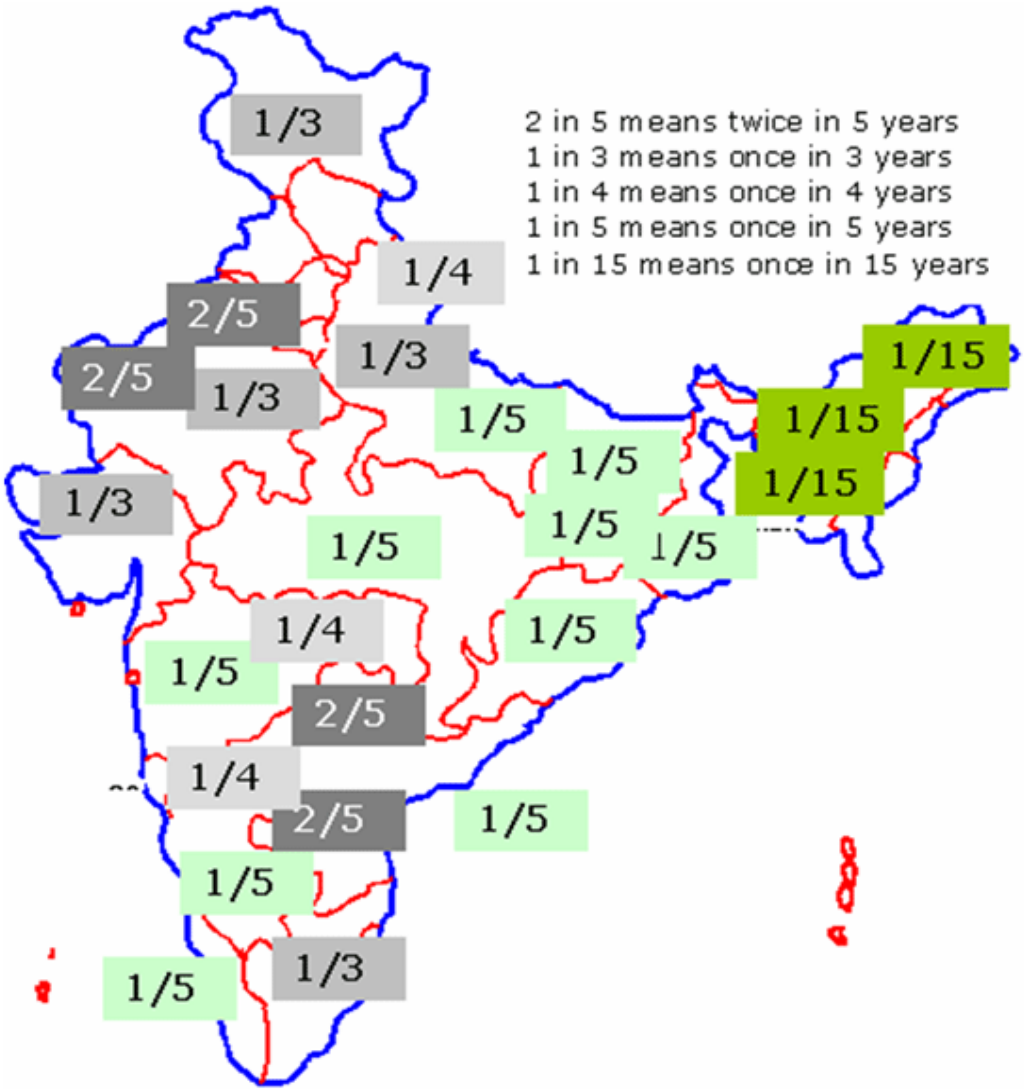
Government of India

CRISIS MANAGEMENT PLAN

DROUGHT

(NATIONAL)

Department of Agriculture & Cooperation
Drought Management Division



Picture depicting the periodicity of Occurrence of Drought in the Country.

I N D E X

Part-I

Crisis Management Plan

Evolving a CMP….

Crisis Management Plan refers to the actionable programme, which is pressed into action in the event of a crisis situation to minimise damages to life, property and environment.

Being prepared to respond to a Crisis situation, helps in reducing the time taken to mobilize resources for an effective response. It also helps us to maintain cordial relations among stakeholders, enabling us to return to normal business operations more quickly. The goal of crisis management is to facilitate over all management of the crisis situation to minimize adverse impact on the community at large, maintaining individual and sovereign credibility, and controlling and strengthening the Government's credibility with the public.

CMP helps us to develop preventive measures in a time framed manner and provides for continuous improvement in managing crisis situation. CMP ensures factual and timely communication of what needs to be done under a specific circumstance to all the stake holders to minimise the losses.

The crisis recovery model based upon past experiences, on identified priorities and trigger-points with appropriate response matrix viz. contingency action plans of different agencies could be known as Crisis Management Plan (CMP). The identified priorities of CMP is to clarify the goals and in defining the roles and responsibilities of various responders (Ministries / Departments, Organisations and individuals) involved in crisis management, and putting together a communication process for quickly notifying the Public in the event of a crisis.

The Plan outlined in this document does not replace the emergency procedures or contingency action plans already drawn by different agencies, but has been developed to address crisis that have the potential for a much greater impact on the Nation. Despite the fact that care has been taken to include all aspects of crisis management in the document, it cannot be negated that still there may be occasions when an entirely new and unforeseen crisis situation could arise during the same type of crisis. Thus, it is necessary that the team of officers included in the Crisis Management Group (CMG) evolve a strategy to handle such unforeseen situations which can later be included as a part of the CMP as a continuing process.

This Crisis Management Plan (CMP) is part of overall spectrum of Drought Management Plan but is restricted to the management interventions required during the time of Crisis.

1. Drought – a Crisis

Generally, drought is not considered as a crisis of urgent nature but considered as a management issue. Drought is a natural, recurring climatic feature which stems from the lack of rainfall over an extended period of time (i.e. a season or several years resulting in severe shortage of water resources). It occurs almost in all climatic regions of the world. Drought is a normal phenomenon in arid zone areas, a common phenomenon in semi-arid zone areas and a rare to very rare phenomenon in dry humid and humid areas. It is a natural disaster, which can be anticipated and also expected on the basis of rainfall pattern, temperature etc. In a large country like India having many agro-climatic zones, though drought cannot be prevented totally, its impact on the community at large can be minimized. The documents on drought management during droughts of 1987 and 2002 are testimony to this fact.

Drought connotes a situation of water shortage for human, cattle and agriculture consumption resulting in economic losses, primarily in agriculture sector. Drought is classified as **Meteorological, Hydrological and Agricultural.** Unlike the Hydrological and Agricultural droughts, the **Meteorological Drought,** which connotes specific rainfall reduction below -19% of normal rainfall, may not necessarily have any serious impact if the departure from normal is not significant and the rainfall is sufficient enough to sustain the soil moisture.

In India, drought essentially occurs due to failure of south-west monsoon (June – September). Areas affected by drought needs to wait till the next monsoon, as more than 73% of annual rainfall in the country is received during the SW Monsoon season.

