

State Level Disaster Management Plan for Agriculture

Introduction:

Agriculture has been the primary sector of the economy in the state. More than 70 percent of the population in the state directly or indirectly is involved in agricultural activities for their livelihood. Several new advanced techniques have been developed to enhance the crop productivity further in the State. However, it is mainly dependent on monsoon and hence faces severe challenge in the form of natural calamities like floods, drought etc.

With the introduction of a paradigm shift in the approach to disaster management, a full cycle of activities from pre-disaster to post disaster is down up. The pre-disaster activities like mitigation, prevention, and preparedness are called "Risk Management" and the post disaster activities like response, relief, recovery, Rehabilitation are called "Disaster Management". Therefore, the Disaster Management brought out here covers only the post disaster activities. The Risk Management is being taken up in the State Disaster Management.

2. Evolving a DMP

Disaster Management Plan (DMP) refers to the actionable programme, which is pressed into action in the event of a crisis situation, helps in reducing the time taken to mobilize resources for an effective response. The goal of Disaster Management is to facilitate overall management of the crisis situation to minimize adverse impact on the production and productivity of crops at large, maintaining individual and sovereign credibility and controlling and strengthening the Government's credibility with the farming community.

The Disaster Management plan will promote and approach that moves natural calamities management practices from reactive to more proactive management. It aims to provide State wide coordination for efforts towards integration of agricultural science, policies and implementation by strengthening natural calamity monitoring, risk assessment/prediction; early warning services and sharing best practices at the Village, District and the State level.

The DMP for Agriculture advocates and facilitates integration of resources of various agencies such as agriculture, water resources, revenue, disaster management etc. at the same time, it aims to strive for parallel and interactive vertical integration of Agricultural science, policy and society through calamity monitoring, risk assessment prediction and management through mitigation, community preparedness and effective response in a time bound manner for restoration of normalcy in the field of agriculture.

The crisis recovery model based upon past experiences, on identified priorities and trigger-points with appropriate response matrix viz. Agricultural contingency action plans of the Department of Agriculture could be known as Disaster Management Plan (DMP).

3. Aims & Objectives:

The immediate response to provide support to bring normalcy at the earliest by quick and timely response in crisis management situation. The Crisis Management Plan aims at streamlining the activities of different stakeholders in response activities in time of crisis in the State of Tripura. The plan is also meant for bringing together different Departments and Agencies providing the emergency support functions for better coordination.

4. Vulnerability of the State of Tripura:

Tripura with a population of about 38 lakh is vulnerable to multiple hazards. There always is an abundant rainfall during monsoon season, starting from June till September. Monsoon is normally preceded by cyclonic storms and hailstorms which brought havoc throughout the state damaging dwelling houses and crops. Due to excessive rainfall, landslides are very hazardous in the State.

5. Facts of rainfall

The normal rainfall of Tripura is 2169.40 m.m. having 99.2 normal rainy days. The southwest monsoon breaks in the first week of June which usually last till end -September. Pre-monsoon showers begin towards the middle of May and post-monsoon rains occasionally occur in October. There is sometimes, a little rainfall in the winter seasons also. At most places of the State, the highest normal monthly rainfall is during June and July.

6. Typical adverse effects of natural calamities

• Adverse effects can be grouped into sectors; economic & environmental.

Economic

- Losses in production of crops, dairy and livestock, timber and fisheries
- Loss of national economic growth and development
- Income loss for farmers and others directly affected
- Losses to industries related to agricultural production
- Decline in food production and increased food prices
- Unemployment from calamity related production declines
- Revenue losses to government and increased strain on financial institutions

Environmental

- Damage to crop species, animal and fish species and habitat
- Wind and water erosion of soils
- Effects on air quality (dust, pollutants, reduced visibility)

7. Crisis Indicators

Kharif production depends on the quantum and distribution of rainfall. The monsoon normally onsets in the first week of June and withdraws by the end of September and seldom it may give sporadic showers in October. The behaviour of monsoon is broadly classified as under:

- a) Normal season with normal onset, cessation and distribution of monsoon
- b) Delayed onset of monsoon
- c) Normal onset but early withdrawal of monsoon

- d) Normal onset and cessation but prolonged drought period in between (inter spell dry period)
- e) Flood/Excess rains
- f) Uneven distribution of rains

i. Early Warning Indicators:

For Kharif (Sowing June to August)

