सत्यमेव जयते

DROUGHT MANAGEMENT PLAN

NOVEMBER 2017

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE AND FARMERS WELFARE
DEPARTMENT OF AGRICULTURE,
COOPERATION & FARMERS WELFARE

DROUGHT MANAGEMENT PLAN

NOVEMBER 2017

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE AND FARMERS WELFARE
DEPARTMENT OF AGRICULTURE,
COOPERATION & FARMERS WELFARE

Index

jk/kkekgu fl|g
RADHA MOHAN SINGH

df"k ,oa fd lku dY;k.k e=h
Hkkjr ljdkj
MINISTER OF AGRICULTURE
& FARMERS WELFARE
GOVERNMENT OF INDIA

PREFACE

Agriculture plays a vital role in India's economy. About 56% of the net cultivated area of the net cultivated area of the cultivated area of the country is rain-fed accounting for 44% of food production, where the Monsoons play a critical role. Thus, the varied agro-climatic context of Indian agriculture and its general dependence on monsoon rainfall makes it particularly valnerable to drought. Drought is acknowledged as a phenomenon Characterised by a high degree of complexity and therefore the challenge related to prevention, mitigation and management of drought require careful planning and coordination on the part of the Central and State Governments.

It gives me immense pleasure to learn that the Department of Agriculture, Cooperation and Farmers Welfare (DAC&FW) has prepared Drought Management Plan. I am sure that the implementation of the Drought Management Plan by all the stakeholders will go a long way in managing and mitigating drought.

(Radha Mohan Singh)

Office : Room No. 120, Krishi Bhawan, New Delhi-110001 Tel.: 23383370, 23782691 Fax : 23384129

गजेन्द्र सिंह शेखावत
GAJENDRA SINGH SHEKHAWAT

सत्यमेव जयते

कृषि एवं किसान कल्याण
राज्य मंत्री
भारत सरकार
MINISTER OF STATE FOR AGRICULTURE
& FARMERS WELFARE
GOVERNMENT OF INDIA

27 SEP 2017

Forward

I am happy to know that the Department of Agriculture, Cooperation and Farmers Welfare (DAC&FW) has prepared a National Drought Management Plan. Drought is a calamity that is distinct from other calamities in that it is characterised by a slow onset. Its onset, end and severity are often difficult to determine. Drought produces wide-ranging pernicious impacts that may span across economic, environmental and social sectors.

Drought Management is a complex phenomenon which requires active and continuous participation of the State Governments, Ministries/ Departments of the Central Government and other stakeholders in the planning and implementation of mitigation measures.

I am sure that all authorities involved in the management of drought at the Central and State Government levels will find the Drought Management Plan useful.

(Gajendra Singh Shekhawat)

Office : 199Q, Krishi Bhawan, New Delhi-110001, Tel. : +91-11-23782343, 23388165 (KB), Fax : 23074190
Resi. : 12C Firoz Shah Road, New Delhi-110 001, Tel. : +91-11-23352445, 23352445 (Telefax)
e-mail : g.shekhawat@sansad.nic.in

S.K. PATTANAYAK
SECRETARY

सत्यमेव जयते

भारत सरकार
कृषि एवं किसान कल्याण मंत्रालय
कृषि, सहकारिता एवं किसान कल्याण विभाग
Government of India
Ministry of Agriculture & Farmers Welfare
Department of Agriculture, Cooperation & Farmers Welfare

FOREWORD

Drought is a recurrent calamity that has bedevilled Indian agriculture over decades and centuries. The pernicious effects of drought are manifest in the sharp drop in agriculture production, farm income, widespread rural unemployment, out migration from rural areas and distress among cattle and farm animals.

Drought Management Plan is aimed at providing guidance for the overall management of drought in a structured and planned manner with the most efficient and optimum utilization of time, effort and resources so that adverse impact on the community is minimized. Drought Management requires close coordination among Central, State, District and Village levels administration. The Drought Management Plan has been prepared with the objective of defining the roles and responsibilities of different stakeholders involved in managing drought.

It is hoped that Drought Management Plan will be useful for all stakeholders at various levels for drought preparedness and mitigation.

(S.K. Pattanayak)

New Delhi
9th October,2017

Office : Krishi Bhawan, New Delhi-110001, दूरभाष / Phone : 23382651, 23388444 फैक्स सं० / Fax No. : 23386004
E-mail : secy-agri@gov.in

Abbreviations

AIBP	:	Accelerated Irrigation Benefit Programme
ATMA	:	Agricultural Technology Management Agency
CACP	:	Commission for Agriculture Cost and Prices
CDRC	:	Central Drought Relief Commissioner
CWWGDM	:	Crop Weather Watch Group For Drought Management
CMP	:	Crisis Management Plan
CRIDA	:	Central Research Institute for Dry Land Agriculture
CAD&WM	:	Commend Area Development & Water Management
CWC	:	Central Water Commission
CHC	:	Custom Hiring Centre
CSOs	:	Civil Society Organizations
DAC & FW	:	Department of Agriculture, Cooperation & Farmers Welfare
DAHD&F	:	Department of Animal Husbandry, Dairying & Fisheries
DARE	:	Department of Agricultural Research & Education
DM Division	:	Drought Management Division
DMC	:	Drought Monitoring Cell
DMP	:	Drought Management Plan
DM Act	:	Disaster Management Act
DRR	:	Disaster Risk Reduction
DACPs	:	District Agriculture Contingency Plans
DoLR	:	Department of Land Resources
DPC	:	District Planning Committee
DIP	:	District Irrigation Plan
DDMCs	:	District Drought Monitoring Centres
HLC	:	High Level Committee
HRVA	:	Hazard, Risk and Vulnerability Assessment
HKKP	:	Har Khet Ko Pani
IMCT	:	Inter-Ministerial Central Team
IWMP	:	Integrated Watershed Management Programme
INRM	:	Integrated Natural Resource Management
IPCC	:	Inter-governmental Panel on Climate Change
ICAR	:	Indian Council of Agricultural Research
ICDS	:	Integrated Child Development Services
KCC	:	Kisan Call Centre
LPA	:	Long Period Average
MNCFC	:	Mahalanobis National Crop Forecast Centre

MoWR,RD&GR	:	Ministry of Water Resources, River Development & Ganga Rejuvenation
MGNREGS	:	Mahatma Gandhi National Rural Employment Guarantee Scheme
MPLADS	:	Local Area Development Schemes for the Members of Parliament
MLALADS	:	Local Area Development Schemes for the Members of State Legislature
NDMA	:	National Disaster Management Authority
NCMC	:	National Crisis Management Committee
NDMP	:	National Disaster Management Plan
NDRF	:	National Disaster Response Fund
NADAMS	:	National Agriculture Drought Assessment and Monitoring System
NRAA	:	National Rainfed Area Authority
NRSC	:	National Remote Sensing Centre
NRLM	:	National Rural Livelihood Mission
NGOs	:	Non-Government Organizations
NFSA	:	National Food Security Act
NP-NSPE	:	National Programme of Nutritional Support to Primary Education
NRDWP	:	National Rural Drinking Water Programme
NPDRR	:	National Platform for Disaster Risk Reduction
OFWM	:	On Farm Water Management
PKVY	:	Paramparagat Krishi Vikas Yojana
PMKSY	:	Pradhan Mantri Krishi Sinchayee Yojana
PMFBY	:	Pradhan Mantri Fasal Bima Yojana
PRIs	:	Panchayati Raj Institutions
PDS	:	Public Distribution System
SDRF	:	State Disaster Response Fund
SC-NEC	:	Sub-Committee of National Executive Committee
SPI	:	Standardized Precipitation Index
SHGs	:	Self Help Groups
SEC	:	State Executive Committee
SAUs	:	State Agriculture Universities
SSA	:	Sarva Shiksha Abhiyan
SDMCs	:	State Drought Monitoring Centres
TPDS	:	Targeted Public Distribution System
WUA	:	Water User Association

1 Introduction

Agriculture plays a vital role in India's economy. About 56% of the net cultivated area of the country is rain-fed accounting for 44% of food production. Thus Monsoon rainfall is crucial for agricultural operations and food security of the country. It also has negative spin off effects on other sectors of the economy. South West Monsoon (June to September) rainfall contributes to about 73% of total rainfall in the country. Timely onset and spatial distribution of rainfall is crucial for cultivation of Kharif crops that accounts for about 90% of paddy, 70% of coarse cereals and 70% oilseed production of the country. Rainfall especially during the months of June and July are crucial for sowing of Kharif crops. Coastal areas of peninsular India, in particular Tamil Nadu receive bulk of their annual rainfall from the North-East Monsoons, between October and December.

Drought connotes a situation of water shortage for human, cattle and agriculture primarily on account of, though not limited to, significant shortfall in rainfall.

The primary responsibility of managing drought (or any other natural disaster) is that of the State Governments. The role of 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.

1.1 Overview of the department

The Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW) is one of the three constituent Departments of the Ministry of Agriculture & Farmers Welfare, the other two being Department of Animal Husbandry, Dairying & Fisheries (DAHD&F) and Department of Agricultural Research and Education (DARE). This Department is headed by Agriculture & Farmers Welfare Minister and is assisted by three Ministers of State. The Secretary (AC&FW) is the administrative

head of the Department ,who is assisted by one Principal Adviser, five Additional Secretaries including One Financial Adviser, Agriculture Commissioner, 12 Joint Secretaries including Mission Director (National Horticulture Mission) & Mission Director (National Food Security Mission) Horticulture Commissioner Horticulture Advisor, Economic Advisor and two Deputy Director Generals. In addition, Chairman of Commission for Agriculture Costs and Prices (CACP) advises Department on pricing policies for selected agricultural crops.

The DAC&FW is organized into 27 divisions and has five attached Offices and twenty-one subordinate offices which are spread across the country for coordination with state level agencies and implementation of Central Sector Schemes in their respective fields. Further, one Public Sector Undertaking, nine autonomous bodies, ten national-level cooperative organizations and two authorities are functioning under administrative control of Department.

Drought Management Division, DAC&FW(DM Division) is mandated to coordinate relief measures necessitated by drought. Additional Secretary, DAC& FW functions as the Central Drought Relief Commissioner (CDRC) and is assisted by the Drought Management Division in the department. A Drought Monitoring Cell (DMC) in the Drought Management Division is responsible to monitor drought conditions, issue advisories, and coordinate with other Ministries of the Central Government, State Governments and relevant agencies to mitigate/combat the effect of drought. DM Section in Drought Management Division is responsible for processing Memoranda submitted by the State government seeking financial assistance under National Disaster Response Fund.

Given the importance of agriculture sector, Government of India took several steps for its sustainable development. Steps have been taken to improve soil fertility on a sustainable basis through the soil health card scheme, to provide yield based crop insurance to farmers through the Pradhan Mantri Fasal Bheema Yojana, to provide improved access to irrigation and enhanced water efficiency through Pradhanmantri Krishi Sinchayee Yojana, to support organic farming through Paramparagat Krishi Vikas Yojana (PKVY) and to support for creation of a unified national agriculture market to boost the incomes of farmers.

1.2 Purpose and scope of the Plan

Drought Management Plan (DMP) is designed to help reduce the time taken in mobilizing resources for an effective response and enable a harmonious relationship among stakeholders. The goal of DMP is to facilitate overall management of the drought situation in a structured and planned manner with the most efficient and optimum utilisation of time, effort and resources so that adverse impact on the community is minimised.

DMP helps in delineating roles and responsibilities of different Ministries/ Departments of the Government of India involved in drought management for mitigation, preparedness and for relief measures in managing the drought. DMP ensures better preparation and timely communication among stakeholders, which is critical in managing a drought.

This DMP would be applicable to the entire territory of India encompassing all the States and Union Territories.

1.3 Authorities, Codes, and Policies:

1.3.1 Disaster Management (DM) Act, 2005

Section 11 of the DM Act, 2005 mandates that there shall be a National Disaster Management Plan (NDMP) for the whole of India. While the national plan will pertain to the disaster management for the whole of the country, the hazard specific nodal ministries and departments notified by the Government of India will prepare detailed DM plans specific to the disaster assigned.

As per Section 37 of the DM Act, every ministry and department of the Government of India, including the hazard-specific nodal ministries, shall prepare comprehensive DM plans detailing how each of them will contribute to the national efforts in the domains of disaster prevention, preparedness, response, and recovery.

Government of India has given the mandate to Department of Agriculture, Cooperation & Farmers' Welfare to manage Drought. This plan is prepared accordingly.

1.3.2 Sendai Framework for Disaster Risk Reduction (DRR)

The Sendai Framework for Disaster Risk Reduction 2015-2030 is a non-binding agreement, which the signatory nations, including India, will attempt to comply with on a voluntary basis. The four priorities for action under the Sendai Framework are:

1. Understanding disaster risk
2. Strengthening disaster risk governance to manage disaster risk
3. Investing in disaster risk reduction for resilience
4. Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction

The Sendai Framework aims to achieve substantial reduction of disaster risk and losses in lives, livelihoods, and health and in the economic, physical, social, cultural, and environmental assets of persons, businesses, communities, and countries. The Drought Management Plan (DMP) has been aligned broadly with the goals and priorities set out in the Sendai Framework for DRR. Based on global practices and national experiences, the plan will incorporate changes during the periodic reviews and updates.

1.3.3 National Disaster Management Guidelines, Management of Drought, September 2010

The Guidelines have been prepared by National Disaster Management Authority (NDMA) to provide direction to the central ministries/departments, and state governments for preparing detailed action plans to handle drought as a part of an overall hazard Disaster Management plan.

1.3.4 Manual for Drought Management, December 2016

A Manual for Drought Management was published by the DAC & FW in November 2009, which has been revised and updated in December 2016. The revised manual has come into effect from Kharif season of 2017.

The various indices and parameters appropriate for declaration of drought revisited and new indices like Standardised Precipitation Index, Vegetation Condition Index, Percentage Available Soil Moisture, and Hydrology Indices like Reservoir Storage Index, Stream-flow Drought Index and Ground Water Drought Index have been added. Limitations of each of these indices/parameters have been specified, wherever required. The magnitude of the drought event has been graded on a scale of values as "Moderate" and "Severe". Other factors such as extent of fodder supply, scarcity of drinking water supplies, demand for employment and migration of labour, wage trends, food grains supply position etc. have been touched upon with the suggestion that State Governments may frame guidelines for objective evaluation based on monitoring mechanisms and baseline data.

Rainfall related indices have been recommended as the first trigger in the assessment of drought. In the event of rainfall inadequacy of a certain magnitude, the first trigger is set off which would then obligate State Governments to consider other impact indicators related to agriculture (crop sowing coverage), remote sensing, soil moisture and hydrology. The level of severity of drought will be based on the recorded values against the impact indicators and accordingly the second drought trigger is set off. In case the second drought trigger is set off, the Manual prescribes field level verification of ground truthing of crop damage through sample field survey in 10% of the villages selected randomly. The drought and the intensity of the calamity will be declared on the basis of findings from the field survey.

Time-lines have been indicated for declaration of drought, namely, 30 October for Kharif and 31 March for Rabi. States will declare drought and carryout relief operations. They can submit Memorandum for Financial Assistance to Govt of India if the drought was found to be of a severe nature.

The Manual for Drought Management is a guide for governments and agencies engaged in the prevention, mitigation and management of drought. Chapter 3 of the revised Drought Manual relates to drought declaration and provisions under this chapter have been made mandatory by the Ministry of Home Affairs for declaration of drought by the State governments.

1.4 Institutional arrangements for Drought Management

1.4.1 Central Drought Relief Commissioner (CDRC):

Additional Secretary in the Department of Agriculture, Cooperation and Farmers Welfare (DAC&FW) serves as the CDRC and is assisted by the Disaster Management (DM) Division in the Department. A Drought Management Cell in the DM Division is created to help collate information for diverse sources, monitor drought conditions, issue advisories, and coordinate with other Ministries of the Central Government, State Governments and relevant agencies to mitigate/ combat the effect of drought.

1.4.2 Drought Management Division, DAC & FW

Drought Management Division, DAC & FW is mandated for coordination of relief efforts necessitated by drought.

Concerned State Governments are empowered to initiate immediate relief measure to address the situation arising out of drought. State Governments initiate necessary relief measures in the wake of natural calamities including drought from State Disaster Response Fund (SDRF) which is readily available with them. Additional financial assistance, over and above SDRF, is considered from National Disaster Response Fund (NDRF) for natural calamities of severe nature and is approved on the basis of Memorandum received from State Government in accordance with established procedure, keeping in view items and norms in vogue for assistance.

On receipt of such a Memorandum, DAC & FW constitutes an Inter-Ministerial Central Team (IMCT) to visit the affected areas, assess the situation and submit a report on assessment of damages for recommending appropriate central assistance to the State. The report of the IMCT is considered by the Sub-Committee of the National Executive Committee (SC-NEC) under the chairmanship of Secretary, DAC & FW which recommends assistance from NDRF as per extant norms. The recommendation of SC-NEC is then placed before the High Level Committee (HLC) under the chairmanship of Union Home Minister for consideration and approval of appropriate central assistance from NDRF. On receipt of approval of

HLC, Department of Expenditure, Ministry of Finance, Govt. of India releases admissible central assistance to the State from NDRF.