The available data on rainfall indicate on drought perspective that –

- 16% of the Country's total area is drought prone and annually about 50 million people in the country are exposed to the crisis of drought;
- A total of 68% of sown area is subject to drought in varying degrees;
- 35% of area receives rainfall between 750-mm - 1125-mm and is *drought prone;*
- Most of drought prone areas lie in the *arid (19.6%), semi-arid(37%) and sub-humid(21%) areas* of the country that occupy 77.6% of its total land area of 329 million hectares.
- Annual Average Rainfall is 1160 mm in India. However, 85% is concentrated in 100-120 days (SW Monsoon)
- 33%of area receives less than 750-mm rainfall and is *chronically drought prone;*
- 21% area receives less than 750 mm rainfall (large area of Peninsular and Rajasthan)
- Rainfall is erratic in 4 out of 10 years.
- Irrigation Potential is 140 Million Ha (76 MHa Surface + 64 MHa Groundwater)
- Depletion of Ground water and limitation of surface water imply that not all net sown area is amenable to irrigation.
- Per Capita Water availability is steadily declining due to increase in population, rapid industrialization, urbanization, cropping intensity and declining ground water level. Problems are likely to aggravate.
- **Net Result – Inevitability of Drought in Some Part or Other.**

The mechanism for anticipating and managing droughts necessarily differs from similar arrangements concerning other disasters, natural calamities (like earthquakes, floods, cloudbursts, tsunami etc) or man-made disasters, for the following reasons:

(i) Slow onset and prolonged course of droughts as against the other disasters, which have rapid onset, and a limited duration; and

(ii) Early warning indicators in case of droughts are necessarily ambiguous because they may or may not culminate in a full-blown drought.

The Government of India in 2002 decided to retain the issue of management of drought with the Department of Agriculture and Cooperation when it was decided to transfer the management of all other type of natural and man-made disasters with the Ministry of Home Affairs. Unlike other natural disasters its onset is slow but has a very serious impact on the economy due to its intensity and longer duration over a period of time.

State Government's primary responsibility:

The primary responsibility of managing drought (or any other natural disasters) is of the respective State Governments. The role of the Central Government is to supplement the efforts of the State Government in effective management of disasters and provide additional resources (food grains / financial assistance etc.) to combat the situation.

The risk management plan having early warning indicators in case of drought are ambiguous, as they may or may not culminate into a full-blown drought. In such situations the relief based management approach has to be launched to contain the impact of drought. Thus, it is to be understood that besides having a general risk management plan for handling drought with long-term and short-term approaches, we need to have a Crisis Management Plan (CMP) to deal with drought situation by the Central Government and the State Governments to minimize its impact.

Early indicators of Droughts…

The following constitute 'early warning indicators':

For Kharif (sowing June to August)

i) Delay in onset of South-West Monsoon.

ii) Long 'break' activity of South-West Monsoon.

iii) Insufficient rains during the month of July.

iv) Rise in Price of fodder.

v) Absence of rising trend in Reservoir Levels.

vi) Drying up sources of Rural Drinking Water Supply.

vii) Declining trend in progress of sowing over successive weeks compared to corresponding figures for "normal years".

For Rabi (sowing November to January)

i) Deficiency in closing figures for South-West Monsoon (30th September).

ii) Serious depletion in level of Ground Water compared to figures for "normal years'.

iii) Fall in the level of Reservoirs compared to figures of the corresponding period in the 'normal years' – indication of poor recharge following SW Monsoon.

iv) Indication of marked soil moisture stress.

v) Rise in price of fodder.

vi) Increased deployment of water through tankers

(For Tamil Nadu & Pondicherry the crucial period is North East Monsoon – October to December)

Other Seasons

For areas like Gujarat, Madhya Maharashtra, Marathwada and North Interior Karnataka the crucial period is March / April when due to chronic hydrological drought, many areas develop acute scarcity of Drinking Water.

For specific states and particular crops there are particular times in a year when progress of rains is of special significance e.g. February rains in Kerala for plantation crops.

2. Crisis Management Framework

It is the framework of crisis analysis aimed at identification of fundamental aspects of Crisis situation (Phases of crisis, magnitude, outcome of crisis (impact), trigger mechanism and strategic response matrix).

Level	Phases of Crisis	Vulnerability Magnitude (area specific) (Scale : Zero – 10)	Outcome of the Crisis Phase	Identified Trigger mechanism	Strategic Response Matrix / Action
1.	Normal	**Zero.** ***(Rainfall is above +19% to - 19% cumulatively for more than 4 weeks period through out the season)***	Nil	Nil	➢ Developing and Strengthening drought preparedness ➢ assessing food and water requirements and resources, ➢ constant monitoring drought-related characteristics ➢ Drawing up of perspective plans with the vision of **drought proofing** under NREGA
2.	Alert	**1 - 2** Forecast of late onset of monsoon coupled with continuing water crisis and heat wave. **(Apr - Jun)** ***(Rainfall forecast is expected to be less than the normal rainfall and below -19% and the***	Incipient. Sudden acceleration of demand of employment.	• CAP (Crop) • CAP (Water) • CAP (Health)	➢ Preparation of updated Contingency Crop Plan and its propagation through effective agro-advisory services ➢ Propagation of short-term water conservation measures, water-budgeting, ➢ Proper health advisories and ensuring availability of emergency medical services ➢ Continuation of ongoing alternative employment generation programmes in drought affected / prone areas, through

		deficit continues for more than 2-3 weeks & Soil moisture level is sustainable)			NREGA as a part of supplementary employment and as a social safety net support under NREGA ➢ Monitoring over exploitation of ground water for non-agricultural and non-drinking purposes (i.e. industrial / commercial / entertainment purposes) **<u>Advisory Note:</u>** **(The ULBs may be directed to control the extraction of water)** ➢ Energising the Identified alternative sources for the requirement of water, food, fodder and power. ➢ Meeting of Crisis Management Group (CMG) to review and revitalise the role of concerned machineries.
3.	Warning	**<u>3-4</u>** Delayed onset of monsoon. Deficit Rainfall for more than two weeks. Acute water crisis. **(May – Mid July)** ***(Rainfall is less than the normal rainfall and below -19% and the deficit continues for more than 3 – 6 weeks & Soil moisture, GW & SW level is lower than previous normal average)***	Moderate	• CAP (Crop) • CAP (Water) • CAP (Health) • CAP (Food & PD)	➢ Effective role of Extension machinery and realising the objectives of Contingency Crop Plan. ➢ Operationalising short-term water conservation measures by municipal and district agencies, water-budgeting by irrigation and Drinking Water Department. **<u>Advisory Note:</u>** **Identify alternative sources when the town is in "Warning" period and the supply of water may be restricted to 70 lpcd instead of 135 lpcd)** ➢ Judicial use of drinking water (restricted supply of water for basic requirement and alternative non-potable water for other purposes) ➢ Meeting of CMG to review the action initiated by line Departments and affected State Governments and taking decision for movement of water and

					fodder from surplus areas (States) to the deficit areas (States). ➢ Review and Visit by Area Officers in the deficit rainfall States. ➢ Apprising the developments to National Crisis Management Committee (NCMC) ➢ Action Plan for meeting out the shortage of secondary and tertiary sectors
4.	Emergency	**5-7** Deficit or No rainfall during the sowing period. Mid-season withdrawal of monsoon. Dry spell for more than 4 weeks. Deficit rainfall in the range of -20% to -40%. Wilting of Crops due to shortage of water and continuing heat wave conditions. **(JUL –SEP)** ***(Rainfall is less than the normal rainfall and below -25% and the deficit continue for more than – 6 weeks & Soil moisture, GW & SW level is alarmingly low).***	Severe	• CAP (Crop) • CAP (Water) • CAP (Cattle Care) • CAP (Health) • CAP (EGP) • CAP (Food & PD) •	➢ Referring the issue to NCMC for taking up with Cabinet for taking certain vital decisions like deferment / rescheduling /fresh loan, movement of water and fodder through railways, additional allocation of food grains, establishing cattle camps, alternative employment generation programmes, enhancing PDS allocations, import of food grains to meet the gap between demand and supply, checking up of inflation etc. **Advisory Note:** **In the 'Emergency' period, water may be supplied at 40 lpcd and non-potable water may be supplemented for other uses.** ➢ Early release of instalments under CRF and ensuring that the State Governments utilise it for initial emergency measures. ➢ Enabling employment under NREGA as a part of supplementary employment and as a social safety net support. ➢ Monitoring and visiting of deficit rainfall States personally by each designated area officer in the Department Apprising the developments to National