- a) Delay in onset of South-West Monsoon.
- b) Long 'break' in activity of South-West Monsoon.
- c) Insufficient rains during the month of July.
- d) Rise in Price of fodder.
- e) Absence of rising trend in Reservoir Levels.
- f) Drying up sources of Rural Drinking Water Supply.
- g) Declining trend in progress of sowing over successive weeks compared to corresponding figures for "normal years".

ii. For Rabi (Sowing November to January)

- a) Deficiency in closing figures for South-West Monsoon (30th September).
- b) Serious depletion in level of Ground Water compared to figures for "normal years".
- c) Fall in the level of Reservoirs compared to figures for the corresponding period in the "normal years" - Indication of poor recharge following SW Monsoon.
- d) Indication of marked soil moisture stress.
- e) Rise in price of fodder.
- f) Increased deployment of water through tankers.

Based on behavioral classification of monsoon, a State level **Agricultural Crop Contingency Plan** for Tripura has been prepared to combat natural calamities like drought, flood, unusual rain etc. & placed at **Appendix**.

8. Crisis Management Framework

This framework has been prepared in order to identify the fundamental aspect of crisis situation; it includes the phases of crisis, magnitude, outcome of crisis phase, trigger mechanism and strategic response matrix.

Level 1	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	NIL	NIL	Developing and

					Strengthening drought/flood preparedness <ul style="list-style-type: none"> constant monitoring of Drought/flood-related characteristics Drawing up of perspective plans with the vision of drought/flood proofing..
2	Alert/ Watch	1-2 Forecast of late onset of monsoon (Apr - Jun) (Rainfall forecast expected to be less than the normal rainfall)	Incipient Sudden acceleration of demand of employment	Contingency Action Plan <ul style="list-style-type: none"> Crop Water 	<ul style="list-style-type: none"> Preparation of updated Contingency Crop Plan and its propagation through effective agro-advisory Services.
3	Warning	3-4 Delayed onset of monsoon	Moderate	CAP (Crop) <ul style="list-style-type: none"> CAP (Water) 	<ul style="list-style-type: none"> Effective role of Extension machinery and realising the objectives of Contingency Crop Plan
4	Emergency	5-7 Deficit or No rainfall during the sowing period. Midseason withdrawal of monsoon.	Severe	CAP (Crop)	Enabling employment under MGNREGS as a part of supplementary employment and as a social safety net support.
5	Acute	7-10 Early	Full	-	<ul style="list-style-type: none"> Weekly CMG meeting

		withdrawal of monsoon	blown drought		and monitoring of the progress of crisis relief measures • Review of visit by Area Officers to the deficit rainfall Districts.
6	Recovery (post-disaster)	> 10 -0 Normal rainfall in Rabi and subsequent seasons	Mitigated	-	Payment of compensation for losses in time to the beneficiaries of crop insurance,

9. Specific Actions by the Department of Agriculture

A. Pre drought/flood situation

- Prepare crop contingency plan
- Promote crop insurance

B. During Drought/Flood Situation

- . Assessment of crop damage
- . Issue periodic bulletins

C. Post Drought/flood Measures

- Suggest/ implement Change in cropping pattern - Water saving crops like Jawar, Bajra and groundnut to be introduced in drought area & rice crop can be replaced by suitable low water consumption crops.
- Promote sprinklers and drip irrigation methods.
- -Promotion of low irrigation requirement crops, drought tolerant seed varieties and other livelihood options in chronic drought prone areas.
- .Promote submergence tolerant varieties of paddy in flood prone areas

10. Monitoring & Reporting of Drought/Flood

Government of India has designed and launched an interactive web portal for online reporting of drought related information in prescribed MIS format, which is available at [http:// dacnet. nic.in/droughtmis](http://dacnet.nic.in/droughtmis). All districts may utilize the web portal and enter all drought related information for monitoring drought/flood and planning for mitigation.

11. Dissemination of Information and Media Management

Sharing information with print, radio and television media is an important aspect of drought/flood management. The Department of Agriculture, Tripura may provide information on all aspects of drought/flood to the farming community and media. Designated Spokespersons of the State Government should be accessible to media for providing information on drought/flood, for which a communication outreach strategy may be adopted. They should organise periodical briefings for dissemination of information

12. Crisis Management Group

There shall be a Crisis Management Group (CMG) in the Department of Agriculture for Crisis Management at State Level to deal with the crises which fall within the ambit of its responsibility. The composition of the Crisis Management Group (within the department) is required to be notified by the Government.

