



HANDBOOK FOR DISTRICT ADMINISTRATION ON DISASTER RISK MANAGEMENT IN **AGRICULTURE SECTOR**



Resilient India - Disaster Free India

National Institute of Disaster Management (NIDM)
(Ministry of Home Affairs, Government of India)



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May, 2021

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ISBN No. : 978-93-82571-50-6

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Edition: 2021

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Published by :

National Institute of Disaster Management (NIDM),
Ministry of Home Affairs, New Delhi-110042.

Citation :

Gupta, A. K., Srivastava, R., Hodam, S. and Singh, S. (2021). Handbook for District Administration on Disaster Risk Management in Agriculture Sector. National Institute of Disaster Management, New Delhi. Pages 48 Nos.

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Cover Picture Source :

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नित्यानंद राय
NITYANAND RAI

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संदेश

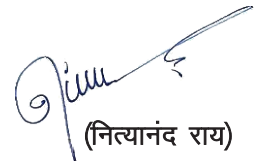
भारत एक कृषि प्रधान देश है जिसकी अधिकांश आबादी प्रत्यक्ष या अप्रत्यक्ष रूप से कृषि से संबंधित कामकाज पर निर्भर करती है। भारत की ज़्यादातर आबादी के लिए कृषि आज भी आजीविका का मुख्य स्रोत है। इसमें मुख्यतः ज़मींदार, बटाईदार एवं खेतिहर मजदूरों की भागीदारी है, इसके आलावा हसी क्रम में कृषि उत्पादों का व्यवसाय करने वाले लोग भी शामिल हैं।

कृषि मंत्रालय 2022 तक कृषि आय को दोगुनी करने के अपने महत्वाकांक्षी लक्ष्य को प्राप्त करने की ओर अग्रसर है। भारत कृषि में सिंचाई सुविधाओं, भंडारण और कोल्ड स्टोरेज जैसे बुनियादी जरूरतों में निवेश की तरफ वृद्धि कर रहा है जिसमें आने वाले समय ज़्यादा बेहतर परिणामों की उम्मीद है।

कृषि क्षेत्र प्राकृतिक और मानवजनित रूप की विभिन्न आपदाओं से निरंतर खतरे में है, साथ ही जलवायु परिवर्तन के प्रभाव से भी यह क्षेत्र संकट में है। चूंकि कृषि-क्षेत्र मत्स्य पालन, पशुपालन जैसे अन्य विभिन्न विभागों के साथ आता है, इसलिए इस क्षेत्र को प्राकृतिक आपदाओं से बचाना हमारी मुख्य प्राथमिकता है।

राष्ट्रीय आपदा प्रबंधन संस्थान द्वारा बनाई गई पुस्तिका "कृषि क्षेत्र में आपदा जोखिम प्रबंधन" जिला प्रशासन के लिए बहुत महत्वपूर्ण है। इन मुद्दों पर आपदा प्रबंधन संस्थान, राष्ट्रीय एवं प्रादेशिक स्तर पर पहले से ही काम कर रहा है। यह पुस्तिका जिला स्तरों पर जोखिम प्रबंधन को लागू करने के लिए एक व्यावहारिक मार्गदर्शन के रूप में देखी जा सकती है। यह पुस्तिका जिला अधिकारियों को आपदा के प्रबंधन को बेहतर करने में सुविधा प्रदान करेगी और साथ ही कृषि क्षेत्र में काम कर रहे विस्तार क्षेत्र के अधिकारियों और अन्य लाभ पाने वालों को मार्गदर्शन देगी।

मैं इस प्रकाशन को लाने के लिए एनआईडीएम की पूरी टीम की सराहना करना चाहता हूँ और उनके प्रयास से सफलता की कामना करता हूँ।



(नित्यानंद राय)

24.06.2021

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FOREWORD

Indian Agriculture is often threatened by natural disasters like flood, drought, cyclone, etc. It is the need of the hour to make this sector resilient and sustainable to ensure food security and protect the Indian economy thereby saving the lives and livelihood of Indian farmers.

This handbook has been developed with the objectives of defining the Agriculture Disaster Risks, Vulnerabilities and Challenges, Prevention and Mitigation Measures, Preparedness and Response plan. Aim of this handbook is to help in implementing risk reduction initiatives and disaster risk management at District level. It will also help in strengthening the resilience of farming community to deal with disasters at district administration level. The handbook provides guidance to the attached, affiliated and subordinate offices at district level to manage the risks of disasters before, during and after a disaster.

I am happy that under the guidance of Prof. Anil K Gupta, Ms. Richa Srivastava and Dr. Sanayanbi Hodam have come up with this handbook. I believe this Handbook will help all the district officials working in the agriculture sector in understanding the challenges being faced by Indian agriculture in relation to natural disasters and its management and mitigation measures.



(Manoj Kumar Bindal)



PREFACE

Every year our Indian agriculture is being challenged by natural disasters like floods, droughts, hailstorms, pest attacks, etc. Frequency and severity of natural disasters are continuously increasing, and agriculture is easily affected at large extent by these disasters since it depends directly on the climate, weather, water and land. Some of the impacts are loss of crops, contamination of water bodies, increased risk of getting disease, destruction of agricultural infrastructures, etc.