					Crisis Management Committee (NCMC) on regular basis ➢ Measures for meeting out the shortage of secondary and tertiary sectors
5	Acute (Potential Disaster)	**7-10** Early withdrawal of monsoon. Midseason withdrawal.. Severe deficit of cumulative annual rainfall. Severe soil moisture deficit. No rainfall for more than 4-6 weeks in sown area, resulting in crop damage Severe shortage in availability of GW and SW. **(JUL–OCT)** ***(Rainfall is less than the normal rainfall and below -25% and the deficit continue for more than – 6 weeks & Soil moisture, GW & SW level is alarmingly low).***	**EXTREME** (FULLY BLOWN DROUGHT)	• CAP (Water) • CAP (Cattle Care) • CAP (Social Sector) • CAP (Energy Sector) • CAP (Health) • CAP (Food & PD) • CAP (Labour & Employment)	➢ Decision by Cabinet for Constitution of GoM / Task Force under the chairmanship of a Union Minister of Cabinet rank to take decisions during acute crisis ➢ Monitoring of drought affected States individually by each designated area officer in the Department about ongoing relief measures. ➢ Weekly CMG meeting and monitoring the progress of drought relief measures ➢ Review of visit by Area Officers to the deficit rainfall States. ➢ Strict Water conservation measures and monitoring the release of canal water for irrigation ➢ Constitution of Central Team to visit to drought declared States. ➢ Assessment of damages and estimation of losses for release of funds from NCCF ➢ Special assistance to farmers / dairy / poultry / fishery sector ➢ Enabling employment under NREGA as a part of supplementary employment and as a social safety net support ➢ Revitalising the ongoing programmes for vulnerable sections of society ➢ Preventive measures for loss of human /cattle life on account of potential disaster. ➢ Measures for meeting out the shortage of secondary and tertiary sector and

					measures for economic revival. ➢ Legislative measures like issue of control orders for maintaining the sustained supply of essential commodities. ➢ Video Conferencing with drought affected States.
6	Recovery (Post Disaster)	**<u>>10-0</u>** **(OCT–JUN)** *Normal rainfall in Rabi and subsequent seasons. Easing of soil moisture stress situation Farming /Rural community's livelihood requirements Returning to normal activity.*	**<u>Mitigated</u>**	• CAP (Water) • CAP (Cattle Care) • CAP (Energy Sector) • CAP (Health) • CAP (Employment Guarantee Programmes) • CAP (Food & PD) • CAP (Labour & Employment) •	➢ Rescheduling of farm loans ➢ Early release of input subsidy ➢ Payment of losses in time to the beneficiaries i.e. agri-insurance, NCCF / CRF benefits etc. ➢ Adequate availability of seeds for sowing in next season ➢ Monitoring of the ongoing relief measures and taking necessary course correction ➢ Simultaneous documentation ➢ Monitoring of the climate and ensuring alternative arrangements against relapse of the drought.

➢ CAP – Contingency Action Plan

Note: ***Contingency Action Plans*** *(SOP) (in respect of Crop, Water, Cattle Care, Health, Energy Sector, Food and livelihood Security) –*

(To be prepared by concerned Central Government Ministries / Departments)

Specific Attention to Water User Groups:

Water User Groups

- Public Water Suppliers
- Municipal Waste Discharges
- Agriculture
- Industry (Infrastructure, Food processing including beverages, others(heavy industry, mining)
- Power Production (Hydro electric)
- Recreation (Parks, fountains etc.)

Potential Actions

- ❖ Leak Repair
- ❖ Non-Essential Water use restrictions
- ❖ Pressure Reduction
- ❖ Voluntary Water Conservation
- ❖ Mandatory Water Conservation
- ❖ Emergency Source Enhancement
- ❖ Interconnection
- ❖ Major User Restriction
- ❖ Emergency Rate Structures
- ❖ Source Blending

5. Strategic Activity Planner

Activity	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
DROUGHT PREPAREDNESS												
Reviewing CMP												
Monitoring												
Rainfall												
Temperature												
Surface water level												
Normal Area Vs Sown area												
Assessment												
Drinking water availability												
Irrigation water availability												
Soil Moisture												
Fodder availability												
Food grains availability												
Energy Sector requirement												
Inputs and Seed availability												
Water Conservation measures												
Check dams / Water sheds												
Rain Water Harvesting												
Ground Water Recharge												
Protection of aquatic resources for aquaculture												

Activity	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
DROUGHT REPORTING												
Early Warning System (EWS)												
Forecast of Contingency Cropping												
Forecast of Crop Loss												
Forecast of Water Deficiency												
Forecast of Food insecurity												
Forecast of Cattle feed deficit												
Declaration of Drought												
Estimation												
Unsown area												
Crop Loss due to drought												
Potential Water deficit												
For irrigation												
For drinking												
Fodder requirement, availability, additional demand for cattle care												
Loss to AH/ Fisheries												
Loss to Energy Sector (fuel and hydroelectricity)												
DROUGHT RESPONSE												
Propagation of Forecast through Extension Services												
Propagation of contingency cropping												
Promotion of agro forestry												
Issue of Agro advisories												
Issue of General advisories												
CRF release												
Alternative employment												
Food Security to vulnerable Sections												
Food grain requirement of farming community												

Processing of request for additional financial assistance												
Water and Fodder movement												
Energy Sector requirement (Import / Indigenous procurement from outside the State)												
Cattle & animal welfare (Vet.)												
Cattle camp												
Encouraging of community welfare organizations for mitigation efforts and monitoring of their activity												

5. Agencies responsible for Identified Activities

Activity	Primary	Secondary	Tertiary
Reviewing CMP	DAC	MHA / NDMA	NCMC
Monitoring			
Rainfall	IMD	States	Dept. of Agriculture and Cooperation (DAC)
Temperature	IMD	States	DAC
Surface water level	IMD	States	DAC
Ground Water level	IMD	States	DAC
Monitoring of Agricultural Drought	Drought Research Unit, IMD Pune / NRSA	States	DAC
Assessment			
Drinking water availability	States	DWS & MoWR (CGWB)	DAC
Irrigation water availability	States	MoWR	DAC
Soil Moisture	States	NRSA / IMD / MoWR (Irrigation Wing)	DAC
Fodder, cattle feed and poultry feed availability	States	Do AH&D	DAC
Food grains availability	States	D/o F&PD	DAC
Energy Sector requirement	States	M/o Power / PNG	DAC
Inputs and Seed availability	States	DAC (Seeds & NRM Div)	
Water Conservation measures			
Check dams / Water sheds	States	DAC / RD (LR) / MoWR	DAC
Deficit irrigation, Sprinkler and drip irrigation, reuse of irrigation water, use of water of suboptimal quality	States	MoWR (Irrigation Wing)	DAC
Rain Water Harvesting & Water Shed Management	States	MoWR / CGWB	DAC
Ground Water Recharge	States	CGWB	MoWR
Adjustment in sanction water /Water Pricing	States	CWC	MoWR
Monitoring of Water levels in Headworks such as Jackwells and Tubewells	ULB / Implementing Agency	Public Health Engineering Department / State Government	DAC
Judicial use of available water	ULB / Department in-charge of O&M	State Government	MoWR