1.4.3 Crop Weather Watch Group for Management of Drought:

The Crop Weather Watch Group for Drought Management (CWWGDM), in the DAC&FW, has been set up as an Inter-Ministerial mechanism, which should meet at least once a week during June to September period to monitor drought situation in the country. The composition of the Group and the specific areas of responsibility are suggested in Table below.

Partners	Tasks
Additional Secretary, Department of Agriculture, Cooperation & Farmers Welfare & Central Drought Relief Commissioner	Chairperson
Economics & Statistical Advisor, DAC&FW	Report behaviour of agro-climatic and market indicators
Agriculture Commissioner	Crop conditions: Availability of Inputs; Contingency Planning
Animal Husbandry Commissioner	Livestock health; Fodder availability
India Meteorological Department	Rainfall forecast and monsoon conditions.
Central Water Commission & Central Ground Water Board	Monitoring data on Important reservoirs / groundwater.
Ministry of Power	Availability of power
Indian Council of Agricultural Research	Technical input and contingency planning
Remote Sensing Centres	Provide satellite based inputs
Mahalanobis National Crop Forecast Centre	Agricultural Drought Information
Indian Space Research Organisation	Technical inputs on drought parameters
Joint Secretary, Drought Management	Coordinator

The CWWGDM will be responsible for the evaluation of multi-source information and data from scientific and technical bodies to determine the likely impact of meteorological and other environmental parameters on agriculture. The

CWWGDM is also conducting video conferences with State Governments every week, particularly, during the June-Sept period, to keep a close watch on the developments in the agricultural scenario and forge a common plan of action with all stake-holders, should the need arise.

1.4.4 Crisis Management Group

The Crisis Management Group on drought headed by the Additional Secretary & Central Drought Relief Commissioner reviews situation with the representatives of all the Line Departments, States and other Stakeholders as and when warranted.

1.4.5 Crisis Management Plan (CMP)

The CMP is an actionable programme, which is pressed into action in the event of a drought, to minimize damage to life and property. It delineates the roles and responsibilities of various stakeholders, including central and state government and their agencies in managing the drought effectively. It is updated every year before the monsoon sets in. This CMP is a part of overall spectrum of drought management but is focused on management interventions required during the crisis.

1.4.6 Mahalanobis National Crop Forecast Centre (MNCFC)

MNCFC was established as an attached office of DAC&FW in 2012 to use space technology for agricultural assessment. MNCFC carries out drought assessment and monitoring under the National Agricultural Drought Assessment and Monitoring System (NADAMS) after the technology was transferred from the National Remote Sensing Centre in the Department of Space (Government of India). District/sub-district level monthly drought assessments are carried out for 14 major drought-prone agricultural States of India under the NADAMS project. The drought assessment is carried out in the MNCFC using long-term satellite data (NOAA-AVHRR, MODIS, Resourcesat2 AWiFS) on multiple vegetation indices, Rainfall Deficiency (or SPI) using meteorological data, Soil Moisture Index (from agro-meteorological modeling and satellite data), irrigation statistics and sown

area figures. The monthly reports are made available in the public domain (www.ncfc.gov.in) for use of all concerned States and National agencies.

1.4.7 Central Research Institute for Dry land Agriculture (CRIDA)

CRIDA under the aegis of the Ministry of Agriculture and Farmers Welfare has formulated District Agriculture Contingency Plans (DACPs) for 623 districts in the country to suggest contingency strategies to farmers to cope with major weather related aberrations; including delay in onset of south-west monsoon, dry spells etc. CRIDA has prepared these extensive district plans covering crops, horticulture, livestock, and poultry and fisheries sectors in consultation with State Agricultural Universities and State Government departments.

1.4.8 Drought Monitoring Cells (DMCs) at State level

The NDMA guidelines for Management of drought 2010 recommend establishing separate DMCs with adequate staff under SDMA. DMCs will undertake on a priority basis, the preparation of vulnerability maps for their respective states. Upgrade to decentralize drought management planning and monitoring system and create an opportunity for involvement of various stakeholders to undertake ownership of drought risk reduction.

1.5 Plan Management (Development, Approval, Implementation, Review and Revision)

Drought Management Division, DAC & FW will be responsible for developing, maintaining, revising, reviewing and updating the DMP periodically and to get it approved by NDMA.

2 Hazard, Risk and Vulnerability Assessment (HRVA)

2.1 History of Drought

Droughts during the colonial period, tended to degenerate into severe famines causing massive human losses. According to one estimate, in the latter half of the 19th century, there were approximately 25 major famines across India, which killed 30-40 million people. The first Bengal famine of 1770 is estimated to have wiped out nearly one third of the population. The famines continued until Independence in 1947, with the Bengal famine of 1943–44 which affected 3-4 million people, being among the most devastating.

The situation improved remarkably in post-independent India. Investment in irrigation works, promotion and availability of quality inputs, focus on research & extension led to increased agricultural productivity and greater resilience among the farming communities. This development did not only render the country self-sufficient in food production but to a considerable extent, famine proof. Though population quadrupled since Independence, the country did not witness a famine in the past 69 years and in fact, India has become one of the major exporters of agricultural produce in the world.

The history of meteorological drought in India is given in Box 1.

Box 1: Meteorological History of Droughts in India

During 1871–2015, there were 25 major drought years, defined as years with All India Summer Monsoon Rainfall (AISMR) less than one standard deviation below the mean (i.e. anomaly below –10 percent): 1873, 1877, 1899, 1901, 1904, 1905, 1911, 1918, 1920, 1941, 1951, 1965, 1966, 1968, 1972, 1974, 1979, 1982, 1985, 1986, 1987, 2002, 2009, 2014 and 2015. The frequency of drought has varied over the decades. From 1899 to 1920, there were seven drought years. The incidence of drought came down between 1941 and 1965 when the country witnessed just three drought years. However, during the 21 years, between 1965 and 1987, there were 10 drought years which was attributed to the El Nino Southern Oscillation (ENSO).

Among the many drought events since Independence, the one in 1987 was one of the worst, with an overall rainfall deficiency of 19% which affected 59–60% of the normal cropped area and a population of 285 million. This was repeated in 2002 when the overall rainfall deficiency for the country as a whole was 19%. Over 300 million people spread over 18 States were affected by drought along with around 150 million cattle. Food grains production registered an unprecedented steep fall of 29 million tonnes. In 2009, the overall rainfall deficiency for the country as a whole was 22%, which resulted in decrease of food grain production by 16 million tonnes. During 2014-15 and 2015-16 large parts of the country were affected by drought causing widespread hardships to the affected population since the calamity encompassed major agricultural States in the country.

Source: Drought Manual 2016, DAC&FW

2.2 Hazard, Risk and Vulnerability mapping

The objective of undertaking a HRVA is primarily to anticipate the potential problems and possible solutions to help to save lives, protect property, assets, reduce damage and facilitate a speedy recovery. It is worthwhile to mention that HRVA is a means towards becoming disaster resilient and is not an end in

itself. HRVA is a critical part of the disaster risk reduction program and it has the potential to help the necessary authorities to prepare for emergencies. Use of HRVA helps the policy makers, administrators and the community to make risk based choices to address vulnerabilities, mitigate hazards, and prepare for response to and recovery from hazard events. Apart from the Central Government, the State Governments, district authorities and even the local level governance institutions (like municipalities and village panchayats) can undertake hazard risk and vulnerability analysis based on their respective locations vis-à-vis hazards.

What is Drought?

Drought is a temporary aberration, unlike aridity or even seasonal aridity (in terms of a well defined dry season), which is a permanent feature of climate. Drought in contrast is a recurrent, yet sporadic feature of climate, known to occur under all climatic regimes and is usually characterized by variability in terms of its spatial expanse, intensity and duration. Conditions of drought appear primarily, though not solely; on account of substantial rainfall deviation from the normal and / or the skewed nature of the spatial / temporal distribution to a degree that inflicts an adverse impact on crops over an agricultural season or successive seasons. What is universally accepted is that drought stems from a deficiency or erratic distribution in rainfall but the spread and intensity of the calamity is contingent on several factors, including the status of surface and ground water resources, agro-climatic features, cropping choices and patterns, socio-economic vulnerabilities of the local population etc. It is difficult to provide a precise and universally accepted definition of drought due to its complex nature and varying characteristics that manifest across different agro-climatic regions of the world in a myriad different ways.

Drought differs from other natural hazards such as cyclones, floods, earthquakes, volcanic eruptions, and tsunamis in that:

- There is no universally accepted definition that can encapsulate the complexity of this phenomenon adequately;
- It is difficult to determine the beginning and end of a drought episode

because of the slow, 'creepy' onset, silent spread and gradual withdrawal. In India, it is generally considered to be coterminous with the monsoons;

- An episode could spill over months or even years with or without any accompanying shift in the geographical arena;
- There is no indicator or index which can precisely forecast the advent and severity of a drought event, nor project its possible impacts;
- Spatial expanse tends to be far greater than in the case of other natural calamities, which when compounded by the difficulties associated with the impact assessment of the disaster, makes effective response highly challenging;
- Impacts are generally non-structural and difficult to quantify e.g. the damage to the ecology, the disruption of socio-economic fabric of communities, the long term effects of mal-nutrition on health and morbidity etc.;
- The impact tends to get magnified in the event of successive droughts.

The occurrence of drought is contingent on a number of factors such as cropping choices and agronomic practices, soil types, drainage and ground water profiles, to name a few. However, rainfall deficiency and spatial and temporal distribution, duration and dry spells are acknowledged as the most important triggers for drought.

In India, About 56% of the net cultivated area is rain-fed, accounting for 44% of food production. Thus Monsoon rainfall is crucial for Agriculture production and food security of the country, plus it has spin off effects on other sectors of the economy. South West Monsoon (June to September) rainfall contributes to approximately 73% of total rainfall of the country. Timely onset and spatial distribution of rainfall is crucial for cultivation of Kharif crops. Rainfall especially during the months of June and July are crucial for sowing of Kharif crops.

About 68% of cropped area in India is vulnerable to drought, of which 33% receives less than 750 mm of mean annual rainfall and is classified as "chronically

drought-prone" while 35% which receive mean annual rainfall of 750-1125 mm is classified as "drought-prone". The drought-prone areas of the country are confined primarily to the arid, semi-arid, and sub-humid regions of peninsular and western India.

The South West monsoon sets in during the first week of June in the south-west corner of India and gradually proceeds towards the north-west region covering the entire country by the second week of July. The withdrawal of the Monsoon commences in the first week of September from the west and north and recedes from most parts of the country by the month-end. Even when the overall rainfall in the country was normal, large variations were noticed across regions, within States, and sometimes even within districts.

The recurrence of drought in India is owed largely to the unique physical and climatic susceptibilities of the country, which include:

- Considerable annual / seasonal/regional variations in spite of a high average annual rainfall of around 1,150 mm.
- A relatively short window of less than 100 days during the South-West Monsoon season (June to September) when about 73% of the total annual rainfall of the country is received.
- Uneven distribution of rainfall over different parts of the country in that some parts bear an inordinately high risk of shortfalls, while others tend to receive excessive rainfall. Even though India receives abundant rain on an average, for the country as a whole, much of the excess water, which otherwise could have contributed towards enhancing natural resilience towards drought, gets lost as run-offs. The variability in rainfall exceeds 30% in large areas of the country when compared to Long Period Average (LPA) and exceeds 50% in parts of drought- prone Saurashtra, Kutch and Rajasthan;
- Low average annual rainfall of 750 mm over 33% of the cropped area in the country heightens the susceptibility to drought;

- Over-exploitation of ground water and sub-optimum conservation and storage capacity of surface water leading to inadequate water availability for irrigation, particularly in the years of rainfall deficiency. Steady decline in per capita water availability for humans and animals even in non-drought years;
- Out migration of cattle and other animals from drought hit areas heightens the pressure on resources in surrounding regions.
- Limited irrigation coverage (net irrigated area in the country is less than 50%) exacerbates the impact of drought on account of complete dependence of agriculture in such areas on rainfall.

2.3 Emerging Concerns

Drought produces wide-ranging impacts that span across many sectors of the economy. The reverberations are felt by the society and economy much beyond the areas actually experiencing the onslaughts of physical drought because agricultural production and water resources are integral to our ability to produce goods and services. Drought affects the overall economy of the country at macro and micro economic levels, both directly and indirectly**.** Direct impacts are usually visible in falling agricultural production and heightened food insecurity among poor and vulnerable sections; depleted water levels; higher livestock and wildlife mortality; cattle and animal migration; damage to ecosystem from indiscriminate exploitation; increased fire hazards etc. Indirect impacts of drought can be gauged from the reduction in incomes for farmers and agribusinesses, increased prices for food and fodder, reduction in purchasing capacity and slump in consumption, default on agricultural loans, distress sale of agricultural land & livestock, rural unrest, shrinkage in avenues for agricultural employment etc. These deleterious impulses have huge negative multiplier effects in the economy and society. The impacts of drought are generally categorized as economic, environmental, and social.

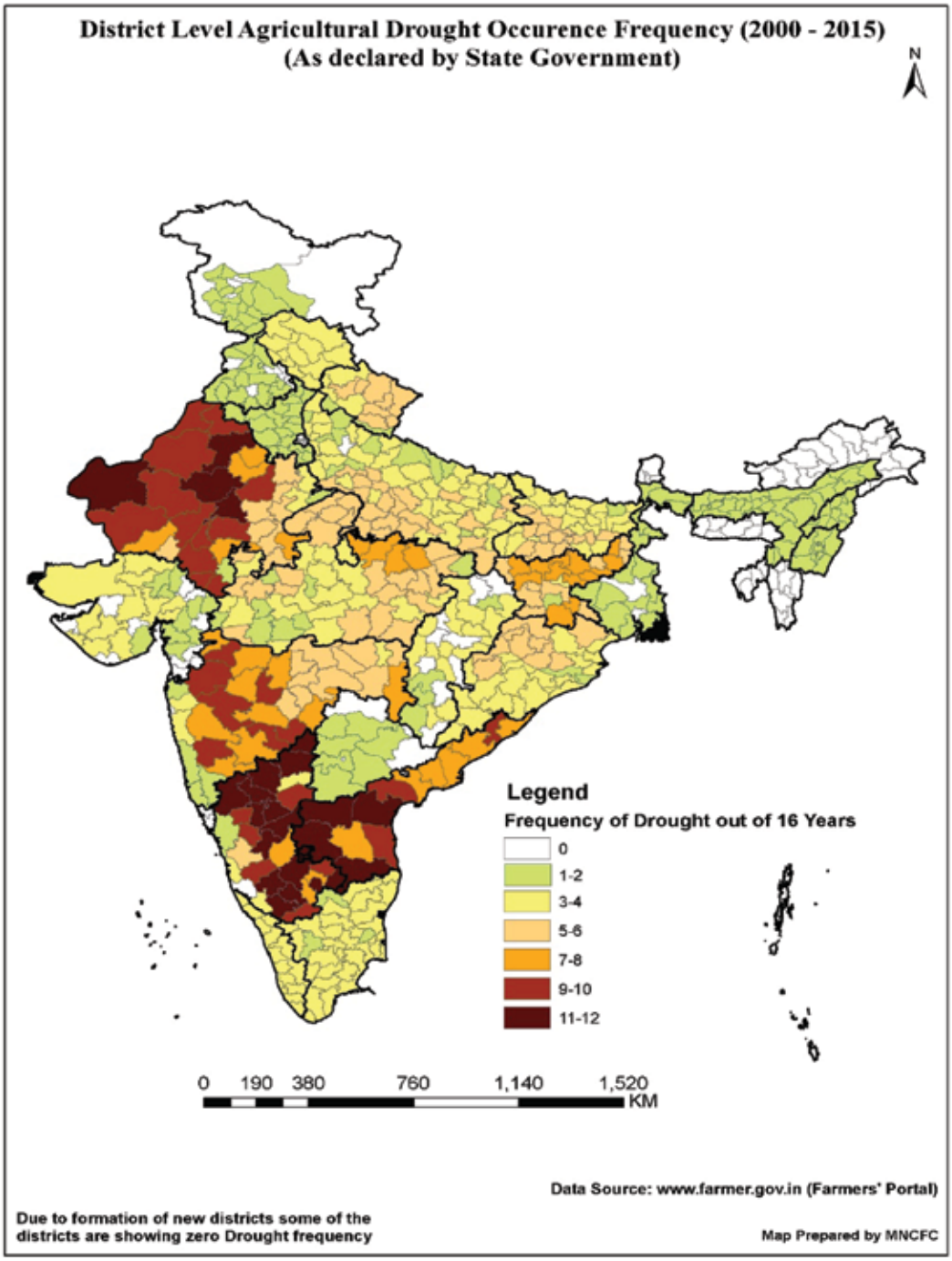
Economic impacts refer to production losses in agriculture and related sectors, especially animal husbandry, dairy, poultry, horticulture and fisheries. It affects

livelihoods and quality of life for the majority of farmers, share croppers, farm labourers, artisans, small rural businesses and rural population in general that is dependent on agriculture. All industries dependent upon the primary sector for raw materials suffer on account of reduced supplies and hardening prices. Drought thus causes a dampening impact on the economy by squeezing profit margins, drying up income and revenue streams and constricting employment avenues through disruption caused to supply chain managements, slowing down flow of credit and tax collections, depressing industrial and consumer demand, increased dependence on imports, and lowering of overall market sentiments.