Though, there are visible improvement brought through adoption of management practices through on-farm and off-farm operations in this sector, there are also growing risk of disaster related damages and losses to the agriculture systems. Agriculture is a major component of the Indian economy. More than 75 % of our people have their live hood as agriculture and agriculture oriented works. Unlike anytime in the past, India's agriculture challenge has to be understood concurrently in many dimensions. Looking to the need of nation, its people and businesses, making agriculture system in the country to be resilient to the risk of disasters, is crucial, also for ensuring livelihoods, food security, health, environmental quality and economic resilience.

In view of this, it is, therefore, important that agriculture disaster has to be understood and dealt with it concurrently by the district authorities and hence, this handbook has been prepared. This handbook not only provides practical guide but also describes roles and responsibilities of the District level officials towards the implementation of disaster risk management in agriculture sector at all levels in a district area.

This handbook has also been thoroughly reviewed by Dr. G. Rabindra Chary, Director, ICAR-Central Research Institute for Dryland Agriculture, Dr. J. Radhakrishnan, I.A.S, Principal Secretary, Commissioner, Revenue Administration and State Relief Commissioner, Chennai, Dr. G.S. Srinivasa Reddy, Director, Karnataka State Natural Disaster Monitoring Centre, Karnataka and Dr. Anand Kumar, Consultant, IPE Global who are presently dealing with agriculture and its related challenges and disasters.

I hope this handbook is helpful to the district authorities to understand the agriculture disasters, its prevention and mitigation measures and preparation and response plan.


(Prof. Anil K Gupta)

ACKNOWLEDGEMENT

I, on behalf of the team acknowledge Maj. Gen. Manoj Kumar Bindal, ED, NIDM for his encouragement and timely guidance throughout. The preparation of Handbook for District Administration on Disaster Risk Management in Agriculture Sector has been expedited with the help of Ms. Richa Srivastava, Dr. Sanayanbi Hodam and Ms. Swati Raghuvanshi. My sincere thanks to the entire team.

This preparation of the handbook involved peer review by **Dr. G. Rabindra Chary**, Director, ICAR-Central Research Institute for Dryland Agriculture, **Dr. J. Radhakrishnan**, I.A.S, Principal Secretary, Commissioner, Revenue Administration and State Relief Commissioner, Chennai, **Dr. G. S. Srinivasa Reddy**, Director, Karnataka State Natural Disaster Monitoring Centre, Karnataka and **Dr. Anand Kumar**, Consultant, IPE Global who are presently dealing with agriculture and its related challenges and disasters. On behalf of the team, I acknowledge the contributions of the reviewers for their valuable inputs and suggestions. I acknowledge with thanks the entire publication cell in NIDM engaged in printing and publication of this report especially Mr. Santosh Kumar Tiwari, Ms. Karanpreet and Ms. Sonali.



(Prof. Anil K Gupta)

CONTENTS

• Key Terminologies	1
• About the Handbook	3
• Understanding Hazard, Risk Vulnerabilities	4
• Who May Use this Handbook?	4
• Role of Krishi Vigyan Kendra (KVK)	5
• Why Climate Resilient Agriculture?	6
• Why District Collectors / District Level Officials?	7
• Resilient Agri-Infrastructure and Agro-Industries	8
• Seasonality Analysis of the Identified Hazard	10
• Capacity Analysis	13
• Capacity Development Activities	13
• Hazard Specific Prevention and Mitigation Measures	17
• Responsibilities for the District Officials for all the Disasters in general	18
• Existing Disaster Management Plans	25
• Importance of Social Inclusion	27
• Scenario Based Mock Drills	29
• Organization and Inventory	30

KEY TERMINOLOGIES

Disaster: A disaster is an event of nature or man-made that leads to sudden disruption of normal life of a society, causing damage to life and property to such an extent that normal social and economic values available are inadequate to restore normalcy after a disaster.

Disaster risk: The potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period.

Disaster risk management: The systematic process of using administrative directives, organizations and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster

Hazard: A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Mitigation: The lessening or limitation of the adverse impacts of hazards and related disasters. Natural hazard: Natural process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Preparedness: The knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions.

Prevention: The outright avoidance of adverse impacts of hazards and related disasters. Public awareness: The extent of common knowledge about disaster risks, the factors that lead to disasters and the actions that can be taken individually and collectively to reduce exposure and vulnerability to hazards.

Source: NDMP, 2019

Recovery: The restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors.

Response: The provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.

Capacity development: The process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals, including through improvement of knowledge, skills, systems, and institutions.

Agriculture: Agriculture describes the practice of growing crops and other allied activities like horticulture livestock, fisheries, poultry, post harvest, value addition etc. or raising animals. Someone who works as a farmer is in the agriculture industry.

Contingency planning: A management process that analyses specific potential events or emerging situations that might threaten society or the environment and establishes arrangements in advance to enable timely, effective and appropriate responses to such events and situations.

Source: NDMP, 2019

ABOUT THE HANDBOOK

This Handbook has been developed for authorities at the district level and other local governments as a practical guide for the “District Administration on Disaster Risk Management in Agriculture Sector”. The handbook will help in implementing risk reduction initiatives and disaster risk management at sub national level. This will further help in achieving the goals of United Nations' Sustainable Development Goals, Sendai Framework for Disaster Risk Reduction and targets of Paris Climate Agreement to which India is also a party and committed to Sustainable Development and Inclusive Growth.