Planning of naturally drought restraint crops with less water consumption and duration	States	ICAR / Directorate of Extension	DAC (Crops Division)
Water Supply system for drought prone areas for arranged supply of water to commercial and industrial activities having low water consumption	States	CWC	MoWR
Reduction in conveyance loss, evaporation from soil surface, renovation and percolation of tanks, water consciousness	States	CWC	MoWR
Early Warning System (EWS)			
Forecast of Contingency Cropping	States	ICAR / DAC (Extn.)	DAC
Forecast of Crop Loss	States	ICAR / DAC (Extn.)	DAC
Forecast of Water Deficiency	States	MoWR / DWS	DAC
Forecast of Food Insecurity	States	D/o Food & PD	DAC
Forecast of Cattle feed deficit	States	D/o AHD	DAC
Declaration of Drought	States		
Estimation			
Normal Area Vs sown area	States	DAC	
Unsown area	States	DAC	
Crop Loss due to drought	States	DAC	
Loss to Animal Husbandry & Fisheries Sector	States	DoAHD&F	
Potential Water deficit			
For irrigation	States	MoWR	DAC
For drinking	States	DWS	DAC
Fodder / cattle feed / poultry feed requirement, availability, additional demand for cattle care	States	DoAHD&F	DAC
Loss to Energy Sector	States	Power / PNG	DAC

Drought Mitigation			
Propagation of Forecast through Extn. Services	States	DAC	
Propagation of contingency cropping	States	ICAR	DAC
Propagation of agro forestry	States	M/o E&F	DAC
Issue of Agro advisories	States	DAC	
Issue of General advisories	States	DAC	
CRF release	M/o Finance	States	
Alternative employment	States	D/o Rural Development	DAC
Food Security to vulnerable Sections	States	M/o WCD / SJ & E / RD	DAC
Food grain requirement of farming community	States	D/o FPD	DAC
Request for additional financial assistance from NCCF etc.	States	DAC	HLC / Finance
Water and Fodder movement	States	Railways	DAC
Packaged / Bottled water	States	D/o DWS, WCD, SJ&E, RD	DAC
Energy Sector requirement	States	Power / PNG	DAC
Cattle & animal welfare (Vet.)	States	DoAHD	DAC
Cattle camp	States	DoAHD	DAC
Monitoring and encouraging of NGOs / VOs	States	Panchayati Raj	DAC
Taking over of the exploratory wells in drought prone areas	States	CGWB	MoWR
Adoption of traditional methods of water storage and completion of ongoing storage projects	States	CWC	MoWR

Details of agency-wise Standard List of Items for Drought Preparedness may be seen in Part-II.

6. Crisis Management Group

There shall be a Crisis Management Group (CMG) for Drought Management as is defined in the Crisis Management Plan (National) to deal with various phases of drought. The composition of the CMG for Drought is at Appendix I. Joint Secretary (Drought Management), the nodal officer nominated by the Department of Agriculture & Cooperation

to coordinate with NCMC will be the Member-Secretary of CMG. CMG would periodically review the drought preparedness, take appropriate decisions and report the developments to the Agriculture Secretary and to National Crisis Management Committee (NCMC). The issues to be decided by the Cabinet would be referred to NCMC for further necessary action by the Cabinet Secretariat.

At State level, a similar set up as envisaged for the Centre shall be made to review the crisis of drought.

At District level, the District Magistrate / Collector would be the head of the Crisis Management Group to deal the issue at sub-district / block / Taluk level.

7. Nodal Officers

Besides State Relief Commissioners and State Agriculture Secretaries, all State Government Department and line Departments / Ministries/ offices / agencies of the Central Government, responsible for different sets of activity connected with crisis management of drought shall nominate an officer not below the rank of Director or equivalent in the Government of India. The list of nodal officers containing their name, designation, telephone (office / residence), FAX, e-mail, mobile number address shall be maintained in the Department of Agriculture & Cooperation, Government of India and got updated every month.

At District level, the District Magistrate / Collector would be the nodal officer of the drought affected district, who will be co-opted in the drought management spectrum at the time of acute crisis in their district.

8. Drought Management Contacts

- Composition of Crisis Management Group (CMG) – **Appendix-1**
- List of Officers of Drought Management Division– **Appendix-2**
- List of Nodal Officers of Line Ministries / Departments – **Appendix-3**

9. Conclusion

The aim of the CMP (Drought) is to help all stake holders to be more prepared and less vulnerable to drought. It will also result in a timely and effective response by government agencies to reduce impacts during a drought crisis. The strategic activity planner and identification of agencies responsible for managing the crisis is aimed at demarcation of the duties of respective personnel in the identified activity.

This plan enables the officials who are responsible to focus their efforts on emerging crisis situations, which may require a unique response. As much as decisions taken in advance of a Crisis would make the remaining decisions are taken easily and go through the Crisis. However, existence of a National level mechanism and a holistic and integrated drought management plan would reduce the focus of the Crisis Management Plan (CMP) towards relief and rehabilitation in the event of fully blown drought.

Appendix -1

LIST OF MEMBERS OF CRISIS MANAGEMENT GROUP

1. Chairman - Additional Secretary & Central Drought Relief Commissioner

2. **Members –**

Nodal Officers of Line Ministry / Departments:

i. D/o Animal Husbandry, Dairying & Fisheries
ii. D/o Drinking Water Supply
iii. M/o Earth Sciences
iv. M/o Environment & Forests
v. D/o Food & Public Distribution
vi. M/o Health & Family Welfare
vii. M/o Home Affairs
viii. India Meteorological Department
ix. M/o Labour & Employment
x. M/o Panchayati Raj
xi. M/o Petroleum & Natural Gas
xii. M/o Power
xiii. M/o Railways
xiv. D/o Rural Development
xv. M/o Urban Development
xvi. M/o Water Resources
xvii. M/o Women & Child Development

3. **Member Secretary – Joint Secretary** (Drought Management)

Appendix -2

LIST OF NODAL OFFICERS OF THE LINE MINISTRIES / DEPARTMENTS

S. No	Name of the Ministry / Department & Address	Details of Nodal Officer / Alternate Nodal Officer
1.	D/o Animal Husbandry, Dairying & Fisheries Krishi Bhavan, New Delhi	JS (Admn),
2.	D/o Drinking Water Supply, CGO Complex, Lodhi Road, New Delhi	Shri A. Bhattacharya, Jt. Secretary 24361643 Shri R. K. Sinha, Director 24364518
3.	M/o Earth Sciences Mahasagar Bhavan, Block No.12, CGO Complex, Lodi Road, New Delhi-110 003	Dr. K.J. Ramesh Scientist G / Adviser (Multi Hazards) Tele fax – 24622059 Mobile – 9868733464 E-mail : kj.ramesh@nic.in, kjramesh26@gmail.com
4.	M/o Environment & Forests 7th Floor, Paryavaran Bhavan, CGO Complex, Lodi Road New Delhi – 110 003	Shri Rajbir Singh Bondwal Assistant Inspector General of Forests National Afforestation and Eco-Development Board , M/o Environment & Forests, Tele : 24364981 Fax : 24361704 E-mail : rajbir_singh_ifs@yahoo.com
5.	D/o Food & Public Distribution Krishi Bhavan, New Delhi	1) Shri Siraj Hussain, Joint Secretary(P&FCI), 194 Krishi Bhavan, New Delhi – 110 001 Tel : 011-23381177 (o) 95120-2586161 ® 9818518384 (M) 2) Shri H.S. Bajwa, Joint Director(Movt.) 182-B, Krishi Bhavan, New Delhi – 110 001 011-23382709 (o) 011-24673145 ®