Environmental impacts **can be gauged from** low water levels in ground water and surface reservoirs, lakes and ponds, reduced flows in springs, streams and rivers, loss of forest cover, migration of wildlife and sharpening man-animal conflicts and general stress on biodiversity. Reduced stream flow and loss of wetlands may affect levels of salinity. Increased groundwater depletion rates, and reduced recharge may damage aquifers and adversely affect the quality of water (e.g., salt concentration, acidity, dissolved oxygen, turbidity) which in turn may lead to a permanent loss of biological productivity of soils.

Social impacts **are manifest in widespread disruption in rural society on account of** outmigration of the population from drought affected areas, rise in school dropout rates, greater immiseration and indebtedness, alienation of land and livestock assets, malnutrition, starvation and loss of social status among the most vulnerable sections. The situation of scarcity in some cases may exacerbate social tensions and lead to erosion of social capital.

Frequency of Occurrence of Drought (2000-2015)



3 Prevention and Mitigation

3.1 Monitoring of Drought & Early Warning

The revised Manual for Drought Management, 2016 of the Department of Agriculture, Cooperation and Farmers' Welfare has discussed rainfall, vegetative indices, progression of crop sowing, soil moisture and hydrological indices in a cogent matrix for the determination of drought.

Central and State Governments monitor following parameters that may indicate an onset of drought like conditions:

(i) Rainfall & Dry spell (ii) Progression of sowing (iii) Remote sensing based Vegetative Indices (iv) Soil Moisture Based Indices (v) Hydrological Indices

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

(i) Slow and almost imperceptible onset coupled with a prolonged duration as against other disasters, which have rapid and often dramatic onset, and a limited salience; and

(ii) Early warning indicators in case of droughts tend to be ambiguous and non-definitive.

A Drought Management Cell in the DM Division is created to help collate information for diverse sources, monitor drought conditions, issue advisories, and coordinate with other Ministries of the Central Government, State Governments and relevant agencies to mitigate/combat the effect of drought.

The Crop Weather Watch Group in the Department of Agriculture, Cooperation and Farmers' Welfare (DAC&FW) and the Drought Monitoring Centres (DMCs)

under the State Disaster Management Authorities meet periodically during the South-West Monsoon season to monitor portents of drought.

Early indicators of Drought

The following constitute 'early warning indicators':

i) Delay in onset of Monsoon.

ii) Long 'break' or Dry Spell during the Monsoon season.

iii) Insufficient rains and skewed spatial distribution, particularly during the sowing periods.

iv) Rise in price of fodder.

v) Absence of rising trend in reservoir levels and / or reduction in stream flows and depletion rate of groundwater.

vi) Drying up of sources of rural drinking water supply.

vii) Declining trend in the progress of sowing as compared to total normal sown areas.

viii) Out migration of rural population.

ix) Increased deployment of water through tankers

A checklist for monitoring Drought is given below.

Drought Monitoring Checklist

(For Ministry of Agriculture and Farmers Welfare, Government of India and Relief Commissioner, State Governments)

Meteorological Data:

Agencies: India Meteorological Department, National Centre for Medium Range Weather Forecasting, State Governments

Indices to be Monitored: Daily, weekly, and monthly rainfall, snow fall / fog

Hydrological Data:

Agencies: Central Water Commission, Central Ground Water Board, State Governments

(irrigation departments, groundwater agencies, water resources departments/ projects)

Indices to be Monitored: Water storage in reservoirs / ponds / lakes, river flow, groundwater level, yield and draft from aquifers, water loss through evaporation, leakage, seepage.

Agricultural Data:

Agencies: National Crop Forecast Centre, Directorate of Economics & Statistics, Indian Council of Agricultural Research, Agricultural Census Data, State Government agriculture departments, agricultural universities

Indices to be Monitored: Soil moisture, area under sowing and type of crop, crop water

requirement, status of growth, crop yield, alternative cropping possibilities, land holdings.

Data from Space:

Agencies: National Remote Sensing Centre, Indian Space Research Organisation.

Indices to be Monitored: Vegetation monitoring, rainfall, surface wetness and temperature.

Socio-economic Data:

Agencies: NITI Aayog, Department of Food & Public Distribution, Department of Consumer Affairs, Department of Rural Development. Ministry of Women and Child Development ,Department of Animal Husbandry, Dairying & Fisheries, Revenue Department of State etc.

Indices to be Monitored: Availability and prices of food grains, availability of fodder, migration of population.

Analysis of Data from Ground and Remote Sensing Sources

Prediction/ Forecasting / Declaration of Drought.

3.2 Preventive and Mitigation Measures

The containment and mitigation of the crippling impact of drought, and the eventual attainment of the objective of drought proofing of an area is contingent upon a proactive and relentless, but planned pursuit of a combination of structural / physical and non-structural long and short term measures. The short term measures are mostly reactive or relief centric in nature and mostly relate to in-season drought management through contingency planning and relief distribution. Long term mitigation measures are geared towards the adaptation to climate change, restoration of ecological balance through adoption of sustainable agronomic and conservation practices, sensible crop choices etc. Most of these measures are translated on the ground through soil and water conservation, watershed management, agronomic practices suited to rain fed agriculture and forestry programmes that seek to integrate soil, water and forestry management in an ecological compliant and sustainable manner.

Drought mitigation needs to be ensconced in the regular development programmes of the Centre and State Governments. Some of the most significant current national programmes that may have a decisive bearing on drought mitigation are Pradhan Mantri Krishi Sinchayee Yojna, National Rain fed Area Development Programme, National Rural Drinking Water Programme etc. Many of these programmes can be guided towards the development of a cogent drought mitigation strategy at the State level by taking advantage of the flexibility which has been in-built into the centrally sponsored schemes for the purposes of mitigation of calamities like drought.

3.2.1 Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) has been formulated with the vision of extending the coverage of irrigation 'Har Khet ko pani' and improving water use efficiency 'More crop per drop' in a focused manner with end to end solution on source creation, distribution, management, field application and extension activities. The components of PMKSY are:

- **Accelerated Irrigation Benefit Programme(AIBP)** with the focus on faster completion of ongoing Major and Medium Irrigation projects;
- **Har Khet Ko Pani (HKKP) which deals with** Source augmentation, distribution, ground water development, lift irrigation, diversion of water from water plenty to water scarce areas, supplementing rain water harvesting, repair, restoration, renovation of traditional water bodies etc;
- **Per Drop More Crop** which relates to Micro level storage structures, efficient water conveyance & application, precision irrigation systems etc. and
- **Watershed development** which focuses on Ridge area treatment, drainage line treatment, soil and moisture conservation, water harvesting structure, livelihood support activities and other watershed works in rain fed / degraded areas.

PMKSY has been formulated as an umbrella scheme amalgamating ongoing schemes viz. Accelerated Irrigation Benefits Programme (AIBP) of the Ministry of Water Resources, River Development & Ganga Rejuvenation (MoWR, RD&GR), Integrated Watershed Management Programme (IWMP) of Department of Land Resources (DoLR) and the On Farm Water Management (OFWM) of Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW). The Ministry-wise activities are presented in Table.

S.N.	Components	Illustrative Activities
1	AIBP by MoWR, RD&GR	• To focus on faster completion of ongoing Major and Medium Irrigation including National Projects
2	PMKSY (Har Khet ko Pani) by MoWR,RD&GR	• Creation of new water sources through Minor Irrigation (both surface and ground water) • Repair, restoration and renovation of water bodies; strengthening carrying capacity of traditional water sources, construction rain water harvesting structures (Jal Sanchay);

		• Command area development, strengthening and creation of distribution network from source to the farm; • Improvement in water management and distribution system for water bodies to take advantage of the available source which is not tapped to its fullest capacity (deriving benefits from low hanging Fruits). At least 10% of the command area to be covered under micro/precision irrigation. • Diversion of water from source of different location where it is plenty to nearby water scarce areas, lift irrigation from water bodies/rivers at lower elevation to supplement requirements beyond IWMP and MGNREGS irrespective of irrigation command. • Creation and rejuvenation of traditional water storage systems like Jal Mandir (Gujarat); Khatri, Kuhl (H.P.); Zabo (Nagaland); Eri, Ooranis (T.N.); Dongs (Assam); Katas, Bandhas (Odisha and M.P.) etc. at feasible locations.
3	P M K S Y (Watershed) by Dept. of Land Resources, MoRD	• Water harvesting structures such as check dams, nala bund, farm ponds, tanks etc. • Capacity building, entry point activities, ridge area treatment, drainage line treatment, soil and moisture conservation, nursery raising, afforestation, horticulture, pasture development, livelihood activities for the asset-less persons and production system & micro enterprises for small and marginal farmers etc.

		• Effective rainfall management like field bunding, contour bunding/ trenching, staggered trenching, land levelling, mulching, etc.
4	PMKSY(Per drop more crop) by Dept. of Agriculture, Coop. & FW, MoAFW	• Programme management, preparation of State/ District Irrigation Plan, approval of annual action plan, Monitoring etc. • Promoting efficient water conveyance and precision water application devices like drips, sprinklers, pivots, rain-guns in the farm (JalSinchan); • Topping up of input cost particularly under civil construction beyond permissible limit (40%), under MGNREGS for activities like lining inlet, outlet, silt traps, distribution system etc. • Construction of micro irrigation structures to supplement source creation activities including tube wells and dug wells (in areas where ground water is available and not under semi critical / critical /over exploited category of development) which are not supported under PMKSY (WR), PMKSY (Watershed) and MGNREGS. • Secondary storage structures at tail end of canal system to store water when available in abundance (rainy season) or from perennial sources like streams for use during dry periods through effective on farm water management;

		• Water lifting devices like diesel/ electric/ solar pumpsets including water carriage pipes. Extension activities for promotion of scientific moisture conservation and agronomic measures including cropping alignment to maximize use of available water including rainfall and minimise irrigation requirement (Jalsarankchan); • Capacity building, training for encouraging potential use water source through technological, agronomic and management practices including community irrigation. • Awareness campaign on water saving technologies, practices, programmes etc., organisation of workshops, conferences, publication of booklets, pamphlets, success stories, documentary, advertisements etc. • Improved/innovative distribution system like pipe and box outlet system with controlled outlet and other activities of enhancing water use efficiency. • Implementation of Watershed projects with the help of dedicated institutions with multi-disciplinary professional teams (State, District and project levels) and active participation of Gram Sabha, Watershed Committee, Self Help Groups and User Groups right from planning execution and monitoring. • Use of information technology, remote sensing techniques, GIS facilities, with spatial & non-spatial data in scientific planning, implementation, monitoring and evaluation of watershed project.

		• The Ridge to Valley approach is followed while planning rainwater harvesting structure for sustainability and efficiency. • Renovation and repair of existing water harvesting structures in the project areas.

Using geospatial technologies viz., satellite remote sensing, geographic information systems, global positioning systems, and mobile technology etc. many critical parameters of watersheds such as their delineation, silting and monitoring the water harvest structures, including their impact could be well addressed. At NRSC (ISRO), the monitoring of watersheds using geo-spatial technologies is being carried out as per the guidelines of the PMKSY. These products and services are helpful in decision making on the action plans towards drought mitigation.

3.2.2 National Rainfed Area Programme

The objective of the programme is to increase agricultural productivity in rainfed areas in a sustainable manner by adopting appropriate farming system based approaches, minimize adverse impact of possible crop failure due to drought and other calamities through diversified and composite farming system etc.

The National Rainfed Area Authority (NRAA) in the Department of Agriculture, Cooperation & Farmers Welfare an advisory body for policy and programme formulation and monitoring of schemes / programmes related to degraded land development for horticulture and integrated agricultural development in rainfed areas. The Central Government approved the involvement of NRAA for providing technical inputs in policy planning, implementation and monitoring of PMKSY especially in the areas of rain water conservation / watershed development and its management including other agricultural and allied sectors.

3.2.3 Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)

Considering the importance of water conservation, and given all the scientific and technological advances at their command, the Ministry of Rural Development in consultation and agreement with the Ministry of Water Resources, River Development & Ganga Rejuvenation and the Ministry of Agriculture and Farmers Welfare has developed an actionable Framework to ensure that MGNREGS funds are used in accordance with the best practices in the sector.

The need for drought proofing villages in water stressed blocks was being felt for many years. Many State Governments have started excellent initiatives for water conservation in last few years using Mahatma Gandhi NREGA funds viz. the 'Mukhyamantri Jal Swalalamban Abhiyan' in Rajasthan, the 'Dobha' or Farm Ponds construction in Jharkhand, the 'Mission Kakatiya' in Telangana. 'Neeru Chettu' in Andhra Pradesh, 'Kapil Dhara' in Madhya Pradesh, bore well recharge in Karnataka, 'Jalyukt Shivar' in Maharashtra are some of the recent initiatives. The present Framework draws on many of the good practices in these States and some other initiatives.

The Framework strives to leverage the synergies between Mahatma Gandhi NREGA, Pradhan Mantri Krishi Sinchayee Yojana, IWMP and Command Area Development & Water Management programmes, given their common objectives. Types of common works undertaken under these programmes/ schemes are water conservation and management, water harvesting, soil and moisture conservation, groundwater recharge, flood protection, land development, Command Area Development & Water Management (CAD&WM). These programmes were addressing the above mentioned activities with their own set of planning tools, processes, technical expertise and financial resources which is now envisioned to be used in coordination to bring the advantages of each programmes/ schemes to strengthen a concerted action for water conservation and management.

The highlights of the Frameworks are:-

- **Paradigm shift from Relief Works approach to Integrated Natural Resource Management (INRM) approach in implementation of MGNREGS.**
- Planned and systematic development of land and harnessing of rainwater following watershed principles to become the central focus of MGNREGS works.
- All lands falling under the watershed will be developed on ridge to valley treatment principle.
- Individual works (including work on private land) will be logically sequenced and packaged together on the principles of INRM, to form projects following the principles of watershed management in an integrated manner.
- Systematic identification, planning and implementation of projects leading to creation of sustainable and productive assets for the community.
- **District as synergizing unit for convergent planning under the leadership of the District Collector.**
- With the convergence of the ongoing schemes in the area, a comprehensive project of village/ watershed/ command area, incorporating/ integrating all the works/ activities required for the integrated development of the village/ watershed/ CAD approach is to be prepared.
- Support of institutions like IITs, NIITs, Agricultural Universities, State technical institutions, professionals sourced as part of Corporate Social Responsibility and Universities as a part of the 'Unnat Bharat Abhiyan' to be promoted.
- The District Planning Committee (DPC) to ensure that the **Natural Resource Management component of Labour Budget of Mahatma Gandhi NREGS is essentially made part of the District Irrigation Plan (DIP)**.

- **Technical inputs from the joint pool of IWMP in Watershed Cell cum Data Centre, Mahatma Gandhi NREGA unit, Water Resource Department, the Agriculture department, Regional Office of Central Water Commission (CWC).**
- **Consultation with National Remote Sensing Centre (NRSC), ISRO** to leverage the GIS solution for planning and monitoring for Natural Resource Management.
- **Community based participatory planning and creation of sustainable livelihoods** by involving the Self Help Groups (SHGs) under National Rural Livelihood Mission (NRLM) in the planning and implementation of watershed projects under Mahatma Gandhi NREGS.
- **Ratification by the Gram Panchayat(s) for shelf of projects**.

Under Mahatma Gandhi NREGA, 153 works are permissible of which 100 relate to NRM alone (of which 71 are water related works).

Watershed management works can be taken up independently under MGNREGA where there is no IWMP project sanctioned/proposed and in convergence with IWMP- wherever IWMP project is already sanctioned and proposed (new IWMP Projects).

3.2.4 Water Harvesting and Conservation

Water harvesting and conservation refer to processes and structures of rainfall and run- off collection from large catchments area and channeling them for human consumption. In India, these processes and structures have been in existence since antiquity, but the increasing frequency and severity of droughts and population growth have focused on the revival of these practices and structures. Every household's minimum water requirements can be easily met by collecting rainwater locally from village / community ponds / large manmade containers, by diverting and storing water from local streams / springs and by tapping sub-surface water below river / stream beds.