The handbook also describes roles and responsibilities of the District level officials towards the implementation of disaster risk management in agriculture sector at all levels in a district.

WHAT IS IN THIS HANDBOOK?

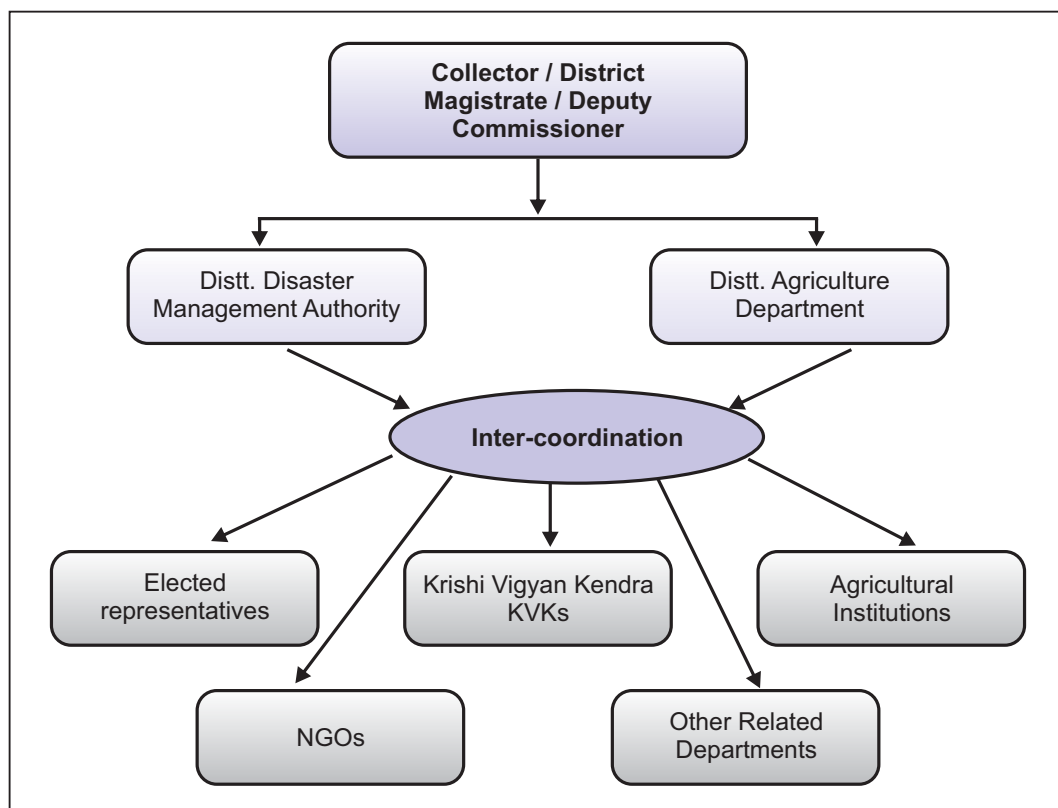
- Challenges in Indian agriculture sector
- Seasonality analysis of the identified hazard
- Agriculture Disaster Risks, Vulnerabilities and Challenges
- Prevention and Mitigation Measures
- Capacity Development and Communication
- Preparedness and Response
- Strategic actions for sustainable management of Agriculture System

UNDERSTANDING HAZARD, RISKS and VULNERABILITIES

The agriculture sectoral risks of disasters consist of the risks for the entire sector that the state, district, taluka and village represent. The departmental risks of disasters consist of the risks arising out of the exposure of vulnerable departmental assets to the natural or manmade hazards. There are multiple types of vulnerabilities associated with the agriculture sector owing to varied root causes like climate change, high population growth, rapid-urbanization, increasing industrialization, rapid development within high risk seismic zone, environmental degradation, climate change/variability, etc. These vulnerabilities have been categorized in four major types viz., environmental vulnerability, social vulnerability, economic & systematic vulnerability and physical. Therefore, Hazard Risk Vulnerability and Capacity Assessment (HRVCA) have to be carried out at (limitation of data) hot spots in the district / district level with participatory and analytical approaches.

WHO MAY USE THIS HANDBOOK?

- Agriculture Official, District collector, Magistrate, Sub-national level officials, Development/Line departments and Public services who address risk factors within development planning/activities.
- Panchayati Raj Institutions and officials of Urban Local Bodies who implement the programs.
- Academia, Universities, Research institutes and NGOs who can help in documentation, assess historical and potential hazards and related risk scenarios.
- Citizen groups and civil society as a whole.