		9811204651 (Mob.)
6.	M/o Health & Family Welfare Directorate General of Health Services (EMR) Nirman Bhavan, New Delhi	Shri Vineet Chawdhry Joint Secretary Tele No. 23062579 Alternate Nodal Officer Dr. P.R. Ravindran Director (EMR) Tel. No. 23061302 Fax : 23061457
7.	M/o Home Affairs, North Block, New Delhi	1) Shri Dev Kumar, Director (NDM-I) Tel: 23092696 (Telefax), 26266708®, 9871087616 (Mob.) 2) Shri J.L. Chugh, Director (NDM-II) Tel : 23092670 24525239®
8.	India Meteorological Department Mausam Bhavan, Lodi Road, New Delhi	Shri B.K. Bandopadhyay DDGM (Services) Tel. No.24635664 E-mail : bkbando1705@yahoo.co.in Alternate Nodal Officer Shri Awadhesh Kumar, Director Tel. No. 24611068 E-mail : awdk54@gmail.com
9.	M/o Labour & Employment Shram Shakti Bhavan, New Delhi	Shri R.L.Singh, Director 23715137
10.	M/o Panchayati Raj Sardar Patel Bhavan, New Delhi	Shri Avtar Singh Sahota Joint Secretary Tel : 23747910 Fax: 23747930
11.	M/o Petroleum & Natural Gas, Shastri Bhavan, New Delhi	JS(Admn)
12.	M/o Power Shram Shakti Bhavan, Rafi Marg New Delhi	Shri ICP Keshari, Joint Secretary (OM), Room No.218 Tel : 23714367(o), 26175584 ® E-mail : ikeshari@gmail.com Alternate Nodal Officer Shri A.K. Saxena Director (OM), Room No. 219

		Tele : 23716674 (o), 26266166 ® E-mail : akumar.saxena@nic.in
13.	M/o Railways Railway Board Rail Bhavan, New Delhi	Shri Rajeev Director (Traffic) Shri Amitabh Director (Safety)
14.	D/o Rural Development Krishi Bhavan, New Delhi	Shri S.K. Singh Director (NREGA)
15.	M/o Urban Development (CPHEEO) Nirman Bhavan, New Delhi	Shri R. Sethuraman Adviser, (PHEE) Tel : 23062482 Fax : 23062559 Shri M. Sankaranarayanan, Dy. Adviser (PHE Tel : 23061571 Fax : 23062559 Fax : 23062482
16.	M/o Water Resources, Block No.11, 8th Floor, CGO Complex, Lodi Road New Delhi	Shri H.K. Sahu, Sr. Joint Commissioner (Indus), Tele fax : 24392095 <u>Alternate Nodal Officer</u> Shri Y.K. Sharma Director, Water Management Directorate Room No.205 Sewa Bhavan, R.K. Puram, New Delhi. Tele : 26107403
17.	M/o Women & Child Development Shastri Bhavan, New Delhi	Smt.Kalyani Chadha, Director Ministry of Women & Child Development, Room No.640-A Shastri Bhavan, New Delhi. Tel. No. 23384714 (o), 26863303 ®

Appendix-3

DETAILS OF OFFICERS OF DROUGHT MANAGEMENT DIVISION

S. No.	Name & Designation	Room No.	Telephone	E-mail
1	Dr. C.V. Ananda Bose Additional Secretary & Central Drought Relief Commissioner	129	23311363 23382532 23388046 ®	cva.bose@nic.in
2	Shri Atanu Purkayastha Joint Secretary	138	23381503 23387669 Fax	jsrkvy-agri@nic.in
3.	Shri C.M. Sharma Deputy Secretary	248B	23384752	sharma.cm@nic.in
4.	Shri S. Janakiraman Under Secretary	387	23383309	sjramans@yahoo.com
5.	Shri S.V. Patil Under Secretary	22	23389453 23384555(Fax)	drought.krishi@nic.in
6.	Smt. Sheel Prabha Jain Section Officer (DM Section)	387	23383309	

PART – II

OF

CMP (Drought)

(To be kept as reference along with the Master Document)

I N D E X

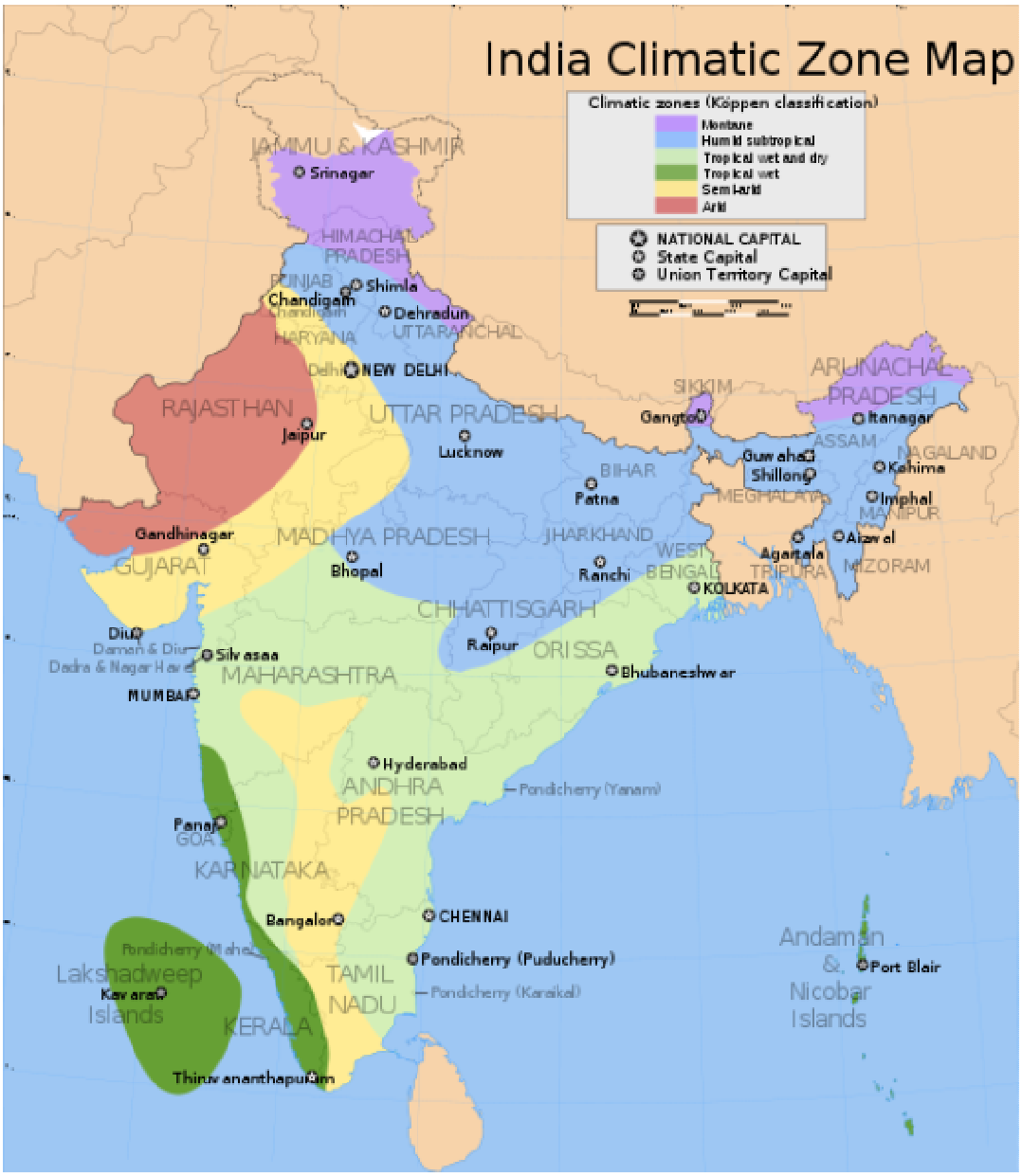
PART – II

(To be kept as a reference along with the Master Document)