There are two methods for water conservation: (i) artificial recharge of groundwater, and (ii) traditional methods. While the artificial recharge of groundwater is used extensively in all the watershed development programmes being implemented, traditional methods of water collection and harvesting through ponds / tanks are even more important for assuring continuous and reliable access to water. Both methods include measures which are low-cost, community-oriented and environment-friendly. It is necessary for the Government and NGOs working in the area of water conservation to promote both sets of measures, depending on the local conditions.

These methods are considered very useful for groundwater recharge both when rainfall is deficient and when there are flash floods (that result in overtopping of defined courses of rivers / streams and their spreading into flood plains). Harvesting and conservation of floodwater to rejuvenate depleted high-capacity aquifers by adopting integrated groundwater recharge techniques, such as dams, tanks, anicuts, percolation tanks, could improve water availability and create a water buffer for dealing with successive droughts.

3.2.5 Rainwater Harvesting in Urban Areas

Rainwater harvesting involves the collection, storage and distribution of rainwater from the roof, for use inside and outside the home or business. In most urban centres, rainwater harvesting has become necessary to address the acute water scarcity, which they experience and the flooding during short spells of heavy rainfall. Most of the rain falling on the surface tends to flow away rapidly leaving very little for recharge of groundwater. Capturing the runoff is therefore an important solution to the worsening urban water situation.

Rainwater harvesting has several benefits. It helps in utilizing the primary source of water, and prevents the runoff from going into sewers or storm drains, thereby reducing the load on treatment plants. It also reduces urban flooding and by recharging water into the aquifers, helps in improving the quality of existing groundwater through dilution.

3.2.6 Water Saving Technologies: Drip and Sprinkler Irrigation Systems

State Governments are encouraging adoption of water-saving technologies, such as sprinkler and drip irrigation systems, through provision of subsidies to the farmers on the purchase of these systems. These technologies are recommended for achieving higher irrigation efficiencies and could be used for very small-sized holdings.

While sprinklers require energized pump sets, microtube drips can work under a very low pressure head, with as little as a bucket full of water. Sprinklers tend to irrigate more uniformly than gravity systems and therefore efficiencies typically average about 70%. But in windy and dry areas much water can be lost due to evaporation in this system. The sprinkler system is particularly effective in sandy undulating terrain. For fruits, vegetables and orchard crops, drip irrigation (also known as trickle irrigation) is more suitable.

These systems require much less maintenance when compared with the conventional pressurized irrigation systems. The ease of maintenance is more significant in micro tube drip systems. However, the adoption of these technologies by poor farmers would depend heavily on the supply of information, materials and services for installation.

3.2.7 Improved Water Saving Farm Practices

It is necessary to adopt farm practices which can progressively reduce the water requirement of existing crops and improve primary productivity of the cultivated land. Such practices are particularly important for semi-arid regions which have already taken to intensive farming with irrigation water, both from canals and aquifers. These practices include the increased use of organic manure with the gradual reduction of chemical fertilizers, vermin-culture and agronomic practices, such as mulching, crop rotation and the use of bio-pest control measures. Organic manure can help regain structure and texture of soils and enhance their moisture retention capacity along with improving soil nutrients. Use of farm management practices, such as mulching, can reduce evaporation from the soil surface, thereby increasing the efficiency of irrigation water utilization.

3.2.8 Long-term Irrigation Management

A long-term strategy is required for managing water resources through irrigation projects in India. It consists of several measures which would expand the area under irrigation and reduce the incidence of drought. All State Governments need to develop policies and procedures for utilization of irrigation resources. The State irrigation department should formulate long-term policies and management practices for the use of irrigation resources. The important elements of these policies and management practices are listed below:

- **Monitoring Reservoirs:** It is necessary for the State irrigation department to set up a monitoring system for water stored in reservoirs, exercise appropriate control on releases of water from these reservoirs and plan for judicious use of water resources. The State irrigation department should prepare a ***water budget*** for every reservoir covering drinking water, kharif / rabi requirements and evaporation losses.

- **Setting up Water Users Association:** State Governments should provide incentives for setting up Water Users Association (WUA) to involve communities in the management of irrigation resources. WUAs should be formed at the minor canal level (average command of 500 hectares). The responsibility for maintaining the minor and smaller channels can be entrusted with the WUAs. The State irrigation department should charge WUAs on the basis of the volume of water actually taken. Incentives for setting up WUAs could be provided to the farmers by relaxing designated crop restrictions and restrictions on conjunctive use of surface and groundwater, channel repairs, rebates for prompt payment of irrigation fees, volumetric fees lower than crop-area fees and maintenance grants.

- **Conjunctive Use of Surface and Groundwater:** This concept is very essential, especially in drought areas to increase the production per unit of water. It allows flexibility in cropping patterns and multi-cropping in the canal command. For proper water management it is necessary to treat the command areas as one composite unit and the two resources

managed judiciously to achieve optimal benefits. This concept use has been successfully implemented in various States. Conjunctive use of surface and groundwater supplies needs careful planning on more scientific lines to achieve full benefits.

- **Prevention of Evaporation Losses from Reservoirs:** Shallow tanks having large surface areas located in the drought-affected regions lose nearly half the volume of stored water by evaporation during the summer months. The evaporation is quite high (250 cm or more) in West Rajasthan, Saurashtra, Deccan Plateau and Southern Coastal regions of Tamil Nadu. In these areas use of a chemical retardant to minimize evaporation losses may be economically viable. A layer of chemicals like cetyl, steary and fatty alcohol emulsions when applied on the water surface can help reduce evaporation. It has been reported that fatty alcohol emulsions can effectively retard evaporation, saving around 40% of the normal evaporation losses. However, such measures may be considered after suitable bio-degradability study and bio-hazard assessment, and after necessary approvals from pollution control and other regulatory authorities.

- **Increasing Storages through Expeditious Completion of Irrigation Projects:** Water storage capacity in the States could be increased through expeditious completion of irrigation projects. Many States that started a large number of irrigation projects could not complete them due to inadequate resources. States should seek resources through the Accelerated Irrigation Benefits Programme (AIBP) of the Government of India for completing these projects and increasing the area under irrigation.

- **Integrating Small Reservoirs with Major Reservoirs:** As large dams are difficult to construct due to high costs and large-scale displacement of people, there is an increased emphasis on creating small reservoirs. A number of small reservoirs could be created to replace a single large reservoir. However, in many cases a group of small schemes may not provide the same benefits as a large project can. It is, therefore, very

important that minor schemes are integrated with the canal systems of major reservoirs.

- **Integrated Basin Planning:** This concept is aimed at coordinating water resources plans throughout a river basin, the most important example of which is the Tennessee Valley Authority in the USA. In India, the Damodar Valley Corporation covering the river Damodar and its tributaries in Bihar and West Bengal was modeled on the lines of the Tennessee Valley Authority.

  The philosophy of river basin development, however, underwent significant changes during thelatter half of the twentieth century. In 1950, the construction of multiple-purpose dams and other engineering works along a river's main channel was central to the concept. The region benefited through navigation, flood control, hydropower generation and distribution, and agricultural development. By the end of the century, however, the concept shifted and broadened and laid emphasis on the values of biodiversity, nonstructural means of improved water management and stakeholder participation in watershed-level initiatives. All States need to adopt integrated basin planning for addressing wide-ranging issues of natural resource management.

- **Inter-basin Transfer of Water:** The permanent long-term solution to the drought problem may be found in the basic principles of transfer of power from surplus river basins to the areas of deficit. Many basins in the country have surplus water resources while others face serious shortages. Creation of storages and inter-basin transfer of water from surplus to deficit regions could therefore be an option for achieving more equitable distribution and optimal utilization of water resources. It has been argued that a National Water Grid could be set up by linking resource abundant rivers such as the Brahmaputra and Ganga with other rivers. Long distance water transfer is not a new concept in India. There are a number of canals, such as the Western Yamuna Canal and Agra Canal in north India, and the Kurnool–

Cuddapah Canal and the Periyar–Vaigai Canal in south India, which have carried water for long distances and irrigated water deficient areas. However, these projects would require huge commitment of resources as well as popular support across the States, and would call for extensive studies related to environment impact and benefit-cost analyses.

3.2.9 Afforestation

It is well-known that the development of forests in areas, which are susceptible to periodic recurrence of drought, is indeed a very effective drought-resistant measure. Areas which are devoid of tree growth suffer serious erosion and need to be covered with vegetation in the shortest possible time with a view to mitigate drought conditions.

Drought-affected areas have vast expanses devoid of vegetation, depleted of tree growth and exposed parent rocks and boulders. The accelerated run-off in these areas is so large that all the surrounding agricultural land cannot even support marginal or subsistence agriculture. To remedy this, vegetation on hill slopes, catchments and other vulnerable areas need to be undertaken, particularly where rainfall is low. Plantation and green cover may be encouraged to help check soil erosion and the use of organic compost and bio-degradable mulching will enable the absorption and retainment of minerals for long time thereby reducing the risk of leaching.

Trees and vegetation not only protect the soil, improve its water holding capacity, minimize runoff, regulate drainage (both surface and underground), but also preserve and improve the productive capacity of the soil and fertility of agricultural land in the vicinity. The foliage produced any effective vegetation, whether trees, shrubs, bushes or even well-pastured grass, forms a sheltering shield or canopy which breaks down the intensity of torrential rain and thus reduces its erosive action on the soil. Furthermore, when this water with reduced velocity reaches down, it does not flow down to the rivers but is absorbed due to the vegetation and helps recharge ground and surface water resulting in the creation of perennial rather than seasonal storage in the reservoirs. Therefore, multi-tier plantation

of grasses, bushes, shrubs and trees of local multipurpose varieties should be promoted as these are more tolerant to temperature / climatic conditions.

Before the afforestation programme is taken up, a thorough inspection and classification of the areas needs to be conducted. The land identified for afforestation should be divided into three categories: (i) areas with adequate depth of soil to make afforestation feasible; (ii) areas with shallow soils fit for supporting grass and shrub growth but not fit for tree growth; (iii) badly degraded and eroded areas unfit for tree growth and shrubs and where only soil and moisture conservation operations should be carried out.

In drought-prone areas, planting of drought-resistant varieties of trees should be considered. Fruit trees, such as sitafal (annona squamosa) and drought-resistant fodder species, may not only be useful as an afforestation measure, but also enable the supply of fodder to the cattle. Different of bushes and shrubs should be planted, which not only prevent soil erosion but also provide a leaf-hedge against cattle and barrier against fire when planted like a boundary or fence.

Afforestation should be financially supported through the social forestry and watershed development programmes which normally carry budgetary provisions for this activity. Assistance from the Sub-Mission on Agro-forestry will help to promote peripheral boundary plantation, low density block plantation and high density block plantation. Panchayat Raj Institutions (PRIs) can play a critical role in the expansion and sustainability of activities.

3.2.10 Crop insurance

Farmers from drought risk regions may be encouraged to subscribe to the crop insurance for reducing the risk. Awareness building programmes may be undertaken to increase the farmer participation in the crop insurance.

Crop insurance schemes have been in existence at the national level since 1985 and have been modified from time to time. With a view to remove the problems of high share of premium and reduction in sum insured as well as provide comprehensive insurance cover to the farmers right from sowing to post-harvest stage as

well as simplifying the premium structure for farmers. Govt. of India has come out with the New Scheme "Pradhan Mantri Fasal Bima Yojana" (PMFBY) which addresses all the shortcomings of the earlier schemes. The premium structure for the farmers in PMFBY has been simplified and made uniform for all crops at 1.5% for Rabi and 2% for Kharif for food crops & oilseeds so as to encourage farmers to take insurance cover. Balance premium will be borne by the Govt. Facilities for on farm assessment of claims for localized calamities like hailstorm, landslides and inundation as well as damage to crops kept in the field after harvest for drying has also been provided in the new scheme. This scheme is expected to provide adequate financial cover to the farmers against losses to crops due to natural calamities and also address the problem of indebtedness and poverty related to crop losses.

3.2.11 Community Participation in Drought Mitigation

Community participation is an essential feature of drought mitigation programmes. As local water management and rainwater harvesting hold the key to drought mitigation, Government policies should emphasize community-based water resource management. Community-based institutions, such as WUAs, can play important roles in managing water resources at the micro level. The Prime Minister's Fasal Bima Yojna (PMFBY) and Pilot Unified Package Insurance Scheme may be promoted vigorously in drought affected districts. The states may also involve communities/NGOs/PRIs in preparation of plans for drought mitigation.

Build on Micro-level Experiences: The villages of **Sukhomajri** in Haryana and about 100 communities in Alwar have improved their socio-economic conditions through community-led water management. These communities used traditional water harvesting structures, such as village tanks and johads, which increased the groundwater table in the area, resulting in increased water storage and substantial increase in crop production and resultant income. **Ralegan Siddhi** and **Hirve bazar** from Ahmednagar district are the other successful examples of community-based initiatives in water resource management. These micro-level success stories need to be spread to other parts of the country for other communities to replicate.

Innovative Community-based Institutions: Several models of community-based institutions have emerged, which are effectively managing surface and groundwater. In Odisha, the 'Pani Panchayat programme' assigns various roles to the community and the local self-government in water management and is preparing community-based drought management plans. In Ozhar, Maharashtra WUAs are enabling farmers to manage irrigation water. In Banikhet, Himachal Pradesh the lift irrigation project deals with various aspects of water use, such as water charges, local maintenance. In Rajasthan, communities are participating in checks on rainwater loss and thus ensuring the enhancement of groundwater. State Governments need to build on these examples and encourage the formation of community based organizations for effective management of water resources.

As discussed above, State Governments need to encourage the formation of WUAs for community based management of water delivery system. Maharashtra has taken the lead in 1990 in forming WUAs, and its State Government has handed over the management of the entire irrigation systems of Niphad block, where the irrigation dam is situated, to the WUA network. WUA-like initiatives have been launched in Tamil Nadu, Andhra Pradesh, Rajasthan, Madhya Pradesh and Odisha, which also suffer from water scarcity. Legislations dealing with transferring of water management to WUA- like groups are being formulated in all these States.

Organize Community-based Consultations through Gram Sabha: Community-based consultations refer to community decisions, collective contribution, self-regulations, and negotiations with the Government conducted through Gram Sabhas, in particular and PRIs in general. These processes can be very important for the management of water, fodder and crops at the community level. Further, these processes can also lead to meeting the basic entitlements through provision of work and food to people affected by drought.

Strengthen Women's Self-help Groups: Self-help groups empower women and help them to access resources. Women start economic activities and generate an independent stream of income. While it has an empowering impact on women, it also increases resilience of the households in responding to drought. Those

households who depend solely on agriculture for their livelihoods suffer badly due to income and consumption losses, while diversified households cope with the impact better. These self-help groups could be formed and strengthened through many interventions at the community level.

Women's self-help groups can play an important role in a large number of measures targeted at drought mitigation. They could be involved in rainwater harvesting, running PDS shops, Aanganwadis and day care centres and overseeing water distribution and utilization in their community. Since women are the most affected in a drought situation, they could plan several measures that reduce their hardships and promote greater equity and efficiency in natural resource management. Women's self-help groups could also come forward in addressing special needs of certain groups, such as pregnant women, school-going children and the old and disabled people. During a drought situation, the well being of these groups can only be ensured through the active support of women's groups.

Empower Panchayati Raj Institutions: Several drought relief and mitigation measures could be implemented through the PRIs more effectively. The necessary budget allocations and implementation support should be provided to these institutions for launching programmes in drought-affected areas. PRIs improve the delivery mechanism and reduce the impact of drought. The examples of several droughts have shown the importance of involving these institutions in drought management.

3.2.12 Linking Climate Change Adaptation and Disaster Risk Reduction (DRR)

As global climate change escalates, the risk of occurrence of droughts, inter-alia, increases. In its 5th Assessment Report, the Inter-governmental Panel on Climate Change (IPCC) has predicts drought related water and food shortage for Asia in coming days.

Climate change increases disaster risk in a number of ways, It changes the magnitude and frequency of extreme events. It changes average climatic conditions and climate variability, affecting underlying risk factors and it generates new

threats, which a region may have no experience in dealing with.

Climate variability refers to the climatic parameter of a region varying from its long- term mean.

Every year in a specific time period, the climate of a location is different. Some years have below average rainfall, some have average or above average rainfall. Due to the phenomenon of climate change affecting India, such variability would have an impact on agriculture. As a result of variability, the hydrological cycle is likely to be altered and the severity of droughts and intensity of floods in various parts of India is likely to increase. Further, a general reduction in the quantity of available run-off is predicted. Simulations using dynamic crop models indicate a decrease in yield of crops as temperature increases in different parts of India.

Livelihood activities that rely on sensitive agricultural systems will be more vulnerable to climate change. Trends such as population growth, pollution, increasing demand for food and water and market fluctuations can compound the impact of climate variability and climate change.

Adaptation to climate variability is a process of practising the cultivation methods to moderate, cope with or take advantage of the consequences of climatic events.

Adaptation options need to benefit the community and ensure community participation so that experiences of local-level adaptation strategies can be shared. To implement adaptation measures in the agriculture sector, it is necessary to understand the potential impacts of climate change and local perceptions. The basic understanding in the context of climate change adaptation in drought prone areas is that the adaptation option should have the potential to improve the livelihood assets (human, natural, financial, physical and social) of rural people.