Role of Krishi Vigyan Kendra (KVK)

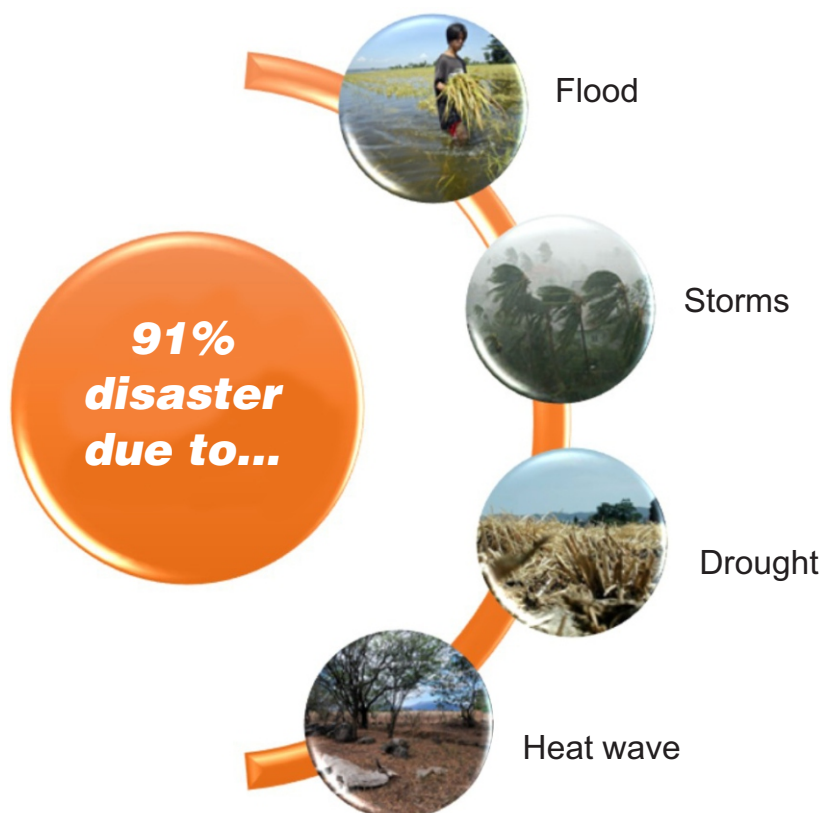
The mandate of KVK is Technology Assessment and Demonstration for its Application and Capacity Development. To implement the mandate effectively, the following activities are envisaged for each KVK:-

- On-farm testing to assess the location specificity of agricultural technologies under various farming systems.
- Frontline demonstrations to establish production potential of technologies on the farmers' fields.
- Capacity development of farmers and extension personnel to update their knowledge and skills on modern agricultural technologies.

- To work as Knowledge and Resource Centre of agricultural technologies for supporting initiatives of public, private and voluntary sectors in improving the agricultural economy of the district.
- Provide farm advisories using Information and Communication Technology and other media means on varied subjects of interest to farmers.

WHY CLIMATE RESILIENT AGRICULTURE?

- Agriculture is one of the most important elements of Indian Economy as more than 50% of the workforce earns their livelihood by means of agriculture. But the sector is challenged by number of threats which are exacerbated by a variety of factors, ranging from frequent natural disasters, climate variability and change, uncertainties in yields and prices, weak rural infrastructure, imperfect markets and lack of appropriate financial services including inadequacy of risk mitigation instruments such as credit and insurance.



- The Indian Government has set a target of doubling farmers' income by the year 2022, 5 trillion dollar economy and ease of living by 2024. However, these targets can be achieved by improving the scenario of Indian agriculture and protecting them from climate variability and natural disasters through proper adaptation and mitigation strategies.
- To better prepare for impacts and to avoid potential new risks, reduce the existing risks of disasters, and manage the actual and potential events of disasters, National Agriculture Disaster Management Plan (NADMP) which has been prepared for the Ministry of Agriculture and Farmers' Welfare by the NIDM may be referred.

WHY DISTRICT COLLECTORS / DISTRICT LEVEL OFFICIALS?

- As per the Disaster Management Act 2005, he/she is the institutional head of disaster management and development at district level
- The District Collector being the head of the district can guide the allocation of resources towards the protection of agriculture and allied sectors such as crops, horticulture, livestock, fisheries, poultry, dairy, life and assets, preparing and implementing district/ block level contingency crop plan, restoration of productive systems and livelihoods, regaining market access, rebuilding social and human capital and physical and psychological health
- There is a tremendous potential to reduce vulnerabilities and risks through mainstreaming DRR in national and state schemes through structured frameworks and operational measures which a Collector can very effectively help in proper implementation.
- Capacity Building and Training is an important component towards Resilient agriculture.



RESILIENT AGRI-INFRASTRUCTURE AND AGRO-INDUSTRIES

Agricultural infrastructure primarily includes wide range of public services that facilitate production, procurement, processing, preservation and trade. Agricultural infrastructure can be grouped under following broad based categories.



- **Input based infrastructure:** Seed, Fertilizer, Pesticides, Farm equipment and machinery etc.
- **Resource based infrastructure:** Water/irrigation, Farm power/energy.
- **Physical infrastructure:** Road connectivity, Transport, storage, processing, preservation, etc.
- **Institutional infrastructure:** Agricultural research, extension & education, information & communication services, financial services, marketing, etc.

Agro Industries includes farm implements, seed industries, pump sets, fertilizer and pesticides. Agro industry can help stabilize and make agriculture more beneficial and create employment opportunities both at the production and marketing stages.



- Helps in processing agricultural products such as field crops, tree crops, livestock and fisheries and converting them to edible and other usable forms.
- Strengthening industrial and agricultural linkages.
- Increase the value of crops of poor farmers and thus yield higher returns.
- Expand marketing opportunities.
- Improve livelihoods of people.