METEOROLOGICAL SUB DIVISIONS IN INDIA
(Source: IMD)

No.	Meteorological Sub-Divisions
1.	Andaman & Nicobar Islands
2.	Arunachal Pradesh
3	Assam & Meghalaya,
4.	Nagaland, Manipur, Mizoram & Tripura
5.	Sub–Himalayan West Bengal & Sikkim
6.	Gangetic West Bengal
7.	Orissa
8.	Jharkhand
9.	Bihar
10.	East Uttar Pradesh
11.	West Uttar Pradesh
12.	Uttaranchal
13.	Haryana, Chandigarh & Delhi
14.	Punjab
15.	Himachal Pradesh
16.	Jammu & Kashmir
17.	West Rajasthan
18.	East Rajasthan
19.	West Madhya Pradesh
20.	East Madhya Pradesh
21.	Gujarat Region
22.	Saurashtra, Kutch & Diu
23.	Konkan & Goa
24.	Madhya Maharashtra
25.	Marathawada
26.	Vidarbha
27.	Chhattisgarh
28.	Coastal Andhra Pradesh
29	Telangana
30.	Rayalaseema
31.	Tamil Nadu & Pondicherry
32.	Coastal Karnataka
33.	North Interior Karnataka
34.	South Interior Karnataka

35. Kerala
36 Lakshadweep


India Climatic Zone Map
Climatic zones (Köppen classification)
Montane
Humid subtropical
Tropical wet and dry
Tropical wet
Semi-arid
Arid
NATIONAL CAPITAL
State Capital
Union Territory Capital
JAMMU & KASHMIR
Srinagar
HIMACHAL PRADESH
PUNJAB
Shimla
Chandigarh
Dehradun
UTTARANCHAL
HARYANA
Delhi
NEW DELHI
RAJASTHAN
Jaipur
UTTAR PRADESH
Lucknow
SIKKIM
Gangtok
ARUNACHAL PRADESH
Itanagar
ASSAM
Guwahati
Shillong
NAGALAND
Kohima
BIHAR
Patna
MEGHALAYA
Imphal
MANIPUR
Aizawl
MIZORAM
Agartala
TRIPURA
WEST BENGAL
KOLKATA
Ranchi
JHARKHAND
Gandhinagar
GUJARAT
MADHYA PRADESH
Bhopal
CHHATTISGARH
Raipur
ORISSA
Bhubaneshwar
Diu
Daman & Diu
Dadra & Nagar Haveli
Silvassa
MAHARASHTRA
MUMBAI
Hyderabad
ANDHRA PRADESH
Pondicherry (Yanam)
Panaji
GOA
KARNATAKA
Bangalore
CHENNAI
Pondicherry (Puducherry)
Pondicherry (Karaikal)
TAMIL NADU
Lakshadweep Islands
Kavaratti
KERALA
Thiruvananthapuram
Andaman & Nicobar Islands
Port Blair

Agro-climatic Divisions of India - Agricultural Meteorology

Preface

Agriculture is determined by the climate. In other words, climate is the key factor in any operation of agricultural production right from field preparation to marketing. The success and failure of farming is closely associated with the prevailing weather conditions. Hence, it is possible to optimize the farm production by adjusting the cropping patterns and agronomic practices to suit the climate of an area if we have a fairly good knowledge about the agro climatic regions of our country. Closely related are the division of agro-ecological regions of our country. In many instances these divisions may be same or very similar. Therefore, the reader is advised to study the article on Agroecological Regions of India. So by knowing climate of a particular area, it would be possible to plan the production strategies suitable to that area in a better way.

Introduction

Agro-meteorology, abbreviated from Agricultural Meteorology and also referred to as Agro-climatology, has been defined in several ways. The name itself implies that it is the study of those aspects of meteorology which have direct relevance to agriculture. Agro-meteorology puts the science of meteorology to the service of agriculture, in its various forms and facets, to help the sensible use of land, accelerate production of food and to avoid the irreversible abuse of land re- sources.

The task of an agro-meteorologist is to apply every relevant meteorological skill to help the farmer to make the most efficient use of his physical environment for improving agricultural production both in quality and quantity.

II. Climatic Divisions of India

To work out the suitable cropping plan for field crops in different agro-climatic regions of the country, it is essential to .know how the country is divided into homogeneous climatic regions. Sub-divisions can be formed on the basis of (a) potential evapo-transpiration, or on the basis of the (b)

periodic occurrence of temperature conditions favourable for the growth of annual crops.

The climate has been classified on the basis of potential evapo-transpiration which represents a climatic index of plant development and a heat index of the agro- climate, soil moisture supply, plant cover and soil management. Among these, first two are of far greater importance than the other factors. According to this classification, the country may be divided into four climatic regions, as detailed in table

S.NO.	Climatic Type	Index or potential Evapo-transpiration	Region & State covered
1.	Arid	-40 to -60	West Rajasthan
2.	Semi-Arid	-20 to -40	Northern & Eastern Rajasthan, Gujarat, Marathwada, Mysuru, Rayalaseema, Punjab, Delhi, Western U.P
3.	Sub-humid	-20 to +20	Central U.P, Western & Central M.P, Vidarbha, Eastern U.P, Bihar, Sub-mountain tracts of U.P, H.P., West Bengal and Nilgiris
	humid	+20 to 100	Konkan, Kerala, Coastal Chennai, Assam, Orissa, West Bengal, Eastern M.P and coastal Andhra Pradesh

Agro-climatic Classification of India based on moisture index (from IMD Pune - www.imdagrimet.org)

Pennman method has been used to estimate evapo-transpiration of about 230 stations located in India (1971). These estimates are used to compute water balance of these stations in India, wherever available. The type of the soil of each station is found out from the soil maps of India published by National Atlas Organization, Govt. of India (1957). On the basis of soil type corresponding to cereal grain crop, the available water capacity of the soil is found out from the table given by Thornthwaite and Mather. Water balance computations are done according to the latest approach of Thornthwaite. The moisture index is calculated without using the weighting factor for aridity index and the complete Climatic Classification is done for about 230 stations according to the revised Units (1966). Using these data, maps of moisture and thermal regimes of the country prepared.

Moisture regions and their limits in Thornthwaite Classification-(1955) Climatic Type	Symbol	Moisture Index Range
Perhumid	A	100 and above
Humid	B4	80 to 100
Humid	B3	60 to 80
Humid	B2	40 to 60
Humid	B1	20 to 40
Moist Sub-humid	C2	0 to 20
Dry Sub-humid	C1	-33.3 to 0
Semi-arid	D	-66.7 to -33.3

Agroclimatic Classification of India based on thermal index

Thermal efficiency and its summary concentration Thermal efficiency(Annual Potential evapotranspiration in cm)	Climatic type	Summer concentration (percentage)	Summer concentration type
14.2	E′Frost		
28.5	D′Tundra	88.0	d′
42.7	C1′	76.3	c_1′
57.0	C2′	68.0	c_2'
71.2	B1′	61.6	b_1'
65.5	C2′	56.3	b_2'
99.7	B3′	51.9	b_3'
114.0	B4′	48.0	b_4′

Delineation of Agroclimatic Zones of India under National Agricultural Research Project (NARP)

This identification of agro-climatic zones for the purpose of developing location specific research and development strategies for increasing agricultural production has been given the due impetus recently. In order to plan agricultural activities more accurately each region (15 Resource Development Regions proposed by Planning Commission) has been further divided into sub-regions based on soil, climate (temperature), rainfall and other agro-meteorological characteristics under NARP project.