Through efforts to determine the viability of adaptation options, it is actually possible to create a menu of adaptation options for the development planning process with the potential to be integrated into the existing institutional agenda. Short-term cropping, inter-cropping, small-scale fodder cultivation, small-scale fish cultivation in mini-ponds, homestead gardens and farm ponds for rainwater

harvesting are some of the examples of adaptation practices that can be adopted at the local level. These livelihood practices, which improve the adaptive capacity of the farmers, are likely to be a regular feature of the drought management programme.

3.2.13 Public Distribution System (PDS)

The Public Distribution supply chain and Fair Price Shops should be fully geared to ensure availability of food grains during the drought situation. The State Government/District Administration should carry out regular inspections to ensure that distribution of ration is not hampered in any way.

3.2.14 Crop management practices

Cultivation of drought resistant crops and crop varieties followed by scientific management practices would lead to drought proofing over a period of time. The State departments should ensure adequate availability of drought resistant seeds and encourage farmers to adopt better crop management practices from time to time. The state governments/scientific institutions should ensure issue of suitable advisories to farmers from time to time.

3.2.15 Documentation of best practices

The best practices in drought mitigation implemented in different parts of the State need to be documented and showcased to all the stakeholders in order to replicate the same in other parts of the state.

3.2.16 Awareness and Capacity building

State governments should take steps to create awareness on drought mitigation methods and programmes to build the capacities of farmers and village level functionaries, which would be of immense help for efficient implementation of different measures of drought proofing. People must be informed of the importance of water conservation and harvesting, optimal water use and the need for increasing forest cover. A wide public awareness about the importance of natural resource management is a very important aspect of a long-term drought

mitigation programme.

Bring together policymakers and scientific experts for developing feasible and practical public policies and encourage academic research on the key indicators of drought. It should be extremely helpful if academic institutions are asked to participate actively in drought mitigation programmes.

3.2.17 Monitoring of Drought Mitigation

The State Government /State Executive Committee (SEC) may consider periodic review of the progress of drought mitigation activities of different departments. The SEC should cause the formulation of holistic drought mitigation plans at least for vulnerable districts. Such plans will help sharpen the focus on mitigation measures and gain from the synergies being brought in by line departments.

3.2.18 Drought Vulnerability and Risk mapping

Drought vulnerability and risk maps are useful to prioritize the areas for convergence of drought mitigation measures. Vulnerability assessment studies should examine livelihood patterns, impact on income and consumption, social capital, migration and social security system, which influence the vulnerability of people. Such an assessment would be necessary to suggest measures for watershed management, irrigation efficiency, appropriate agricultural practices and cropping choices pattern, water conservation etc., NRSC (ISRO) has developed agricultural drought vulnerability assessment methodology by including weather, soil, crop and socioeconomic indicators and generated sub-district level vulnerability maps for Andhra Pradesh, Telangana and Haryana states. The study reports are available at www.nrsc.gov.in. The States may take the assistance of Scientific institutions in the mapping of drought vulnerability and risks. However, to begin with, the districts having encountered large number of droughts in the past 15 years can be justifiably selected for vulnerability assessment.

3.2.19 Decision Support System for Drought Management

Development of a decision support system for drought management would streamline the implementation of the drought mitigation activities. Establishing automated

weather stations and rain gauges to improve the collection of information, promote the use of data related to soil, vegetation and water resource obtained through remote sensing technology and actively support research on climate and natural resource management are some of the initiatives to strengthen the drought mitigation endeavours. Such information provides more analytical tools for understanding drought and making informed policy choices for drought mitigation.

States may network with all the established research institutions at the national and regional level dealing with remote sensing satellite data, dry land agriculture and natural resource management to acquire necessary technical expertise for handing drought mitigation measures.

3.2.20 Impact Assessment and evaluation

States should consider evolving mechanisms for monitoring and impact assessment of drought mitigation programmes/activities periodically. It is suggested to take up household survey with properly designed questionnaire to capture the effectiveness of drought mitigation measures. The impact assessment and evaluation of response system is suggested to be taken up at regular intervals.

3.2.21 Preparation of District Drought Proofing Plans

Government has decided that District Action Plans be prepared for districts which face frequent drought and acute water stress. Central Research Institute for Dry land Agriculture (CRIDA), Hyderabad has been engaged to prepare such District Action Plans. In the first instance 24 districts of States of Andhra Pradesh, Karnataka and Rajasthan with the highest frequency of droughts during the 2000-2015 period have been identified.

The district action plans would be devised making use of basic information on soil types, rainfall characteristics, hydrological and irrigation profiles, watershed development, existing cropping patterns, social-economic vulnerabilities etc. and suggest appropriate measures which may, inter alia, include alterations in the cropping patterns, efficient and sustainable exploitation of ground water/irrigation resources etc. over the short, medium and long term. The Plans would also identify

targets for various actionable recommendations to facilitate a robust monitoring of component/scheme wise progress.

3.3 Information Dissemination

Sharing information with print, electronic and social media is an important aspect of drought management. The Central and State Governments and their agencies should collect and disseminate credible and verified information on relevant aspects of drought to the people and media.

For effective dissemination of information up to village level, states are advised to collect and prepare data repositories of e-mail addresses right up to the village level. District wise e-groups of government employees and of important stakeholders often help in quick dissemination of information and synchronized action. Designated spokespersons of governments should be accessible to media for providing information on drought, for which a communication outreach strategy may be adopted. Periodic briefings for dissemination of information could be considered.

4 Drought Preparedness, Response and Relief

Implementation of drought relief and response measures are initiated following the declaration of drought. Drought being a complex phenomenon, the response and relief measures often requires sector-specific planning and immense inter-departmental coordination. It is necessary that these measures are undertaken promptly and in a planned manner for maximum impact in the amelioration of the hardships caused by drought to the farmers and common people. In fact, it is strongly suggested that response measures in line with Crisis Management Plan and District Crop Contingency Plans ought to get activated as soon as the distress signs become visible, without waiting for a formal declaration of drought.

4.1 Crisis Management Plan

The Ministry of Agriculture and Farmers Welfare prepares a Crisis Management Plan for drought (CMP) before the commencement of each Kharif season. The CMP provides a crisis management framework to identify phases of the crisis and the strategic response corresponding to each such phase. The plan also provides for a Strategic Activity Planner to act as a ready reckoner for critical steps that need to be taken in different times of the year with respect to drought preparedness, drought reporting and drought response, and the agencies responsible for the identified activities. Central Ministries and State Governments may seek guidance from the CMP to devise their own management plans for drought. The CMP is available on the website (www.agricoop.nic.in) of Department. The details of Crisis Management Framework are given in Annexure III.

4.2 Drought Contingency Planning

4.2.1 District Agriculture Contingency Plans

District Agriculture Contingency Plans (DACPs) have been formulated for 623

agriculturally important districts in the country so far by the Central Research Institute for Dry land Agriculture (CRIDA) under the aegis of the Ministry of Agriculture and Farmers Welfare to suggest contingency strategies to farmers to cope with major weather related aberrations, including delay in onset of south-west monsoon, dry spells etc. CRIDA has prepared these extensive district plans covering crops, horticulture, livestock, and poultry and fisheries sectors in consultation with State Agricultural Universities and State Government departments. The State Governments are expected to have contingency plans prepared for drought management at sub-district levels (tehsil/block/mandal/taluka). The district-wise contingency plans are available on the website of the Department http://www.agricoop.nic.in/acp.html , http://crida.in/.

The DACP recommends contingency measures to cope with drought for rainfed and irrigated (groundwater irrigated, tankfed and canal command areas) farming situations on account of delayed onset of monsoon (2/4/6/8 weeks delay) and (early/midseason/terminal drought) for field and horticulture crops. The contingency measures include alternate crops /crop varieties/ agronomic practices/other management options appropriate for drought scenarios.

The DACP should be updated from time to time to incorporate inputs related to new technological advancements and field experiences from scientific institutions (ICAR/SAUs), Ministry of Agriculture & Farmers Welfare and other related departments of Central and State Governments, such as Water Resources / Irrigation, Animal Husbandry, Rural Development, Drinking Water, Banking, etc, State line departments and other stakeholders. There is a need to consider the impact of climate change, the advantages to farmers from the adoption of new moisture stress tolerant crop varieties, water saving innovations, etc. while updating the plans.

4.2.2 Implementation of DACPs

The implementation of DACPs would require the following support systems.

Seed Banks

During drought, the availability of seeds of appropriate varieties in sufficient quantities is a major challenge.

To ensure availability of the desired seed at the time of drought, a plan for production or sourcing of desirable seed varieties needs to be implemented well in advance. A Consortium Approach for production, supply and timely availability of the seed to the farmers is advocated with sufficient guarantees from the State Government for procurement of the available contingent seed. Seed Banks can be set up at the most strategically advantageous locations for which adequate financial provisions will be called for.

Fodder Banks

Livestock component is critical for ensuring livelihoods particularly in arid regions during drought years. Fodder Banks need to be established at strategic locations using improved fodder/ feed storage methods for supply of fodder to deficit areas. Community lands may be identified for fodder production.

Nutrient Banks

The concept of Nutrient Bank is being evolved wherein stocks of essential manures and fertilizers, soil amendments, foliar spray chemicals; bio-fertilizers etc. are maintained locally and made available to the local community to help timely sowing even when the sowing window is limited. These nutrient banks can be managed by SHGs in conjunction with Gram Panchayats. Farmers can approach nutrient bank to avail foliar sprays like KNO3 spray, which enhances drought tolerance.

Custom Hiring Centre (CHC)

Custom hiring centres for farm machinery at village level are likely to enhance availability of implements at low cost, to help in zero tillage, improved seed and fertilizer application, in situ conservation practices, water lifting with energy efficient pumps and efficient application (through micro irrigation systems), foliar

sprays, harvesting of crops, residue incorporation, relay cropping etc. even to small farmers on a real time contingency basis.

Support to Farmers

Farmers require prompt government support in the form of inputs, credit and extension services on a proactive basis.

- **Agriculture Input Support**: Farmers in drought-affected areas need to be provided with subsidized seeds of appropriate varieties to help with the second sowing.
- **Energy Support**: Farmers need to be provided assured quality power supply for irrigation.
- **Extension Support**: The State department of agriculture through its various bodies including ATMA (Agricultural Technology Management Agency) and agricultural universities should provide extension services related to advice on crop varieties, selection of seeds, soil and water conservation measures, contingency crops and agronomic practices. State Governments could also use the Kisan Call Centres (KCCs) and M-Kisan portal of DAC&FW for communicating audio/text messages and advisories to farmers. Audio conferencing of experts with the farmers registered with KCCs and M-kisan portal also could be considered. The State Governments could consider training the Farm Tele Advisors of KCCs so as to enable them to render proper advices and suggestions to the farmers in the Drought affected areas.

4.3 Agricultural Input Subsidy

The norms for SDRF/NDRF provide for assistance to the farmers affected by notified natural calamities including drought. The norms of assistance are reviewed comprehensively after the Award of successive Finance Commissions. The Government of India, Ministry of Home Affairs has issued order on revised items and norms of assistance under SDRF/NDRF on 8th April, 2015 which is applicable for 5 years i.e. from 2015-16 to 2019-20. As per the revised norms,

farmers affected by natural calamities including drought are entitled for input subsidy for crop loss of 33% and above @ Rs. 6800/- per ha. for rainfed areas, Rs. 13500/- per ha. for areas with assured irrigation and Rs. 18000/- per ha. for all types of perennial crops.

4.4 Relief Employment

The most important relief component during the drought period is the generation of employment. Due to drought, agricultural operations are reduced substantially, restricting the scope for gaining employment. People look for alternative employment, or migrate elsewhere in search of employment. As soon as drought is declared, it is, therefore, necessary for the State Governments to immediately start relief employment programmes and provide work to those who need employment in the vicinity. Income generation through these employment works helps participating workers to meet their basic needs.

4.4.1 Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)

Implemented by the Ministry of Rural Development, Mahatma Gandhi National Rural Employment Guarantee Act (Mahatma Gandhi NREGA), 2005 provides the legal framework for the flagship programme of the Government that directly touches lives of the poor and promotes inclusive growth. The Act aims at enhancing livelihood security of households in rural areas of the country by providing at least one hundred days of guaranteed wage employment in a financial year to every household whose adult members volunteer to do unskilled manual work.

Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) is one of the largest and most ambitious social security and public works programmes in the world. The primary objective is augmenting wage employment. The other main objective is strengthening natural resource management through works that address causes of chronic poverty like drought, deforestation and soil erosion and so encourage sustainable development. The scheme is a significant step towards strengthening grass-root processes of democracy and infusing transparency and accountability in governance.

Demand for work

1. Registering demand for work is central to the implementation of Mahatma Gandhi NREGA. The Program Officer and the Programme Implementing Agencies (PIA) must ensure that the process of submission of applications for work must be kept open on a continuous basis.

2. The implementing agencies must ensure that workers in need of employment under Mahatma Gandhi NREGA are provided work within 15 days of the receipt of the application or the date of demand, in case of advance application, whichever is later, as mandated by the Act. Program Officer and implementing agencies must ensure that work is provided on demand within 15 days.

3. The mandate of the Act is to provide at least 100 days of wage employment in a financial year to every rural household whose adult member volunteers to do unskilled manual work. The Ministry mandates the provision of additional 50 days of wage employment (beyond the stipulated 100 days) per Scheduled Tribe Household in a forest area, provided that these households have no other private property except for the land rights provided under the FRA Act 2006.

4. In exercise of the provisions under Section 3 (4) of Mahatma Gandhi NREGA, the Central Government decides to provide an additional 50 days of unskilled manual work in a financial year, over and above the 100 days assured to job card holders in such rural areas where drought or natural calamities (as defined by the Ministry of Home Affairs, Government of India from time to time) have been notified. The notification is issued by the Ministry of Rural Development based on the notification of the State Government to this effect and as recommended by the Department of Agriculture, Co-operation and Farmers Welfare.

4.4.2 Other Employment Generating Schemes

The State Relief Commissioners need to prepare plans, in consultation with

line departments responsible for labour-intensive works, for providing relief employment to the people especially in chronically susceptible regions. The Relief Commissioner must prepare a financial plan for meeting the expenditure incurred on relief employment in close coordination with the Rural Development Department and the district administration.

In a drought situation, the volume of demand for rural employment is likely to see a significant spike and therefore it is necessary for the State Government to bring about convergence of all schemes and programmes of the Centre and States which have a potential for employment generation, such as Pradhan Mantri Krishi Sinchayee Yojna, Local Area Development Schemes for the Members of Parliament (MPLADS) and Members of State Legislature (MLALADS) etc.

The departments responsible for the implementation of this programme need to start public works in drought-affected areas to maximize employment. The State Government may take necessary steps to encourage increased workers' participation in these programmes.

In the course of implementing relief employment programmes, priority needs to be given to water conservation, water harvesting works (such as check dams, gabion structures, percolation tanks), and minor irrigation works (such as tanks and farm ponds, canal excavation, community wells, nalla bunding, afforestation). These works are useful for enhancing the availability of water and agricultural production. Desilting and cleaning of canals, which is overdue on account of non-availability of resources for many years, is also helpful in supplying of water to the tail-end users.

While the district administration must strive to provide employment to all the able-bodied adults, both men and women, and there cannot be any discrimination in the provision of relief, special attention needs to be focused on "below poverty line" families, landless labourers, Scheduled Caste and Scheduled Tribe households.

4.5 Water Resources Management

Water resource management in the drought-affected areas is one of the most

critical tasks of relief operations. Since water is a basic need for human and cattle population, assured supply of drinking water is the most important responsibility for the Government at all levels. It requires diverse measures such as augmentation of water supply, rationing of water use, and efficient utilization and management of water resources, in both urban and rural areas. Provision of water and its use is the most important yardstick for judging the effectiveness of relief operations. A realistic assessment of demand for water, its total availability and management of supply is extremely important in the management of drought.

4.5.1 Water Management

The first step in water resource management is estimation of the availability and demand for water from the Gram Panchayat upto the district level on the basis of the consumption needs for drinking, agriculture, industry etc. All follow up measures aimed at conservation, augmentation and sector-wise prioritization of water supply emerges from an accurate estimation of demand and availability.

Following measures are proposed for managing the water resources in a drought-affected area:

Reservoir Management

The State Government is advised to enunciate the policy for laying down the priorities for use of reservoir storage for drinking, irrigation, industry, power plants, recreation, and other commercial uses.

Repairs and Augmentation of Existing Water Supply Schemes

The State Government should issue special orders for repairs of pipelines, electric-pumps; hand pumps dug wells etc, and augmentation of all existing water supply schemes well before the monsoon season. The drinking water bore wells / tube wells need to be assessed periodically for their aquifer efficiency, well efficiency, conveyance and distribution efficiency. Water conservation measures to be taken up on top priority. In case of successive droughts, the ground water resources should be assessed and considered for exclusive use in the supply of drinking water. In such circumstances, the closing of sluice gates of minors / major irrigation tanks

and conservation of water for human and livestock consumption ought to be given priority.