- Extend shelf-life of commodities.
- Improve palatability of commodities.
- Enhance food security.
- Overcome seasonality and perishability constraints.

Disasters can affect agricultural trade flows, and cause losses in agricultural-dependent manufacturing sub sectors such as the textile and food processing industries. A strategy of development of agro- industries should consist of the following ingredients:

- The growth and expansion of agro-based industries should form an inseparable part of the overall programme of economic and industrial development of the country.
- The related groups of agro-based industries should be set up in a coordinated manner so that the utilisation of by-products is simultaneously possible.

SEASONALITY ANALYSIS OF THE IDENTIFIED HAZARD

Natural hazards like flood, drought, cyclone, etc. have a seasonal occurrence while hazards like earthquake along with various man-made hazards occur at any point of time of a year. In the table below, the solid straight line shows the maximum probability of occurrence and dotted lines indicates less probability of occurrence of respective hazard.

Seasonality analysis of the identified hazard

S. No.	Hazards	Month of the Year											
		J	F	M	A	M	J	J	A	S	O	N	D
1	Drought	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	Flooding						.....	.....	.....	.....			
3	Heat Waves					.....	.....	.....					
4	Cold Waves	.....											.....
5	Hail Storms					.....	.....	.....	.....	.....			
6	Landslides						.....	.....	.....	.....			
7	Cyclone									.....	.....	.....	
8	Fire	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
9	Sea/Coastal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
10	Sea Water Intrusion					.....	.....	.....			.....	.....	.....
11	Pest attack/disease outbreaks	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
12	Tsunamis	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
13	Earthquake	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Sample table

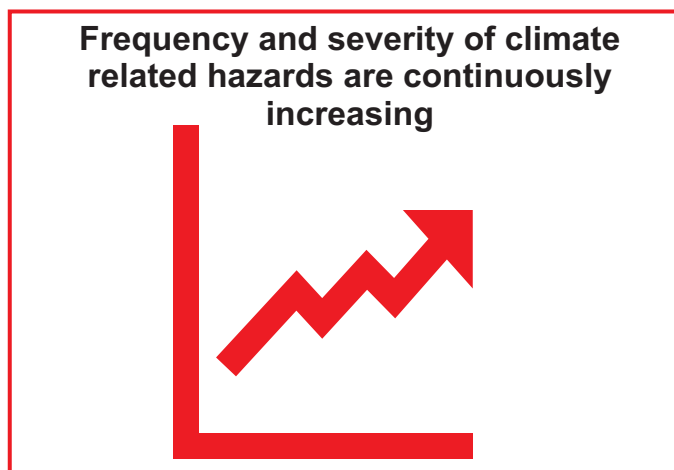
The table below may be filled by District Representative to identify the seasonality hazards prevailing in their respective district for better planning.

S. No.	Hazards	Month of the Year											
		J	F	M	A	M	J	J	A	S	O	N	D
1	Drought												
2	Flooding												
3	Heat Waves												
4	Cold Waves												
5	Hail Storms												
6	Landslides												
7	Cyclone												
8	Fire												
9	Sea/Coastal Erosion												
10	Sea Water Intrusion												
11	Pest attack/disease outbreaks												
12	Tsunamis												
13	Earthquake												

CAPACITY ANALYSIS:

WHY?

Assessing technical & functional capacity gaps and training needs of Government officials on climate change in the context of disaster management and climate change impacts is very important – so as to ensure that they have the required knowledge and skill sets –to plan and implement the departmental activities for building resilience of agriculture sector at the sub-national level.



- The analysis will help in identifying the existing and desired capacity, particularly focusing on technical and functional capacities required to perform the functions based on the expected roles and responsibilities of the departments for planning, coordination implementation and monitoring of climate actions.
- Knowledge base of participants has to be assessed on various aspects related to disaster risk reduction and climate change and its impacts and current policies and programmes of the departments.

CAPACITY DEVELOPMENT ACTIVITIES

The table below describes the task and associated activities for capacity development for Disaster Resilient Agriculture by the District Departments namely SDMA, DDMA, Agriculture Dept., Relief Dept., Revenue Dept. and all Nodal and Line Departments.

Task	Activities
Deploying good resources, advanced technology and equipment	● Identifying existing practices/mechanism ● Identification of gap between existing practices/ mechanism and those required based on hazard risk and vulnerability and lessons learnt from recent past disasters ● Procurements of additional equipment with advanced technologies
Resource Network	● Maintaining the resource network ● Monitoring and maintaining the resource data ● Regular updating the resource data
Communication	● Developing fail-safe communications with advance technology
National Disaster Information System	● Interface with the National Emergency Communication Network (NECN) and HRVCA ● Facilitate access to Central Ministries/ Dept./ States and other authorized users ● Examine integration of national HRVA data base with the IDRN for effective resource management ● Establishing knowledge portal for easy dissemination of data/information
Early Warning	● Improve the last mile Connectivity ● Up-grade technical infrastructure and systems