A total of 127 agro-climatic zones have been identified in India under NARP based on a comprehensive research review of each state. While delineating zonal boundaries the physiographic divisions of each of the state, its rainfall pattern, soil type, availability of irrigation water, existing cropping pattern and administrative units have been considered in such a manner that there are fewer variations on the parameters within a zone.

The delineation of zonal boundary of the NARP in mostly in terms of districts and in some cases talukas/tahasils or subdivisions have also been considered substantial

Agroclimatic zones of India

Region: North India

State : Jammu & Kashmir

Abbreviation	Agroclimatic Zone
AZ1	Low Altitude Subtropical
AZ2	Intermediate
AZ3	Valley temperate
AZ4	Dry Temperate
AZ5	Cold Arid

State :Himachal Pradesh

AZ6	High hills Temperate Wet
AZ7	Sub Montaneb and low hills subtropical
AZ8	Mid hills subtropical
AZ9	Sub Montaneb and low hills subtropical

State : Punjab

AZ10	Undulating Plain
AZ11	Central Plain
AZ12	Western Plain
AZ13	Western
AZ14	Sub montane undulating

State: Haryana

AZ15	Eastern
AZ16	Western

State: Rajasthan

AZ17	Arid Western Plain
AZ18	Irrigated North Western Plain
AZ19	Transitional palin zone of Island drainage
AZ20	Transitional plain zone of Luni Basin
AZ21	Semiarid eastern plain
AZ22	Flood prone eastern plain
AZ23	Sub humid southern plain and alluvial hill
AZ24	Southern humid plain
AZ25	South eastern humid plain

State: Uttaranchal

AZ26	Hill
AZ27	Bhabar and Tarai

State: Uttar Pradesh

AZ28	Western Plain
AZ29	Mid Western Plain
AZ30	South Western Semi arid
AZ31	Central Plain
AZ32	Bundel Khand
AZ33	North Eastern Plain
AZ34	Eastern Plain
AZ35	Vindhya

Region: East & North east India

State: West Bengal

AZ36	Hilly

AZ37	Tarai
AZ38	Old Alluvial
AZ39	New Alluvial
AZ40	Laterite and red soil Zone
AZ41	Coastal Saline

State :Assam

AZ42	Basic valley
AZ43	Upper Brahamaputra
AZ44	Hill
AZ45	Coastal Brahamaputra
AZ46	Upper Brahmaputra valley
AZ47	Lower Brahamaputra valley

State :Arunachal Pradesh

AZ48	Alpine
AZ49	Temperate Sub Alpine

State :Meghalaya

AZ50	Sub tropical Hill

State: Manipur

AZ51	Sub tropical plain

State: Nagaland

AZ52	Mid Tropical Hill

State: Tripura

AZ53	Mid Tropical Plain

State: Bihar and Jharkhand

AZ54	Northwest Alluvial Plain
AZ55	North east Alluvial plain
AZ56	South Bihar Alluvial Plain
AZ57	Central and northeastern plateau
AZ58	Western Plateau
AZ59	South eastern plateau

State:Orissa

AZ60	North western plateau
AZ61	North Central plateau
AZ62	North eastern Coastal plain
AZ63	East & southeastern coastal plain
AZ64	North eastern ghat
AZ65	Eastern gaht highland
AZ66	Southeastern ghat
AZ67	Western undulating

AZ68	West central table
AZ69	Mid Central table land

Peninsular India

State:Madhya Pradesh and Chattisgarh

AZ 70	Chattigarh plain zone including Chattisgarh districts
AZ71	Bastar Plateau
AZ72	North hill zone of Chattisgarh
AZ73	Kymora plateau and Satpara hill
AZ74	Vindya Plateau
AZ75	Central Narmada Valley
AZ76	Gird
AZ77	Bundelkhand
AZ78	Satpura plateau
AZ79	Malwa Plateau
AZ80	Nimar Valley
AZ81	Jhabua hills

State: Gujarat

AZ82	East Gujarat heavy rainfall
AZ83	South Gujarat
AZ84	Middle Gujarat
AZ85	North Gujarat
AZ86	North Western Gujarat
AZ87	South Saurashtra
AZ88	North Saurashtra
AZ89	Ghat and Coastal

State:Maharashtra

AZ90	South Konkan Coastal
AZ91	North Konkan Coastal
AZ92	Western Ghat
AZ93	Submontane
AZ94	Western Maharashtra Plain
AZ95	Scarcity
AZ96	Central Maharashtra plateau
AZ97	Central Vidarbha
AZ98	Eastern Vidarbha

State: Karnataka

AZ99	North East transition
AZ100	North east dry
AZ101	Northern dry
AZ102	Central dry
AZ103	Eastern dry
AZ104	Southern dry
AZ105	Southern transition

AZ106	Western transition
AZ107	Hill
AZ108	Coastal

State: Kerala

AZ109	Northern
AZ110	Southern
AZ111	Central
AZ112	High Altitude
AZ113	Problem area

State:Andhra Pradesh

AZ114	North Coastal
AZ115	Southern
AZ116	Northern Telengana
AZ117	Scarce rainfall zone of Rayalseema
AZ118	Southern Telengana
AZ119	High altitude and tribal
AZ120	Krishna Godavari

State: Tamil Nadu

AZ121	North eastern
AZ122	North western
AZ123	Western
AZ124	Kaveri delta
AZ125	Southern
AZ126	High rainfall
AZ127	High altitude and hilly

Agricultural Zones on the Basis of Distribution of Crops

Agricultural Zones	Area and Crop Distribution
1	The Baripada plain to the east of Budhabalanga. It is dominated by the sugarcane cultivation.
2	The south Balasore plain. It works as wonders for cereals.
3	The southern valley of the Baitarani. This area suits to sugarcane cultivation.
4	The Panposh plateau is dominated by pulses.
5,6	These zones cover the entire Mahanadi, Brahmani and southern portion of the Baitarani deltas. Throughout the zone, pulses are extensively cultivated. In the core sugarcane, jute oilseeds and other cereals are widely grown.
7	This region is solely dominated by oilseeds and is located on the eastern bank of the Brahmani River.
8,9	These zones are found in the middle and lower Brahmani valley. They are dominated by pulses. In the core of this region, cotton and sugarcane are extensively cultivated. Pulses, sugarcane and cotton are the principal crops.
10	This zone dominated by sugarcane is located in the Mahanadi valley and is confined to the Dhenkanal plains.
11	In the Nayagarh region oilseeds are the principal crop.
12	The upper Mahanadi valley is dominated by pulses.
13, 14	These zones located in the hilly terrain of the Udayagiri and Phulbani regions, almost overlap each other and are dominated by pulses and oilseeds.
15, 16	The Rushikulya Plain is the most important agricultural region in Orissa. It is dominated by pulses.
17, 18	The Vansadhara valley is a region dominated by sugarcane cultivation. Rayagada stands at the centre of this zone. Oilseeds are also widely cultivated to the east of the Vansadhara and thus a separate region is formed.
19	This small region in the upper reaches of the Nagabali is dominated by sugarcane cultivation.
20	This is a hilly region almost the same size as the former, but is principally a cereal area.
21, 22	The Nawrangpur plateau is mainly a region of pulses. Towards the southern part of this area, however, sugarcane dominates. So a separate region is worked out with pulses and sugarcane.
23, 24, 25,	The rolling uplands of Bolangir- Titlagarh- Patnagarh and

26	Bhawanipatna are dominated by cereals.
27	The Sonepur plain is dominated by sugarcane cultivation.
28, 29, 30	The Sambalpur and Baragarh rolling uplands are dominated by pulses. In the northern part of this region sugarcane and in the south oilseeds dominate.
31	This region covers the rolling uplands of the basin and the Panposh rolling uplands of the Brahmani. Pulses are the principal crops here.