13. Nodal Officers

Besides State Relief Commissioners and State Agriculture Secretary, line Departments offices/ agencies of the State Government, responsible for different sets of activity connected with crisis management shall nominate an officer not below the rank of Director. The list of nodal officers containing their name, designation, telephone (office / residence), FAX, e-mail, mobile number and address to be maintained in the Disaster Monitoring Cell (Control Room) of the Department of Agriculture, and got updated every month. At District level, the District Magistrate / Collector would be the nodal officer of the drought/flood affected district.

14. Conclusion

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

Strategies for weather related contingency plan for Agriculture

1.1 Drought

1.2 Rainfed condition

Condition				Suggested measures		
1	2	3	4	5	6	
Early season drought (Delayed onset)	Major Farming situation	Normal Crop /cropping system	Change in crop /cropping system	Agronomic measures	Remarks on implementation	
1. Delay by 2 weeks June 3 rd week	1. Low land situation	Aus paddy, Aman Paddy Rice-Rice	No change in cropping system.	Foliar spray of 2% Urea	Seed production for varieties like NDR-97, Sahbhagi Dhan, Vandana required to be taken up.	
	2. Medium land	Aus paddy, sesame, pulses Rice –Sesame /Kharif pulse	Inclusion of crop like Moong ,Cowpea,Sesamum,Sorghum as 2 nd Kharif. Rice-Oilseed/Pulses	i. Direct seeding of pre-germinated paddy seeds with <i>in situ</i> green manuring. Application PSB and <i>Pseudomonas fluorescens</i> as stress management measures. ii. Growing Medium/short duration varieties.	Timely mobilization of inputs.	
	3. Rainfed Tilla land	Jhum Paddy	No change in cropping system.	-	-	
Early season drought (Delayed onset)	Major Farming situation	Normal Crop /cropping system	change in crop /cropping system	Agronomic measures	Remarks on implementation	
2. Early season drought (Delayed onset) Delay by 4 weeks 1 st week of July	1. Low land situation	Aman paddy and late sown Aus paddy Rice-Rice	No change	i. Direct seeding of pre-germinated paddy seeds. ii. Application PSB and <i>Pseudomonas fluorescens</i> as stress management measures. iii. Adoption of SRI	i. Timely mobilization of inputs. ii. Raising Community nursery iii. Awareness on SRI	

	2. Medium land situation	Rice-Rice-	Rice-Maize/Oilseed/Kharif pulses	i. Land preparation and sowing immediately after rain. iii Providing irrigation to standing Pulses & sesame crop,	i. Mobilization of seeds of suitable varieties. ii. Irrigation facilities can be provided linking with OFWM schemes, PMKSY and RKVY
	3. Tilla land situation	Jhum paddy	No change	Bunding across the slope using locally available materials.	-
Delayed by 6 weeks 3rd week of July	1. Rainfed low land situation	Rice-Rice	No change	i. Short duration High Yielding and Hybrids . ii. Closer spacing and direct seeding of pre-germinated seed iii. Foliar spray of 2% urea at 50-55 DAT/DAS in Aus paddy.	Irrigation facilities can be provided linking with OFWM schemes, PMKSY and RKVY
	2. Rainfed medium land situation	Pulses/oilseed-Rice	Moong ,G-Nut,Sesame, Blackgram Pulse –Oilseed Oilseed-pulse	Use of Crop specific R/Culture (inoculation) and application of Pusa Hydrogel at sowing.	Mobilization of inputs
Delay by 8 weeks August 1st week	3. Rainfed Tilla land situation	Not applicable			
	1. Rainfed low land situation	Not applicable			
	2. Rainfed medium land situation.	Not applicable			
	3. Rainfed Upland/Tilla land situation.	Not applicable			