Strengthening training institutes for disaster management	● To be linked to forecasting and coordinated functioning of different departments ● Research and extension of support grants ● Create/ strengthen state level DM institutes
Strengthening of Emergency Operation Centre	● Review functioning ● Improve capabilities based on experience after each disaster event ● Deploy best of Information and Communication (ICT) ● Conduct capacity audits of Emergency Operation Centres (EOCs) ● Set up State and District level EOCs with adequate trained manpower ● Regular reviews and improvement of SOPs, protocols, etc. ● Mobile control rooms
Strengthening of Fire and Emergency Services	● Revamping with institutional reforms, modernization, and changes in legal framework
Main streaming of DM into local governance	● Conduct trainings and workshops on incorporating DM plans into local Governance
Strengthening Community Skills	● Training on Common But Differentiated Responsibilities (CBDR) and preparedness at local levels ● Address gender issues, and special needs of children, differently abled, aged, etc. holistically in the DM context ● Promote private sector and civil society involvement ● Promote Public-Private Partnerships (PPPs)

Use of media for Disaster Management	● Training and Workshops
Human Resource Development	● Organize relevant training programs & refresher courses
To enhance DM and DRR capacities at local levels	● Conduct trainings in disaster management at district level
Developing the technical capacities and professional disciplines	● Technical and professional programs relevant to various specialized aspects of DM ● Develop Training of Trainers (ToTs) ● Research in key areas of DM
Promoting disaster management education and research	● Incorporate subjects of relevance to DM in the curriculum ● Introduce specialized programs, degrees, courses and diplomas ● Incorporate DRR and climate change in the new district disaster management plans ● Promote relevant research projects, programs within institutes through research grants
Sensitization and education for political leaders	● Educate political leadership and elected representatives on risk sensitive planning, disaster prevention, and mitigation

Source: Extracted from NDMP, 2019

HAZARD SPECIFIC PREVENTION AND MITIGATION MEASURES

- The disaster prevention and mitigation measures integrate the global targets into the national efforts and seek to strengthen Indian agriculture reliance to both natural and human-induced disasters. As per DM Act, 2005, “Mitigation” has been defined as “measures to reduce the risk, impact, or efforts of a disaster or threatening disaster situation”. The goal is to minimize the risks from multiple hazards and threats from individual hazards need not always occur in isolation.
- The guiding principles of Sendai Framework states that mitigation of disaster risk requires responsibilities to be shared by different divisions of governments and various agencies.

Responsibilities for the District Officials for all the Disasters in general:

- Coordinating the dissemination of warnings to all, down to the last mile – remote, rural or urban; Regular updates to people in areas at risk.
- Promotion of crop insurance.
- Ecologically sound land-use zonation.
- Coordinate with IMD regarding forecasts, early warning and alert system based on drought severity.
- Establishing First Aid/ Medical Aid facilities in key locations.
- Carry out mass media campaigns.
- All the districts should be delineated on the basis of frequency of occurrence of natural calamities.
- Mapping of vulnerability areas prone to natural calamities in all the districts to be done.
- Standard Operating Procedures (SOPs) have to be prepared and finalized for the vulnerable areas.
- Climate resilient systems have to be developed in consultation with SAUs to overcome the impact of climate change.
- Season wise crop contingency plans including suitable cropping pattern for normal/ delayed/ early withdrawal of monsoon, copious rainfall, etc. has to be developed.
- Weather based crop advisory through early warning system for individual farmers through SMS should be given.
- Preparation of village level intervention for climate resilient agriculture.
- Formation of village climate risk management committee.
- Coordinate the efforts of the state agencies in implementing mitigation measures.

Source: Extracted from NDMP 2019

Responsibilities for the District Officials for all the Disasters in general:

- Promote use of insurance/ risk transfer.
- Identification suitable sites for temporary shelters for people and livestock evacuated from localities at risk.
- Programmes, Training and orientation programs for district govt. staff professionals for veterinary care and support to disaster-affected animals.
- Dissemination of warnings to all (including fishermen), down to the last mile – remote, rural or urban; Regular updates to people in areas at risk.
- Organizing and coordinating the immediate response.
- Constitute/ strengthen the mechanisms for consultation with experts and stakeholders.
- Systematic data management of data on disaster damage and loss assessments.
- Undertake HRVCA as part of preparation/ revision of DMP.
- Ensure the insurance programmes reach the target audiences (especially dryland/ rainfed farmers) and dependent agricultural labor.
- Monitor the implementation of safety enhancements in accordance with norms.
- Development of agro ecological zone wise disaster mitigation technologies for all the major crops.
- Institutional intervention either by strengthening of existing one or creating new one related to seed bank, fodder bank, commodity group, custom hiring centres, collective marketing, etc.

Source: Extracted from NDMP 2019

The Preparedness measures for the disasters affecting agriculture sector have been extracted from NDMP 2019 and are listed as follows:

For Drought

- Prepare geo-spatial database comprising of maps, identifying the areas vulnerable to droughts and overlay block and village boundaries to prioritize the hot spots.
- Prepare comprehensive drought vulnerability index at block/ tehsil level.
- Coordinating the dissemination of agro-advisories to all, down to the last mile – remote, rural ; regular updates to people in areas at risk.
- Collaboration with technical agencies.
- Training and orientation programs for state govt. staff and other direct stakeholders such as: civil society, media-persons, elected representatives, professionals for veterinary care and support to disaster-affected animals.
- Undertake village-wise assessment of water storage in the vulnerable blocks.
- Assess the fodder availability and demand at Panchayat or village level.
- Proactively identify the lack and necessary resources for setting up of cattle camps in drought prone areas.
- Coordinate with state and central agencies in the compilation, for refining forecast accuracy for the region, and analysis of all the drought, water deficit, and crop related data.
- Ensure functioning of DMC with requisite facilities and staff to continuously monitor water availability in the drought-prone blocks.
- Prepare and implement of DM plans and ensure the functioning of agencies with DM task.
- Ensure rainwater harvesting and storage in the social housing schemes especially in drought-prone areas.