Construction of Temporary Piped Water Supply

The State Government should decide to construct temporary piped water supply in a village, if no source of drinking water supply is available in the village; no possibility of constructing a new bore-well at the village or within a distance of one kilometer of the village or to undertake further drilling in the existing bore-well at the village, due to non-availability of groundwater source at the village; where, water supply at the rate of 40 litres per day per head would be available at the source for the projected human and livestock population of the village.

Construction of Bore-wells

A bore-well programme can be taken up in a village, which is facing or is likely to face drinking water scarcity, if it is technically feasible to construct bore-wells at such a village. When a bore-well programme is undertaken in a village, it is necessary to take into account the cattle population of the village.

Other Emergency Measures for Supply of Drinking Water

The Collector should undertake emergency measures such as de-silting or deepening of existing public wells to increase the availability of water. Other measures such as in-well drilling, blasting and revitalization can also be attempted for augmenting the capacity of these wells. These measures need to be planned with the support of departments of water supply, public health engineering, or rural development department, as the case may be.

Where no public well is available or is likely to be successful after taking such measures, the Collector may authorize and make available a private well on rent, if the owner of the well agrees to allow public consumption with no discrimination against any caste, creed or religion. In all the cases where a private well is being brought under use, the Collector should fix the rent for drawing drinking water and make the payment to the owner of the well and also make an announcement to this effect so that the owners of private wells come forward to offer their wells

for supply of drinking water at a rent fixed by the district administration.

Old wells that have fallen into disuse should be repaired for ensuring drinking water supply to the villagers if the State ground water survey and development agency certifies that after carrying out the necessary repairs the well would provide adequate water supply. Before these old wells are used for drawing drinking water, it should be ensured that water is properly chlorinated, and a certificate obtained from the State health department stating that the water is fit for human consumption.

Where the water in a river or stream gets scarce, holes could be dug in the beds of the stream or river. Where water has been impounded by putting a temporary bund, such holes could preferably be dug on the banks near the impounded water and the water is reserved in those holes for drinking purposes. This would provide practically filtered water to the villagers for the purpose of drinking.

Where the water has sunk much below the bed, it may be necessary to sink concrete pipes in the holes dug in the bed so that water gets collected in the pipes and could then be used for drinking water purposes.

When a certain area faces acute drinking water scarcity, it may become necessary to save and preserve water, particularly from small and shallow tanks, for drinking water purposes by controlling evaporation losses. Certain chemicals can be spread over surfaces of water storages, which would control evaporation. However, such a measure needs to be undertaken in consultation with the State health department. The district administration would be responsible for ensuring that chemicals used for controlling evaporation are safe and would not cause any health hazard to the people consuming such water.

4.5.2 Supply of Drinking Water through Tankers and Bullock Carts

The State should take the decision to supply water through tankers or bullock carts to a village or town in the drought-affected area, where no other source of water supply is available. In extra ordinary drought situation the drinking water requirement may also be arranged through Railways.

4.6 Food Security

4.6.1 Provision of Food

For food security of the people, Government is implementing the National Food Security Act, 2013 (NFSA) which provides for coverage of upto 75% of the rural population and upto 50% of the urban population at the national level for receiving subsidized food grains under Targeted Public Distribution System (TPDS), thus covering about two-thirds of the population. Corresponding to the above coverage of the all India level, State/UT-wise coverage was determined by the then Planning Commission. Coverage for receiving highly subsidized food grains under the Act has been delinked from poverty estimates and is substantially above the percentage of population living below the poverty line. Main responsibility for implementation of NFSA, which *inter alia* includes identification of eligible households, issuing ration cards to them, ensuring delivery of food grains upto door-steps of fair price shops and its timely distribution to eligible households lies with States/UTs.

State Government/UT Administration should make assessment of requirement of additional food grains, if any, over and above the NFSA allocation, to deal with special situation arising due to drought, and request the Government of India for additional allocation, which shall make necessary allocation as per the then prevailing policy.

As per existing policy, in case of natural calamities, the allocation of food grains for 3 months of demand can be made to the States/UTs on the basis of request received so that the relief measures are not affected. The allocation of food grains is made at MSP and MSP derived rates for wheat and rice respectively.

4.6.2 Nutrition aspects of Food Security

The State Government should address the nutritional aspects of food security through schemes such as the Integrated Child Development Services (ICDS) and Mid-day Meals. The ICDS is implemented for pre-school children, while mid-day meal has been introduced for school-going children.

Integrated Child Development Services (ICDS)

The ICDS scheme was initiated in 1975 to improve the health and nutritional status of children in the 0–6 age-group by providing supplementary food and coordinating with State health departments to ensure the delivery of the required health inputs. It also provides food supplements to pregnant and lactating women. The type of food supplements in the ICDS programme varies widely, from ready-to-eat food to the supply of supplements cooked in Aanganwadis. The ICDS programme is centrally sponsored. The centre bears the cost of maintaining the infrastructure, while the State bears the expenditure on the food component.

In a drought situation, the ICDS can be used as the main instrument for ensuring nutritional security among the vulnerable sections, which constitute bulk of beneficiaries under this programme even during 'normal times'. Under this arrangement, ICDS centres / Aanganwadis register additional beneficiaries.

The Government is seeking the services of self-help groups for providing supplementary food to Aanganwadis. During a drought situation, the role of self-help groups can be increased for monitoring the health and nutritional status of women and children. Wherever it is necessary to open additional Aanganwadis temporarily, the Government should sanction them and provide finances for these Aanganwadis through the relief funds.

Mid-day Meal Programmes

With a view to enhance enrolment, retention and attendance and simultaneously improve nutritional levels among children, the National Programme of Nutritional Support to Primary Education (NP-NSPE) was launched as a Centrally Sponsored Scheme on 15th August 1995 to cover children studying in classes I-V of Government, Government aided and Local Body Schools. The scheme has been expanded both in coverage and contents since then. Now the Scheme covers the children studying in elementary classes (I-VIII) in Government, Government aided, Special Training Centres (STCs) and Madarsas/Maqtabs supported under Sarva Shiksha Abhiyan (SSA). The name of the scheme has also been changed as "Mid Day Meal Scheme in Schools". The scheme also provides for giving mid

day meals during summer vacation in drought affected areas.

Community Kitchens

In drought situations where certain segments of people, such as the old, disabled, and women, are extremely distressed, the Collectors should start community kitchens, which could be run by the Government itself or through NGOs. These kitchens should be run only during the drought situation and need to be closed when the situation improves, either through provision of relief employment or improving the state of agriculture.

4.7 Waivers and Concessions

Each State Government may take decisions on remissions, waivers, deferments, loan restructuring, concessions etc, taking into account the fiscal situation of the State and severity of the drought.

Following steps can be considered by the State

- Grant remission of land revenue as payable under the relevant Land Revenue Code for those farmers affected by drought.
- The State Government may postpone recovery of dues like Tagai / Taccavi, arrears of water, irrigation and electricity charges, or any other dues related to agriculture from farmers. If recovery is not postponed, the State Government can issue instructions for not recovering dues from the farmers and other agricultural workers by applying coercive measures.
- The State Government may consider converting short-term loans and reschedule current installment of medium-term loans for farmers in the drought-affected areas. The State Government should make necessary provision for restructuring / rescheduling of these loans and pay to the concerned banks.
- The State Government may issue instructions to all cooperative banks through the Department of Cooperation to convert or reschedule kharif loans by the end of March, when assessment of crop losses are available

and final annewari / paisewari values are published.

- The Collector should furnish details of annewari / paisewari values or any other assessment of crop losses to cooperative banks to facilitate the conversion or re- scheduling of such loans. Tehsildars / Block Development Officer / Circle Officer can issue necessary certificates to the District Registrar of Cooperatives to enable the banks to grant conversion facility to the affected farmers.
- The State Government may issue instructions to the cooperative banks not to apply coercive measures for recovering their loans or dues in the drought-affected areas.
- The State Government can decide to waive education / examination fees for the students in Government schools located in drought-affected areas.

4.8 Cattle Camp and Fodder Supply

State Governments need to support their farmers in protecting their cattle population during a drought situation by providing necessary assistance for fodder, feed, and cattle health services. This would discourage distress selling of cattle and help farmers to maintain a very important part of their asset base. Cattle wealth is the mainstay of the rural economy. As small and marginal farmers constitute about 80% of the total community of farmers in the country for whom, cattle often is a valuable asset to help supplement incomes from their small landholdings. Cattle ownership diversifies production and resource management options, increases total farm production and income, provides year-round employment and spreads risk. During a drought situation, every measure needs to be taken to save useful cattle from mortality or distress sale by making arrangements for drinking water, fodder and medicines etc.

On receiving information about fodder scarcity becoming imminent as a result of failure or inadequacy of rains in July–August or the failure or inadequacy in rabi rains, the State should have surveys done for assessment of fodder availability, the price trends and the expected demand in the light of cattle population in vulnerable

areas. The State Government, on the basis of survey report, should issue detailed instructions for maintaining the supply of fodder, either through procurement of fodder, or by setting up cattle camps or fodder depots / bank, or by encouraging farmers to undertake fodder cultivation.

Role of the Animal Husbandry Department

The State Animal Husbandry Department should make available the fodder, feed, and water requirement for each cattle. The Animal Husbandry Department would provide minerals, vitamins, medicines and vaccines at minimum cost to the farmers. The Department would also carry out the necessary inspections and checks in drought-affected areas to ensure that cattle are maintained in good health.

Role of the Forest Department

The Forest Department / Forest Development Corporation should maintain stocks of grass for the use of the distressed Cattle Population in the drought hit areas. The cutting of grass should be completed as early as possible and should be properly dried, converted to hay and stocked. The Forest Department should also make arrangements for the transportation of fodder to places suggested by the Collector. The Government should sanction the necessary expenditure for fodder operations to be undertaken by the Forest Department.

Role of the Agriculture Department

- The Agriculture Department through its various bodies and especially through ATMA would encourage individual farmers to undertake cultivation of fodder, wherever possible. It would provide fodder seeds and fertilizers to the farmers for cultivating fodder, wherever possible; and extension services for undertaking short duration grasses and seasonal fodder crops.
- The Agriculture Department can also undertake cultivation of fodder on the land owned by the agricultural universities. Generally, agricultural universities have huge tracts of land, which could be used for this purpose. The Government needs to provide subsidy to the agriculture universities for cultivating fodder.

- The Agriculture Department can also grow fodder on the seed farms, wherever available or on Demo plots under ATMA. The Government should provide a grant for seeds, fertilizers and other expenditures, depending on the extent of area covered under fodder cultivation.

Role of the Irrigation Department

- The irrigation department should extend all necessary cooperation for promoting fodder cultivation by providing water for irrigation on a priority basis. Such water could be provided to the farmers at a cheaper rate.
- The irrigation department should consider allowing reservoir and tank beds under its control to be leased out for cultivating short duration grasses or seasonal fodder crops. The Collector, with the permission of the irrigation department, could lease out the reservoir and tank bed land on short-term lease subject to the condition that the lessees should grow fodder crop therein and agree to sell the grass / fodder to needy farmers at the price to be fixed by the Collector.

4.9 Health and Hygiene

In drought situation, contamination of drinking water at the source or wrong storage practices may lead to waterborne diseases. Similarly water storage practices may lead to breeding of mosquitoes resulting in outbreak of vector borne diseases. Long-standing drought may affect nutritional status of local population especially that of pregnant and lactating mothers and children. In order to maintain health and hygiene standards of the drought affected population, the State Health Department should take all necessary steps.

4.10 Checklist

A drought preparedness and response checklist is at Annexure II.

5 Institutional Response

The effectiveness of Drought management response is a reflection of the robustness of the government institutional structures. While primary responsibility to monitor, declare, plan and manage response is of the State Government, yet a critical supportive role is contemplated under the present scheme of things for the Central Government. The district administration headed by the Collector spearheads the government institutional response to drought on the ground. Drought thus requires efficient coordination at multiple levels.

Role of the Central Government

The Department of Agriculture, Cooperation and Farmers Welfare (DAC&FW), Ministry of Agriculture & Farmers Welfare (MoA&FW) is responsible for monitoring and coordinating the central government response to drought.

An officer of the rank of an Additional Secretary in the DAC&FW is designated as the "Central Drought Relief Commissioner" for the purpose. SDRF and NDRF are, however, administered by the Ministry of Home Affairs and assistance under these schemes is released by the Ministry of Finance upon the recommendation of the High Level Committee (HLC).

A Crisis Management Group functions under the Chairmanship of the Central Drought Relief Commissioner with representatives of Ministries and organizations. The Crisis Management Group meets from time to time to review the drought situation in the country and progress of relief measures.

The CWWG is an arrangement for monitoring and early warning of any drought like development in any part of the country on a regular basis. In the event of a declaration of drought, the Central Drought Relief Commissioner (CDRC) should monitor and review the progress of relief measures and apprise the National Crisis

Management Committee.

National Crisis Management Committee (NCMC) which has been set up under the Chairmanship of the Cabinet Secretary with Secretaries of Ministries and heads of agencies as members to deal with all calamities and crisis situation should be apprised of the progress of relief and other developments periodically.

The Central Government normally constitutes a Cabinet Sub-committee or a Group of Ministers in situations of severe drought to expedite policy decisions.

The MoA&FW is expected to coordinate closely with other Ministries and agencies in dealing with drought.

Role of the State Government

The State Department of Disaster Management and Relief is responsible for directing drought operations in the State. The Department is headed by a Secretary or Relief Commissioner and assisted by a team of officers. The Relief Commissioner / Secretary, Disaster Management monitors the drought situation through the Drought Management Centres, the District Collectors and departments and agencies.

The Relief Commissioner / Secretary, Disaster Management recommends the declaration of drought on the basis of situation on the ground. Once the State Government declares drought, all necessary orders for relief operations are issued.

Relief Commissioners / Secretary, Disaster Management issue instructions to Collectors for launching relief operations for the people affected by drought.

Relief Commissioner / Secretary, Disaster Management should take steps for timely communication of all decisions of the State Government to the district authorities.

The Relief Commissioner / Secretary, Disaster Management administers the State Disaster Response Fund (SDRF) of the State and issues orders for release of all financial assistance to the district administration and other departments in accordance with extant guidelines.

The Relief Commissioner / Secretary, Disaster Management shall ensure the assessment of losses and relief requirements in consultation with the district administration and line departments. On the basis of this assessment a Memorandum is submitted to Government of India by the State Relief Commissioner for seeking financial assistance from the National Disaster Response Fund (NDRF).

States have adopted various mechanisms for managing drought like State Executive Committee in accordance with the provision of the Disaster Management Act, 2005, Cabinet Sub-committee, Secretaries' Committee under the Chairmanship of the Chief Secretary for taking policy decisions on drought.

Drought management requires coordination with departments of agriculture, horticulture, animal husbandry, water resources, irrigation, social welfare, public distribution, rural development, school education, power, drinking water, public health, and finance.

Role of the District Administration

The district administration under the leadership of the Collector implements all decisions related to drought management on the ground. The implementation takes places through a number of line departments and field agencies working on the ground. The effectiveness of drought management is largely dependent upon coordination among agencies working at the district level.

The Collectors should ensure monitoring all the indicators of drought on the ground such as, collection of daily data on rainfall water storage position, water availability and supply and progress of sowing operations. The Collector should also monitor local information related to demand for relief employment, prices of food grains and the availability of fodder.

The role of the Collector is that of an effective coordinator of drought management. The Collector must be able to provide a sense of mission and direction to all the line departments and agencies working for drought relief. It is necessary that the Collector provides the necessary help and support to all the agencies for performing their tasks more effectively.

At the district level, a district drought / disaster management committee should be set up under the chairmanship of the Collector with members consisting of public representatives, line departments. The SDMCs and DDMCs shall provide all relevant information to the said Committee. The Committee should meet frequently and review the progress of drought relief measures in the district. The district-level committee can become a very effective forum for addressing peoples' concerns and applying correctives in drought management.

Role of Panchayati Raj Institutions

It is necessary to involve the Panchayati Raj institutions (PRIs) - Zilla Parishads, Panchayat Samitis, and Village Panchayats - in the implementation of drought management programmes. PRIs need to provide funds for water conservation and maintenance of water supply schemes. Efforts should be made to identify the projects related to sustainable natural resource management, water conservation etc. to support drought mitigation in the vulnerable regions. The PRIs need to play an important role in the regulation of water use at the individual household and village level. It should recommend using water resources for the purpose of drinking and fodder cultivation.

Role of Non-Government Organizations (NGOs) and Civil Society Organizations (CSOs)

The State Government and district administration need to involve NGOs in organizing drought relief. NGOs and CSOs have the advantage of local presence and community outreach which could be utilized for organizing distribution of relief assistance and implementing mitigation programs. NGOs can also be very effective in providing feedback to the Government and securing corrective actions.