From the website of Ministry of Rural Development (D/o Land Resources)

DROUGHT PRONE AREAS PROGRAMME (DPAP)

Coverage

Upto 1994-95, DPAP was in operation in 627 blocks of 96 districts in 13 States. Prof. C.H. Hanumanntha Rao Committee recommended:

- Exclusion of 245 existing blocks;
- Including of 384 new blocks; and
- Transfer of 64 blocks from DPAP to DDP.

The Government did not agree for exclusion of existing DDP blocks. However, inclusion of new blocks and transfer of blocks from DPAP to DDP was agreed to. Thus, from 1995-96 total blocks covered under DPAP became 947. These 947 blocks were in 164 districts in 13 States. Subsequently, with the re-organization of States, Districts and Blocks, the programme is now covered in 972 blocks of 183 districts in 16 States. These States are Andhra Pradesh, Bihar, Chattisgarh, Gujarat, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uittar Pradesh, Uttaranchal and West Bengal. The identified dry sub humid area under the programme is about 7.46 lakh sq. kms (74.6 million hac.)

STATES, DISTRICTS AND BLOCKS COVERED UNDER DROUGHT PRONE AREAS PROGRAMME (DPAP)

Sl.No.	Name of the State	No. of Districts	No. of Blocks	Area in Sq. Kms.
1.	Andhra Pradesh	11	94	99218
2.	Bihar	6	30	9533
3.	Chattisgarh	8	29	21801
4.	Gujarat	14	67	43938

5.	Haryana	-	-	-
6.	Himachal Pradesh	3	10	3319
7.	Jammu & Kashmir	2	22	14705
8.	Jharkhand	14	100	34843
9.	Karnataka	15	81	84332
10.	Madhya Pradesh	23	105	89101
11.	Maharashtra	25	149	194473
12.	Orissa	8	47	26178
13.	Rajasthan	11	32	31969
14.	Tamil Nadu	17	80	29416
15.	Uttar Pradesh	15	60	35698
16.	Uttaranchal	7	30	15796
17.	West Bengal	4	36	11594
	Total	**183**	**972**	**745914**

DESERT DEVELOPMENT PROGRAMME (DDP)

Coverage

Upto 1994-95, Desert Development Programme was under implementation in 131 blocks of 21 districts in 5 States. The Hanumantha Rao Committee recommended:-

- Inclusion of 32 new blocks; and
- Transfer of 64 blocks from DPAP to DDP

Inclusion of new blocks and transfer of blocks from DPAP to DDP was agreed to. Thus, from 1995-96 total blocks covered under DDP became 227 in 40 districts of 7 States. Subsequently, with the re-organization of Districts and Blocks, the programme is now covered in 235 blocks of 40 districts in 7 States. The corresponding physical area under the programme is about 4.57 lakh sq. kms. The details are given at Annexure 1.

Cost Norms & Funding pattern

The Central share under each type of eco-system under DDP was as under:

Hot Arid Non Sandy Areas	75%
Hot Arid Sandy Areas	100%
Cold Arid Areas	100%

The above Central share was applicable up to 31st March, 1999. With effect from 1st April , 1999, the programme is being funded on the basis of 75:25.

In all these cases for the watershed projects being sanctioned on or after this date. From 1.4.1995 till 31.3.2000, the cost of each ranged between Rs. 22.50 lakhs to Rs. 25 lakhs. With effect from 1.4.2000, a uniform rate of Rs. 30 lakh per project has been prescribed.

STATES, DISTRICTS AND BLOCKS COVERED UNDER DESERT DEVELOPMENT PROGRAMME (DDP)

Sl.No.	Name of the State	No. of Districts	No. of Blocks	Area in Sq. Kms.
1.	Andhra Pradesh	1	16	19136
2.	Gujarat	6	52	55424
3.	Haryana	7	44	20542
4.	Himachal Pradesh	2	3	35107
5.	Jammu & Kashmir	2	12	96701
6.	Karnataka	6	22	32295
7.	Rajasthan	16	85	198744
	Total	**40**	**234**	**457949**

INTEGRATED WASTELANDS DEVELOPMENT PROGRAMMME (IWDP)

Geographical Details of India

AREA	(m.ha)
Total Geographical Area	329 mha.
Records available	304 mha.
Area fit for vegetation	264 mha.
Area under Crops	142 mha.
Area under forest	67 mha.
Degraded Area in villages	35 mha.
Degraded Area with farmers	20 mha.

What are Wastelands?

Degraded land which can be brought under vegetative cover, with reasonable effort, and which is currently under utilised and land which is deteriorating for lack of appropriate water and soil management or on account of natural causes.

The programme does not focus solely on uncultivable wastelands because such lands are:

- Too degraded to recoupe in isolation
- Cost of treatment is very expensive and economical
- Such lands are too remote from the village through protection of vegetative measures and participation of local people is not possible

Categories of Wastelands in India

Category	Area (in sq.Kms.)
Snow Covered/Glacial	55788.49
Barren Rocky/Sheet Rock	64584.77
Sands-inland/coastal	50021.65
Land affected by salinity/alkalinity	20477.38
Gullied/or ravinous land	20553.35
Upland with or without scrub	194014.29
Water logged & Marshy	16568.45
Steep sloping area	7656.29

Shifting cultivation land	35142.20
Mining/Industrial Wastelands	1252.13
Degraded/pastures/grazing land	25978.91
Under utilised/degraded notified forest land	140652.31
Degraded land under plantation crop	5828.09

Grand Total: 638518.31 sq. kms

Criteria adopted by CWC for drought identification

For the studies, Central Water Commission adopted the same criteria as followed by the Irrigation Commission, 1972 i.e. drought is a situation occuring in an area:

- When the annual rainfall is less than 75% of the normal in 20% of the years examined.
- Less than 30% of the cultivated area is irrigated.

Central Water Commission adopted a smaller Unit viz. Talukas for drought identification studies instead of districts and therefore, number of drought affected Talukas were identified as 315 out of a total of 725 Talukas in 99 districts.
Accordingly, out of 108 M. ha area of 99 districts, only 51.12 M. ha spread over 74 districts have been considered as drought districts. Thus, in comparison to total geographical area of the country (329 M. ha) about 1/6th is drought prone.

The approach followed to minimise effect of drought during the 8th Five Year Plan were:

- Larger thrust for watershed development under Drought Prone Area Programme.
- Dry land farming and water resource development.
- Instead of capital intensive engineering works for soil and moisture conservation, encourage simple and low cost structures which can be completed in a short time with the help of local skills.
- Dovetail Crop production activities into the watershed project along with soil conservation activities.
- Take up large scale dry land farming demonstrations.
- Limited irrational and over exploitation of groundwater resources.
- Undertake Research on the efficacy and economics of sprinkler and drip irrigation systems.
- Construction of suitable water harvesting structures for the purpose of conservation and optimal use of surface water and recharge of underground aquifers.
- Renovation and restoration of old tanks/farm ponds in the villages.
- Afforestation and Pasture Development.
- Animal Husbandry and Fodder Development.
- People's participation in drought proofing.

Programs and Schemes under Ministry of Water Resources

- Initiatives for Rain Water Harvesting
- HP 2 - Finance Desk
- AIBP
- CADWM Programme
- R and D
- Hydrology Project
- National project for RRR of water bodies
- Farmers Participatory Action Research Programme
- Artificial Recharge to Ground Water through Dugwell