- Promote protective irrigation through micro irrigation systems.
- Provide advice to farmers to cope with drought, crop management under drought conditions, and efficient water management.
- Training in rainwater management, in situ soil moisture conservation, crop and soil management, farm mechanization and contingency planning.
- Promote culture of disaster risk prevention, mitigation, and better risk management covering crop and water management (including conservation of surface and groundwater).
- Ensure development of district, block, taluka and village drought management plans.
- Promote drought tolerant crops/varieties, rainwater management technologies, resilient cropping/farming/agroforestry systems.
- Prepare plans to provide employment opportunity or alternate livelihood to farming community, especially small marginal farmers and landless laborers.
- Promote watershed management.

For Pest Attack

- Regular scouting /monitoring at block levels for pest incidence in major crops.
- Identification of invasive pests/epidemics/ flare-up of new minor pests.
- Pest surveillance at regular intervals.
- Compilation and preparation of pest reports to have preparedness for next season.
- Development of pest forewarning systems and integration with weather forecasts /agromet advisories.
- Dissemination of pest alerts and pest control measures.

- Ensure the availability of bio control inputs/agents.
- Avoidance of expired /banned pesticides.
- Convergence with various pesticide industries.
- Promotion of PPP.
- Promotion of Low external input(LEI) /non pesticide measures for cost effective pest control/sustainable agriculture(SA).
- Formulate and implement training programmes for pest control to different stake holders including research /extension personnel and farmers.
- Use of new dissemination techniques/modes including ICT and other digital tools.
- Promotion of crop insurance.
- Identification of climate change/variability driven pest incidence and initiate measures for reducing their impacts/levels.
- Promotion of crop diversification and conservation of bio diversity.

For Flood

- Implementing and monitoring of flood preparedness, river basin and reservoir management plans including updating rule curves, improve system of water release from reservoirs.
- Identification of priority flood protection and drainage improvement measures.
- Execution of flood protection and drainage improvement schemes.
- Construction of multi-purpose shelters in villages/ habitations prone to floods.
- Training in best bet practices to cope with floods in field crops, horticulture crops, fisheries, livestock, etc.
- Implement/ promote measures to increase safety, reduce risks from flooding.

- Implementing land-use regulation for low lying areas as per flood control norms.
- Discourage reclamation of wetlands, natural depressions.
- Implementation of watershed management including catchment area treatment and afforestation.

For Cyclone and Tsunami

- Constitute Disaster Level Coastal Advisory Committees as per need.
- Construction of multi-purpose shelters in coastal villages/habitations prone to frequent cyclones.
- Ensure compliance with relevant building codes.
- Ensure that multi-hazard, especially cyclone-resistant features are incorporated in planning and execution of social housing scheme.
- Constitute task teams jointly with central agencies for implementing land-use regulation as per zoning guidelines.
- Creating ToT teams for different trades relevant to cyclone-resistant construction.
- Discourage inappropriate/ risky use of coastal areas.
- Detailed assessment of tsunami hazard to the structure and foundation and the benefits of strengthening.

For Heatwaves

- Ensure incorporation of protection from heat wave in multi-hazard resistant features in the planning and execution of social housing schemes in heat wave prone areas.
- Training in best practices to mitigate heat wave in field crops, horticulture crops, livestock, poultry etc.

- Promote use of building materials that provide protection from heat and cold.
- Facilitate integrated development plans that can cope better with heatwave conditions.
- Create awareness of coping with heat wave and HAP.
- Creating ToT teams for different trades relevant to heat-wave protection in the construction of different types of housing and infrastructure.
- Incorporating gender sensitive and equitable approaches in capacity development for coping with heat wave emergencies.
- Engage private agencies and NGOs for providing safe drinking water at public places and public transports during the heatwave.
- Provide access to public to use the parks to take shelter during day time, especially in cities and towns.

For Earthquake and Landslides

- Adopt suitable bye laws for rural and urban areas, put model codes (e.g., NBC 2016) into practice and ensure proper compliance.
- Detailed land-use zonation incorporating landslide risks as applicable.
- Adopt the techno-legal framework for ensuring compliance with land use zoning and landslide safety issues.
- Joint planning and execution of emergency drills.
- Constitute multi-institutional and multi- disciplinary teams for carrying out post landslide field investigations, document the lessons learnt and disseminate.
- Identify settlements/agriculture related infrastructure/facilities located on sites prone to landslides/ unstable slope.

Fire

- Strict implementation and strengthening of fire safety rules in agriculture services/ manufacturing/ inputs/marketing/storage etc. related infrastructure and facilities.
- Ensure frequent inspection for fire safety system and equipment in public utilities.
- Enactment of Fire Act and other legal measures as per recommendations of SFAC and other official bodies.