The State Government and district administration can set up a coordination forum for NGOs and CSOs at the State and district levels respectively. The coordination forum meetings can be convened to discuss the drought situation and the implementation of relief programmes. NGOs and CSOs can monitor various indicators of drought, particularly its impact on the people, and bring these to the attention of the State Government. The State Government can initiate

necessary relief measures in drought-affected areas, based on the feedback from these organizations.

NGOs and CSOs can convey the local demand for relief employment to the district administration. They can suggest specific works to be started so that the people are provided with employment within a short distance of their homes. These organizations can help the district administration in planning relief employment in a way that durable community assets are created. They can also coordinate with the local administration in ensuring the payment of wages and food grains on time.

NGOs and CSOs can work with the local community in augmenting the sources of drinking water through repairing wells, hand-pumps, tanks, ponds and any other local water structure. They can also help the community in regulating water use within the community and ensuring equitable distribution of available water.

NGOs and CSOs can monitor the distribution of food grains through Fair Price Shops and prevent hoarding and diversion of food grains in the open market.

NGOs and CSOs can provide assistance to the sick, elderly and disabled people in the drought situation. They can run community kitchens with Government assistance. NGOs need to bring the cases of hunger and starvation to the attention of the Government.

In consultation with the Government, NGOs and CSOs can monitor the functioning of ICDS and mid-day meals so that the children get necessary nutrition during the period of drought. They can also bring to the attention of the Government the cases of malnutrition among infants and children.

NGOs and CSOs can set up cattle camps and fodder depots after obtaining the necessary authorization from the Government. They can receive Government assistance as per the SDRF / NDRF norms as well as the necessary veterinary care for this purpose.

6 Financing Relief Expenditure

The present arrangement of financing relief expenditure has two streams, namely, (i) State Disaster Response Fund (SDRF) and (ii) National Disaster Response Fund (NDRF). Contribution to SDRF is made by Central and State Governments in the ratio of 3:1 for general category States (18 out of 29 namely, Andhra Pradesh, Telangana, Bihar, Chhattisgarh, Goa, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal) and in the ratio of 9:1 for special category States (11 out of 29 i.e. 8 North East States namely, Arunachal Pradesh, Assam, Meghalaya, Manipur, Mizoram, Nagaland, Tripura Sikkim and 3 hilly States of Himachal Pradesh, Jammu & Kashmir and Uttarakhand). Allocation under SDRF has been made on the basis of recommendations of the Finance Commission for a period of 5 years. Allocation of funds under State Disaster Response Fund (SDRF) almost doubled from Rs.33580.93 cores during 2010-15 to Rs. 61,220 crores during 2015-2020. The SDRF is a fund, which is kept outside the Government Account so that there is no cash flow constraint for initiating relief operations. The Centre's share is normally released in two half yearly installments, subject to the guidelines in this regard. Funds from the SDRF are to be spent on specific, pre-determined items of expenditure at predetermined scales, as specified in the SDRF guidelines. The items and norms of expenditure for assistance from SDRF/ NDRF is given in Annexure I. The NDRF provides funds for natural calamities of severe nature when the balances available in the SDRF are not adequate for meeting relief expenditures. It is replenished through a surcharge on certain central taxes. The Thirteenth Finance Commission had recommended the use of NDRF for "calamities of severe nature"; this fund is used to meet the expenditure on all natural calamities as recommended by Finance Commissions from time to time, where relief expenditure exceeds the amount balance in the SDRF.

The Ministry of Finance (Department of Expenditure), Government of India releases assistance from both the SDRF and NDRF. The SDRF is released to all the States in normal course, irrespective of its level of relief expenditure, while the NDRF funds are released when the States make specific requests, following a well-laid out procedure.

Release of NDRF Funds

Whenever a State faces a calamity of severe nature and the expenditure from the SDRF exceeds its existing balance, a request is made to the Government of India for release of funds from the NDRF. For drought, hailstorm, pest-attack and cold wave/frost, the request is made to the Ministry of Agriculture and Farmers Welfare and for other identified natural calamities, the Ministry of Home Affairs has the necessary jurisdiction.

The State Government submits the request for release of NDRF funds through a Memorandum. A Memorandum is an important representation of the State Government, providing detailed information on the geographical extent and severity of drought, losses and damages in all the sectors, relief needs, and the request for assistance from the NDRF.

A Memorandum needs to be a balanced document, objectively describing the drought situation, assessing the impact and estimating the relief needs. The State Government should submit the Memorandum to the Ministry of Agriculture and Farmers Welfare only after declaring drought.

After the State Government declares drought and submits the Memorandum, the Ministry of Agriculture sends an Inter-Ministerial Central Team (IMCT) to the concerned State for making an assessment of the drought situation. This team consists of officials from different Central Government Ministries/Departments, such as Agriculture, Animal Husbandry, Food, Rural Development, Power, Drinking Water, NITI Aayog, Finance, Home etc. The team carries out extensive visits of drought-affected areas in the State during which it is expected to assess ground level situation pertaining to crop damage, drinking water, fodder shortage etc., meet local officials, farmers, PRI members, women's groups, etc. The

team then submits a report to the Ministry of Agriculture and Farmers Welfare immediately after conclusion of its visit. The report should provide an assessment of the drought situation in terms of severity, geographical spread, and impact on agriculture, availability of water, food, and fodder.

In the report, the team makes a recommendation for NDRF assistance in accordance with the SDRF guidelines. The recommendation needs to be clear, precise and objective and in consonance with the SDRF / NDRF norms for assistance.

The report of the team is considered by Sub Committee of the National Executive Committee (SCNEC) which is an Inter-Ministerial Committee chaired by the Secretary, DAC&FW (Government of India) and recommendation made on the quantum of assistance from the NDRF.

The SC-NEC recommendation is considered by a High-Level Committee (HLC), consisting of the Union Home Minister, Union Finance Minister, Union Agriculture Minister and Vice Chairman, NITI Aayog. The HLC is chaired by the senior-most Union Cabinet Minister.

After the HLC decision on the SC-NEC recommendation, funds from the NDRF are released by the Department of Expenditure on the advice of the MHA after adjusting for the existing balance in the SDRF.

6.1 Development Programmes for Drought Relief

In addition to the SDRF and NDRF, the Central and State Governments need to take advantage of centrally sponsored schemes etc., which permit use of 25% of the allocation as flexi funds to be used for drought mitigation. Also, a no of schemes/programmes are being implemented by the various central ministries/ departments towards mitigation of drought like National Rural Drinking Water Programme (NRDWP) of the Ministry of Drinking Water & Sanitation.

7 Conclusion

With the enactment of the Disaster Management Act in 2005, India has taken the initiative for a paradigm shift in disaster management, from erstwhile *relief centric approach to a holistic proactive one,* encompassing preparedness, prevention, mitigation and risk reduction. The country is slowly moving towards disaster risk reduction. The National policies being framed in the country include mainstreaming of disaster risk reduction and development programmes, besides community resilience building. Strong institutional structures have been established at various levels with legislative back up and policy framework for enhancing our capabilities to reduce risk and losses to economy and property. There is need to develop strategies for identification of risks, challenges and equitable distribution of scarce resources, with a view to contributing to achieve sustainable development goals. Also, systematic integration of risk mitigation, preparedness and capacity building approaches into National Policy framework and development programmes would not only strengthen institutional mechanism and help create awareness among masses.

This Plan is, accordingly prepared keeping in view the theme of National Platform for Disaster Risk Reduction (NPDRR) to achieve *"Disaster Risk Reduction for Sustainable Development: Making India Resilient by 2030".* This DMP will be updated from time to time taking into account various factors.

Annexure I

REVISED LIST OF ITEMS AND NORMS OF ASSISTANCE FROM STATE DISASTER RESPONSE FUNDS (SDRF) AND NATIONAL DISASTER RESPONSE FUND (NDRF)

(Period 2015-20, MHA Letter No. 32-7/2014-NDM-I Dated 8th April 2015)

Sl.No.	Items	NORMS OF ASSISTANCE
1	2	3
1.	**Gratuitous Relief**	
	a) Ex-Gratia payment to families of deceased persons	Rs. 4.00 lakh per deceased person including those involved in relief operations or associated in preparedness activities subject to certification regarding cause of death from appropriate authority.
	b) Ex-Gratia payment for loss of a limb or eye(s).	Rs. 59,100/- per person, when the disability is between 40% and 60% Rs. 2.00 lakh per person, when the disability is more than 60%. Subject to certification by a doctor from a hospital or dispensary of Government, regarding extent and cause of disability.
	c) Grievous injury requiring hospitalization.	Rs. 12,700/- per person requiring hospitalization for more than a week. Rs. 4,300/- per person requiring hospitalization for less than a week.
	d) Clothing and utensils/ house-hold goods for families whose houses have been washed away/ fully damaged/severely inundated for more than two days due to a natural calamity.	Rs. 1,800/- per family, for loss of clothing. Rs. 2,000/- per family, for loss of utensils/household goods.
	e) Gratuitous relief for families whose livelihood is seriously affected.	Rs. 60/- per adult and Rs. 45/- per child, not housed in relief camps. State Govt. will certify that identified beneficiaries are not housed in relief camps. State Government will provide the basis and process for arriving at such beneficiaries district-wise.

		Period for providing gratuitous relief will be as per assessment of the State Executive Committee(SEC) and the Central Team (in case of NDRF). The default period of assistance will upto 30 days, which may be extended upto 60 days in the first instance, if required, and subsequently upto 90 days in case of drought/ pest attack. Depending on the ground situation, the State Executive Committee can extend the time period beyond the prescribed limit subject to that expenditure on this account should not exceed 25% of SDRF allocation for the year.
2.	**SEARCH & RESCUE OPERATIONS**	
	(a) Cost of search and rescue measures./evacuation of people affected/likely to be affected	As per actual incurred, assessed by SEC and recommended by the Central Team (in case of NDRF). By the time the Central Team visits the affected area, these activities are already over. Therefore, the State Level Committee and the Central Team can recommend actual/near – actual costs.
	(b) Hiring of boats for carrying immediate relief and saving lives.	As per the actual cost incurred assessed by SEC and recommended by the Central Team (in case of NDRF). The quantum of assistance will be limited to the actual expenditure incurred on hiring boats and essential equipment required for rescuing stranded people and thereby saving human lives during a notified natural calamity.
3.	**RELIEF MEASURES**	
	a) Provision for temporary accommodation, food, clothing, medical care, etc. for people affected/ evacuated and sheltered in relief camps.	As per assessment of need by SEC and recommendation of the Central Team (in case of NDRF), for a period up to 30 days. The SEC would need to specify the number of camps, their duration and the number of persons in camps. In case of continuation of a calamity like drought, or widespread devastation caused by earthquake or flood etc., this period may be extended to 60 days, and upto 90 days in cases of severe drought. Depending on the ground situation, the State Executive Committee can extend the time period beyond the prescribed limit subject to that expenditure on this account should not exceed 25% of SDRF allocation for the year. Medical care may be provided from National Rural Health Mission (NRHM)

	b) Air dropping of essential supplies.	As per actual, based on assessment of need by SEC and recommendation of the Central Team (in case of NDRF). - The quantum of assistance will be limited to actual amount raised in the bills by the Ministry of Defence for airdropping of essential supplies and rescue operations only.
	c) Provision of emergency supply of drinking water in rural areas and urban areas.	As per actual cost, based on assessment of need by SEC and recommended by the Central Team (in case of NDRF), up to 30 days and may be extended upto 90 days in case of drought. Depending on the ground situation, the State Executive Committee can extend the time period beyond the prescribed limit subject to that expenditure on this account should not exceed 25% of SDRF allocation for the year.
4.	**CLEARANCE OF AFFECTED AREAS**	
	a) Clearance of debris in public areas.	As per actual cost within 30 days from the date of start of the work based on assessment of need by SEC for the assistance to be provided under SDRF and as per assessment of the Central team for assistance to be provided under NDRF.
	b) Draining off flood water in affected areas	As per actual cost within 30 days from the date of start of the work based on assessment of need by SEC for the assistance to be provided under SDRF and as per assessment of the Central Team, (in case of NDRF)
	c) Disposal of dead bodies/ Carcases	As per actual, based on assessment of need by SEC and recommendations of the Central Team, (in case of NDRF).
5.	**AGRICULTURE**	
i)	*Assistance for farmers having landholding upto 2 ha*	
A	Assistance for land and other loss	

	a) De-silting of agricultural land (where thickness of sand/silt deposit is more than 3", to be cetified by the competent authority of the State Government.	Rs. 12,200/- per hectare for each item. (Subject to the condition that no other assistance/ subsidy has been availed of by/is eligible to the beneficiary under any other Government Scheme)
	b) Removal of debris on agricultural land in hilly areas	
	c) De-silting / Restration/ Repair of fish farms	
	d) Loss of substantial portion of land caused by landslide, avalanche, change of course of rivers.	Rs.37,500/- per hectare to only those small and marginal farmers whose ownership of the land is legitimate as per the revenue records.
B.	Input subsidy (where crop loss is 33% and above)	
	a) For agriculture crops, horticulture crops and annual plantation crops	Rs.6,800/- per ha. In rainfed areas and restricted to sown areas. Rs.13,500/- per ha. In assured irrigated areas, subject to minimum assistance not less than Rs.1000 and restricted to sown areas.
	b) Perennial crops	Rs.18,000/- per ha. For all types of perennial crops subject to minimum assistance not less than Rs,2000/- and restricted to sown areas.
	c) Sericulture	Rs.4,800/-per ha. For Eri, Mulberry, Tussar Rs.6,000/- per ha. For Muga.
(ii)	Input subsidy to farmers *having more than 2 Ha of landholding*	Rs,6,800/- per hectare in rainfed areas and restricted to sown areas. Rs.13,500/- per hectare for areas under assured irrigation and restricted to sown areas. Rs.18,000/- per hectare for all types of perennial crops and restricted to sown areas. Assistance may be provided where crop loss is 33% and above, subject to a ceiling of 2 ha. per farmer.

6.	**ANIMAL HUSBANDRY ASSISTANCE TO SMALL AND MARGINAL FARMERS**	
	i) Replacement of milch animals, draught animals or animals used for haulage.	Milch animals – Rs.30,000/- Buffalo/cow/camel/yak/Mithun etc. Rs.3,000/- Sheep/Goat/Pig Draught animals – Rs.25,000/- Camel/horse/bullock, etc. Rs.16,000/- Calf/Donkey/Pony/Mule - The assistance may be restricted for the actual loss of economically productive animals and will be subject to a ceiling of 3 large milch animals or 30 small milch animals or 3 large draught animals or 6 small draught animals per household irrespective of whether a household has lost a larger number of animals. (The loss is to be certified by the Competent Authority designated by the State Government). *Poultry :-* Poultry @ 50/- per bird subject to a ceiling of assistance of Rs.5000/- per beneficiary household. The death of the poultry birds should be on account of a natural calamity. *Note :-* Relief under these norms is not eligible if the assistance is available from any other Government Scheme, e.g. loss of birds due to Avian Influenza or any other diseases for which the Department of Animal Husbandry has a separate scheme for compensating the poultry owners.

	ii) Provision of fodder/feed concentrate including water supply and medicines in cattle camps.	Large animals – Rs.70/- per day. Small animals – Rs.35/- per day. Period for providing relief will be as per assessment of the State Executive Committee (SEC) and the Central Team (in case of NDRF). The default period for assistance will be upto 30-days, which may be extended upto 60 days in the first instance and in case of severe drought up to 90 days. Depending on the ground situation, the State Executive Committee can extend the time period beyond the prescribed limit, subject to the stipulation that expenditure on this account should not exceed 25% of SDRF allocation for the year. Based on assessment of need by SEC and recommendation of the Central Team, (in case of NDRF) consistent with estimates of cattle as per Livestock Census and subject to the certificate by the competent authority about the requirement of medicine and vaccine being calamity related.
	iii) Transport of fodder to cattle outside cattle camps	As per actual cost of transport, based on assessment of need by SEC and recommendation of the Central Team (in case of NDRF) consistent with estimates of cattle as per Livestock Census.
7.	**FISHERY**	
	I) Assistance to Fisherman for repair / replacement of boats, nets – damaged or lost - Boat - Dugout-Canoe - Catamaran - Net (This assistance will not be provided if the beneficiary is eligible or has availed of any subsidy/assistance, for the instant calamity, under any other Government Scheme)	Rs.4,100/- for repair of partially damaged boats only Rs.2,100/- for repair of partially damaged net. Rs.9,600/- for replacement of fully damaged boats. Rs.2,600/- for replacement of fully damaged net.

	ii) Input subsidy for fish seed farm	Rs.8,200 per hectare. (This assistance will not be provided if the beneficiary is eligible or has availed of any subsidy/assistance, for the instant calamity, under any other Government Scheme, except the one time subsidy provided under the Scheme of Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture)
8	**HANDICRAFTS / HANDLOOM ASSISTANCE TO ARTISANS**	
	i) For replacement of damaged tools/equipment	Rs.4,100 per artisan for equipments. - Subject to certification by the competent authority designated by the Government about damage and its replacement
	ii) For loss of raw material/ goods in process/finished goods	Rs.4,100 per artisan for raw material. - Subject to certification by Competent Authority designated by the State Government about loss and its replacement.
9.	**HOUSING**	
	a) Fully damaged / destroyed houses	
	i) Pucca house	Rs,95,100/- per house, in plain areas Rs,1,01,900/- per house, in hilly areas including Integrated Action Plan (IAP) districts
	ii) Kucha House	
	b) Severely damaged houses	
	i) Pucca house	
	ii) Kucha House	
	c) Partially Damaged Houses -	
	(i) Pucca (other than huts) where the damage is at least 15%	Rs,5,200/- per house
	(ii) Kutcha (other than huts) where the damage is at least 15%	Rs,3,200/- per house

	d) Damaged /destroyed huts:	Rs.4,100/- per hut. *(Hut means temporary, make shift unit, inferior to Kutcha house, made of thatch, mud, plastic sheets etc. traditionally recognized as hut by the State/ District authorities.)* Note : The damaged house should be an authorized construction duly certified by the Competent Authority of the State Government.
	e) Cattle shed attached with house	Rs.2,100/- per shed.
10.	**INFRASTRUCTURE**	
	Repair/restoration (of immediate nature) of damaged infrastructure : (1) *Roads & bridges (2) Drinking Water Supply Works, (3) Irrigation, (4) Power (only limited to immediate restoration of electricity supply in the affected areas), (5) Schools, (6)Primary Health Centres, (7) Community assets owned by Panchayat. Sectors such as Telecommunication and Power (except immediate restoration of power supply), which generate their own revenues, and also undertake immediate repair/ restoration works from their own funds/ resources, are excluded.*	*Activities of immediate nature :* *Illustrative lists of activities which may be considered as works of an immediate nature are given in the enclosed Appendix.* *Assessment of requirements:* *Based on assessment of need, as per States' costs/ rates/ schedules for repair, by SEC and recommendation of the Central Team (in case of NDRF)* - *As regards repair of roads, due consideration shall be given to Norms for Maintenance of Roads in India, 2001, as amended from time to time, for repairs of roads affected by heavy rains/floods, cyclone, landslide sand dunes, etc to restore traffic. For reference these norms are* • Normal and Urban areas: upto 15% of the total of Ordinary Repair (OR) and Periodical Repair (PR). • Hills: upto 20% of total of OR and PR.