Cloudburst and Hailstorms

- Compile and maintain data on events like cloud bursts and hailstorms – location, event information, impacts, etc.
- Develop additional drainage for quick and safe flow of storm water.
- Training on various aspects of coping with cloudburst, hailstorms, search and rescue.

EXISTING DISASTER MANAGEMENT PLANS

These existing plans can be referred to the District Administration Officers for their references to have sound planning.

Document	Description and Relevance
Drought Manual 2016, MoAFW	This manual of Ministry of Agriculture and Farmers' Welfare, GoI, has been developed for central and state government for better understanding of drought management. The manual describes about understanding drought, drought monitoring and early warning, drought declaration, response and relief and drought mitigation.

Drought Management Plan, 2017, MoAFW	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 ensures better preparation and timely communication among stakeholders, which is critical in managing a drought.
Crisis Management Plan (CMP) for Drought, 2019	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.
District Agriculture Contingency Plan(DACP)	DACP at the district level provide the requisite technical information both for preparedness and real-time response measures, further, for projecting the demand like seeds, fertilizers, pesticides, feed, fodder and vaccines. Besides that, awareness, sensitivity and capacity building of all stakeholders are integral to implementation of the contingency plans. The process will lead to a self reliant planning and implementation mechanism at district level.

District Disaster Management Plan (DDMP)

The basic aim for formulating a DDMP Plan is to ensure that the District Administration is prepared to handle any unprecedented situation that may arise in the district. The plan is essential to institutionalize Disaster Management in the District and to deal with future disasters in an efficient and effective manner. The information available in DDMP is valuable in terms of its use during disaster. Based on the history of various disasters that occur in the district, the plan has been so designed as an action plan rather than a resource book and is more like government exercises.

IMPORTANCE OF SOCIAL INCLUSION

The gender gap in agriculture not only hinders the productivity of women, it also places them at greater risk to hazards with the result that disasters can exacerbate or entrench existing inequalities between men and women. Moreover, barriers to women's access to information can also impair their resilience. The work burden for women and girls increases during and after disasters, as they are typically responsible for kitchen work, household chores, securing fuel wood, water and fodder, and caring for the sick and injured. Rural women and girls in developing countries are often the most affected by hazards and disasters, due to gender inequalities.

Smallholder farmers are already facing numerous risks to agricultural production and climate change and disasters are expected to disproportionately affect smallholder farmers and make their livelihoods even more precarious. Small and marginal farm holder families constitute more than half of the national population. Their contribution to the national food supply and to agricultural GDP can not be ignored.



Considering the above challenges, the central government has come up with different policies which address the above issues. The National Policy on Farmers 2007 has included “mainstreaming the human and gender dimensions in all farm policies and programmes as one of the major policy goals.” Accordingly, Gender Mainstreaming initiatives are being promoted in the Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW), Ministry of Agriculture & Farmers Welfare, by way of building their capacities and improving their access to inputs, technologies and other farming resources. Focus is also being given on formation of women Self Help Groups (SHGs), capacity building interventions, linking them to micro credit, enhancing their access to information and ensuring their representation in decision making bodies at various levels.

SCENARIO BASED MOCK DRILLS

Mock drills and trainings on disasters like earthquake, fire, etc., must be organized to test their readiness to deploy within the shortest possible time following the activation of a disaster response especially for agriculture establishments and infrastructures. Mock drills have to be conducted in a manner like that of the drills carried out by fire-fighting department or army units and must be held at the pre-designated locations or base camps under the guidance of the designated incident commanders and associated departmental heads. The purpose of drills is to promote preparedness by testing the plan with equal participation of all relevant stakeholders. This process must capture information from exercises, post-disaster critiques, self-assessments, audits, administrative reviews, or lessons-learned processes that may indicate that deficiencies exist.

The mock drills should be repeated every 6 months.



In case of any lockdown due to pandemic, riots, etc., it is advised to follow the guideline and instructions of Government.

ORGANIZATION AND INVENTORY

The District should have list of Organizations and Inventories for better preparedness and management. Some of the list are given below :

- List of district level Mandis (Agriculture Product Market).
- List of ware houses.
- List of agro industries.
- Drought and flood maps of the district.
- List of KVKs.
- List of Farmer Producer Organizations (FPOs).
- List of Government Programs / Schemes available for Agriculture and Allied sector.
- List of custom hiring centres for farm mechanization.
- List of farm input suppliers (pesticides/fertilizers/seeds etc.).
- List of Women SHGs working on value addition to Agri products / farm waste / maintaining seed banks etc.
- List of State and District level Agencies / Organizations providing necessary information and services to Agriculture and Allied sectors.
- Safe disaster shelter for humans and livestock.
- Post-harvest crop care facilities.
- Fodder banks.
- Seed banks.
- Animal/cattle camps .
- Availability of services of insurance, transfer/ compensation payments etc.

- Facilities available for protecting produce harvested immediately after a heavy intensity rain.
- List of warehouses/cold storages.
- List of regulated markets etc.
- List of agro-processing units.
- List of agri-startups, FPOs etc.
- List of private agencies supplying/producing inputs such as seed, fodder, fertilizers, pesticides, farm implements, etc.

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