		- In case of repair of roads, assistance will be given based on the notified Ordinary Repair (OR) and Periodical Renewal (PR) of the State. In case of OR & PR rate is not available, then assistance will be provided @ Rs 1 lakh/km for State Highway and Major District Road and @ Rs. 0.60 lakh/km for rural roads. The condition of "State shall first use its provision under the budget for regular maintenance and repair" will no longer be required, in view of the difficulties in monitoring such stipulation, though it is desirable goal for all the States. - In case of repairs of Bridges and Irrigation works, assistance will be given as per the schedule of rates notified by the concerned States. Assistance for micro irrigation scheme will be provided @ R. 1.5 lakh per damaged scheme. Assistance for restoration of damaged medium and large irrigation projects will also be given for the embankment portions, on par with the case of similar rural roads, subject to the stipulation that no duplication would be done with any ongoing schemes. - Regarding repairs of damaged drinking water schemes, the eligible damaged drinking water structures will be eligible for assistance @ Rs. 1.5 lakh/ damaged structure. - Regarding repair of damaged primary and secondary schools, primary health centres, Anganwadi and community assets owned by the Panchayats, assistance will be given @ Rs 2 lakh/ damaged structure. - Regarding repair of damaged power sector, assistance will be given to damaged conductors, poles and transformers upto the level of 11 kV. The rate of assistance will be @ Rs 4000/- poles, Rs. 0.50 lakh per km of damaged conductor and Rs.1.00 lakh per damaged distribution transformer.
11	Procurement of essential search, rescue and evacuation equipments including communication equipments, etc for response to disaster.	- Expenditure is to be incurred from SDRF only (and not from NDRF), as assessed by the State Executive Committee (SEC). - The total expenditure on this item should not exceed 10% of the annual allocation of the SDRF.

12	Capacity Building	- Expenditure is to be incurred from SDRF only (and not from NDRF), as assessed by the State Executive Committee (SEC). - The total expenditure on this item should not exceed 5% of the annual allocation of the SDRF.
13	State specific disasters within the local context in the State, which are not included in the notified list of disasters eligible for assistance from SDRF/ NDRF, can be met from SDRF within the limit of 10% of the annual funds of allocation of the SDRF.	- Expenditure is to be incurred from SDRF only (and not from NDRF), as assessed by the State Executive Committee (SEC). - The norm for various items will be the same as applicable to other notified natural disasters, as listed above, or - In these cases, the scale of relief assistance against each item for 'local disaster' should not exceed the norms of SDRF. - The flexibility is to be applicable only after the State has formally listed the disasters for inclusion and notified transparent norms and guidelines with a clear procedure for identification of the beneficiaries for disaster relief for such local disasters', with the approval of SEC.

Note:-

(i) The State Governments are to take utmost care and ensure that all individual beneficiary-oriented assistance is necessary/ mandatory disbursed through the bank account (viz; Jan Dhan Yojana etc.) of the beneficiary.

(ii) The scale of relief assistance against each items for all disasters including 'local disaster' should not exceed the norms of SDRF/NDRF. Any amount spent by the State for such disasters over and above the ceiling would be borne out of the resources of the State Government and not from SDRF.

APPENDIX

(Item No.10)

Illustrative list of activities identified as of an immediate nature.

1. Drinking Water Supply:

i) Repair of damaged platforms of hand pumps/ring wells/spring lapped chambers/public stand posts, cisterns.

ii) Restoration of damaged stand posts including replacement of damaged pipe lengths with new pipe lengths, cleaning of clear water reservoir (to make it leak proof).

iii) Repair of damaged pumping machines, leaking overhead reservoirs and water pumps including damaged intake – structure, approach gantries/ jetties.

2. Roads:

i) Filling up of breaches and potholes, use of pipe for creating waterways, repair and stone pitching of embankments.

ii) Repair of breached culverts.

iii) Providing diversions to the damaged/washed out portions of bridges to restore immediate connectivity.

iv) Temporary repair of approaches to bridges/embankments of bridges, repair of damaged railing bridges, repair of causeways to restore immediate connectivity, granular sub base, over damaged stretch of roads to restore traffic.

3. Irrigation:

i) Immediate repair or damaged canal structures and earthen/masonry works of tanks and small reservoirs with the use of cement, sand bags and stones.

ii) Repair of weak areas such as piping or rat holes in dam walls/embankments.

iii) Removal of vegetative material/building material/debris from canal and drainage system.

iv) Repair of embankments of minor, medium and major irrigation projects.

4. Health:

Repair of damaged approach roads, buildings and electrical lines of PHCs/ community Health Centres.

5. Community assets of Panchayat:

a) Repair of village internal roads

b) Removal of debris from drainage/ sewerage lines.

c) Repair of internal water supply lines.

d) Repair of street lights.

e) Temporary repair of primary schools, Panchayat ghars, community halls, anganwadi, etc.

6. Power: Poles/ conductors and transformers upto 11kv.

7. The assistance will be considered as per the merit towards the following activities:

	Items/ Particulars	Norms of assistance will be adopted for immediate repair
i)	Damaged primary school building Higher secondary/ middle/ college and other educational institutions buildings	Up to Rs.1.50 lakh/ unit Not covered
ii)	Primary Health Centre	Upto Rs.1.50 lakh/ unit
iii)	Electric poles and wires etc	Normative cost (Upto Rs.4000 per pole and Rs.0.50 lakh per km)
iv)	Panchayat Ghar/ Anganwadi/ Mahila Mondal/ Yuva Kendra/ Community Hall	Upto 2.00 lakh/ unit
v)	State Highways/ Major District road	Rs.1.00 lakh/km *
vi)	Rural road/ bridge	Rs.0.60 lakh/ unit*

vii)	Drinking water scheme	Upto 1.50 lakh/ unit
viii)	Irrigation Sector: Minor irrigation schemes/ Canal Major irrigation scheme Flood control and anti Erosion Protection work	 Upto Rs.1.50 lakh/ scheme Not covered Not covered
ix)	Hydro Power Project/ HT Distribution systems/ Transformers and sub stations	Not covered
x)	High Tension Lines (above 11kv)	Not covered
xi)	State Govt. Buildings viz. departmental/ office building, departmental/ residential quarters, religious structures, patwarkhana, Court premises, play ground, forest bungalow property and animal/ bird sanctuary etc.	Not covered
xii)	Long terms/ Permanent Restoration work incentive	Not covered
xiii)	Any new work of long term nature	Not covered
xiv)	Distribution of commodities	Not covered (However, there is a provision for assistance as GR to families in dire need of assistance after a disasters).
xv)	Procurement if equipments/ machineries under NDRF	Not covered
xvi)	National Highways	Not covered (Since GOI borne entire expenditure towards restoration works activities)
xvii)	Fodder seed to augment fodder production	Not covered

* If OR & PR rates are not provided by the State.

Annexure II

Drought Preparedness and Response Checklist

Activity	**Agencies**	**Indices to be monitored:**	**Drought relief measures to be organized:**
Monitoring Water Sources:	Departments of revenue, irrigation, water supply and water conservation	Daily, weekly and monthly rainfall, groundwater sources, water storage levels in reservoirs/ ponds/ lakes	Reservation orders have been issued for drinking water. Water is being equitably distributed for multiple purposes: drinking, commercial, industrial and agricultural. Temporary water supply schemes have been sanctioned. Supply of drinking water is being organized through tankers/bullock carts/trains. A ban on digging deep bore-wells has been Enforced
Crop Management:	State departments of agriculture and revenue, State agricultural universities	Soil moisture, area under sowing and type of crop, status of growth, crop yield, alternative cropping possibilities	Seeds for second sowing have been secured and supplied. A crop contingency plan (less-water consuming, drought-resistant crops) has been developed. Crop insurance premium has been paid by the Government. Micro - irrigation equipments (sprinkler and drip irrigation systems) are available to the farmers for using water optimally

Fodder Management:	State departments of animal husbandry, agriculture and revenue	Availability of fodder, fodder prices, fodder cultivation, availability of water for fodder cultivation.	Supply of fodder increased through getting fodder from surplus States/ districts. Coordination mechanism set up with the forest department and agricultural university. Farms to get surplus fodder. Fodder cultivation encouraged and incentives provided through Government schemes. Ban imposed on taking fodder from the State. Fodder depots set up and the prices fixed at levels, which farmers can buy. Cattle camps set up through the Government, NGOs and cooperative societies. Water supply arranged for cattle camps. Vaccination and other health measures organized for cattle.

Relief Employment	Department/ agencies Implementing the National Rural Employment Guarantee Scheme (NREGS) and other schemes such as Pradhan Mantri Gram Sadak Yojana (PMGSY) and Swaranjayanti Gram Swarozgar Yojana (SGSY):	Demand for relief employment, number of relief works on shelf, number of works in progress, attendance of workers, wages distributed	Demand for relief employment assessed. Job cards available with the people. Relief employment plan prepared in consultation with the agencies. Number of sanctioned works available on shelf. People informed of their rights and entitlements under the MGNREGS. Relief works started in response to the people's demands. All the amenities organized on the sites of relief works. Distribution of wages supervised to ensure it is timely and fair. Attendance on relief works reported on a daily/ weekly/ monthly basis.
Food security	Food and Civil Supplies Corp./ Dept. of State Govt or District Admn., Food Corporation of India (FCI)	Availability of food grains in the open market; Sufficient availability of food grains in FCI godown for distribution through PDS; Timely lifting of food grains by State Govts and its delivery to Fair Price Shops; Hassel-free and timely distribution of food grains to beneficiaries	State Government to launch drive to cover left out eligible households/ members; State Government to launch drive against hoarding of food grains; Timely availability of food grains at fair price shops; Efficient and timely distribution of food grains for ration card holders; Efficient distribution of additional food grains, if any, allocated for drought relief.

Distribution of Relief Assistance:	State revenue and agriculture departments	Funds available through SDRF and NDRF, funds allocated for distribution of input subsidy, distribution of input subsidy and gratuitous relief	Seeds stock available for distribution among the farmers Enough seeds available in the open market for agricultural operations Tie-up with seeds corporations arranged. Information on the cultivable areas affected by drought collected. Information on small and marginal farmers' land holding available. Request submitted to the Government of India for NDRF assistance. Financial assistance made available to the farmers for purchasing inputs. Financial assistance made available for distribution of relief assistance Financial assistance made available through bank transfer.

Annexure III

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 +19% to -19% cumulatively for more than 4 weeks period throughout the season)	Nil	Nil	➢ Constant monitoring of drought-related parameters. ➢ Conservation of rain water by checking surface run offs.
2	Alert/ Watch	**1-2** Forecast of late onset of monsoon coupled with continuing water crisis and heat wave. Delayed onset of monsoon and anticipated deficit rainfall in the areas already affected by drought from the previous year.	Incipient. Sudden acceleration of demand of employment	• CAP (Crop) – Contingency Action Plan. • CAP (Water) • CAP (Health)	➢ Wide publicity for the Contingency Crop Plan through effective agro advisory services ➢ Propagation of short-term water conservation measures, water budgeting, ➢ Proper health advisories and ensuring availability of emergency medical services

		(Apr – Jun) (Rainfall forecast is expected to be less than the normal rainfall and below -19% and the deficit continues for more than 2-3 weeks & Soil moisture level is unsustainable)			➢ While ongoing works under MGNREGS would continue, yet district/ block panchayat levels to remain in complete readiness to cater to a spurt in demand on wage employment under MGNREGS. ➢ Monitoring over exploitation of ground water for non- agricultural and non-drinking purposes (i.e. industrial / commercial/ entertainment purposes) **Advisory Note:** **(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. ➢ The State Executive Committee (SEC) to meet

3	Warning	**3-4** Delayed onset of monsoon. Deficit Rainfall for more than two weeks. Acute water crisis (Jun-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)	➢ District Crop Contingency Plan put into operation. ➢ Operationalising short-term water conservation measures by municipal and district agencies, water- budgeting by Ministry of Water Resources (Irrigation), M/o Urban Development (PHED) and by Drinking Water & Sanitation. **Advisory Note:** **Identify alternative sources when the town is in "Warning" period and the supply of water may be as per norm issued by M/o Drinking water and Sanitation.** ➢ Judicious 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 plan 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. ➢ Appraising the developments to National Crisis Management Committee (NCMC)/ National Executive Committee and State Executive Committee in the States. ➢ MGNREGA related works to be operationalized in full swing. ➢ Provision of Mid Day Meal in Schools during vacation.

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 (NEC) 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 as per norm issued by M/o Drinking water and Sanitation.** ➢ Early release of installments under State Disaster Response Fund (SDRF) and ensuring that the State Governments utilise it for initial emergency measures. ➢ MGNREGA Works to continue in full swing.

					➢ Monitoring and visit 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 the shortage of secondary and tertiary sectors. ➢ Provision of Mid Day Meals in Schools during vacation. ➢ Distribution of Food Rations wherever needed.

5	Acute (Potential Disaster)	**7-10** Early withdrawal of monsoon. Mid-season 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 & SW. **(JUL - OCT)** (Rainfall is less than normal and below -25% and the deficit continue for more than – 6 weeks & Soil moisture, GW & SW level is alarmingly low)	EXTREME (F U L L B L O W N 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 office in the Department about ongoing relief measures. ➢ Weekly CMG meeting and monitoring of the progress of drought relief measures. ➢ Review of visit by Area Officers to the deficit rainfall States. ➢ Strict Water conservation measures and monitoring of the release of canal water for irrigation. ➢ Constitution of Central Teams to visit to drought declared States. ➢ Assessment of damages and estimation of losses for release of funds from National Disaster Response Fund (NDRF) Special

					assistance to farmers / dairy / Poultry / fishery sectors. ➢ Enabling employment under MGNREGS 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 the shortage of secondary and tertiary sectors and measures for economic revival. ➢ Legislative measures like issue of control orders for maintaining sustained supply of essential commodities. ➢ Video Conferencing with drought affected States. ➢ MGNREGS works to continue in full swing. ➢ Distribution of food Rations ➢ Mid day Meal distribution in schools.

6	Recovery (Post Disaster)	**10-0** **(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.	**Mitigated**	• 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 compensation for losses in time to the beneficiaries i.e. agri-insurance, **NDRF**/ State Disaster Relief Fund SDRF (formerly CRF) benefits etc. ➢ Adequate availability of seeds for sowing in the 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.

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE AND FARMERS WELFARE
DEPARTMENT OF AGRICULTURE,
COOPERATION & FARMERS WELFARE

DPG_2359354142