Early season drought (Normal onset)	Major Farming situation	Crop/Crop ping system Crop	Crop management	Soil nutrient & moisture conservation measures	Remarks on implementation
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination / crop stand etc.	1. Low land situation	Rice-Rice- Crop	1. Watering in the nursery bed for 2 nd Kharif 2. SRI practices for 2 nd Kharif 3. Repairing of bund for soil moisture conservation 4. Treatment of seed and seed bed with <i>P. flurosceus</i> .	1. Maximum use of organic manure for 2 nd Kharif	1. Buffer stock of quality seed. 2. Selection of suitable varieties specific to prevailing situation and their seed production. (Naveen, MTU 7029, Ranjit etc.
	2. Medium land situation	Aus, Aman, Sesame, Moong, G-Nut	1. Watering in the nursery bed for 2 nd Kharif 2. Treatment of seed and seed bed with <i>P. flurosceus</i> . 3. Sowing of pre-germinated seeds of 2 nd Kharif paddy.	1. Application of sufficient organic matter in the nursery bed 2. Use of organic mulch in main field of oilseed/pulses	1. Buffer stock of quality seed. 2. Selection of suitable varieties specific to prevailing situation and their seed production. (MTU-7029, Sahbhagi Dhan, Ranjit, MTU1010 G/Nut-k—6, TAG 24 Sesamum-GT2, GT10, B-67)
	3. Tilla land situation	Rice as mixed crop	-	Application of water soluble NPK	Mobilization of inputs
Mild season drought (long dry spell, consecutive 2 weeks rainless (> 2.5mm) period)	Major Farming situation	Crop/Crop ping system Crop	Crop management	Soil nutrient & moisture conservation measures	Remarks on implementation
At vegetative stage	1. Low land situation	Rice Rice-Rice-	i. Bunds should be kept in good condition in rice field ii. If crop is damaged short duration High yielding and	i. Foliar application of 2% Urea on standing aman paddy ii. Stop top dressing of urea in case of rice	-

			hybrid paddy can be grown through SRI		
	2. Medium land situation	Sesamum/ Groundnut /paddy Oilseed- Rice/Pulse- Rice/ pulse- oilseed	i. Bundh should be kept in good condition in rice field ii. Spray of anti-transpirants like Triocntanol, Brassilonoids iii. If crop is damaged short duration High yielding and hybrid paddy can be grown	i. Foliar application of 2% Urea in paddy ii. Stop top dressing of urea in case of rice iii. Organic mulching in standing oilseed and pulse crop	-
	3. Tilla land situation	Rice as mixed crop.	-	Application of water soluble NPK	-
Mild season drought (long dry spell)	Major Farming situation	Crop/Crop ping system Crop	Crop management	Soil nutrient & moisture conservation measures	Remarks on implementation
At reproductive stage	1. Low land situation	Rice Rice-Rice-	i. Bunds should be kept in good condition in rice field ii. If crop is damaged/partially damaged early rabi oilseed and pulses to be grown iii. Providing irrigation for proper grain filling.	i. Bunds should be kept in good condition in rice field ii. Jal kund (catch pit) to be dug	
	2. Medium land situation	Groundnut Oilseed- Rice/Pulse- Rice	Bunds should be kept in good condition in groundnut field	-	

		3. Tilla land situation		Harvesting of crops which attain Physiological maturity			
		3. Tilla land situation	Rice as mixed crop.				
Terminal drought (Early withdrawal of monsoon)	Major Farming situation	Crop/Cropping system	Crop	Soil nutrient & moisture conservation measures	Remarks on implementation		
	1. Low land situation	Rice Rice-Rice-	Providing irrigation at critical stages	Application of sufficient amount of organic manures in main fields before transplanting/ sowing	Arrangement of Pump set		
	2. Medium land situation	Sesamum/Groundnut/paddy Oilseed-Rice/Pulse-Rice/ pulse-oilseed	i. Early rabi and normal rabi of oilseed and pulses are to be grown ii. Providing irrigation to paddy iii. Growing Toria in Aus fallows with light irrigation	i. <i>In situ</i> green manuring in paddy ii. Application of Pusa Hydro gel in pulses.	Arrangement of Pumpset and Pusa Hydrogel		
	3. Upland/Tilla land situation	Rice as mixed crop.	Harvesting of crops which attain Physiological maturity				
3.1 Unusual rains (untimely, unseasonal etc.) (For both rain fed and irrigated situations)							
Condition		Suggested contingency		measures			
1. Continuous high rainfall in a short span leading to water logging		Vegetative stage	Flowering stage	Crop maturity stage	Post-harvest		

Condition	Suggested contingency measures	Post harvest
Boro and Aus paddy	Drainage	Drainage
Rabi and Summer Pulses	Drainage	Drainage
Rabi and summer Oilseeds	Drainage	Drainage
Heavy rainfall with high speed winds in a short span 2	Vegetative stage	Flowering stage
paddy	Drainage of excess water	Drainage of excess water
Pulses	Drainage of excess water	Drainage of excess water
Oilseeds	Drainage of excess water	Drainage of excess water
Coarse cereals	Drainage of excess water	Drainage of excess water
Flood situation	Major Farming situation	Crop management
Partly damaged	Low land situation	Rice-Rice- Crop/Cropping system Crop

i. Wherever the crop is partially damaged, Gap filling has to be adopted. If seedlings are not available for gap filling, the survived hills are to be split into individual tillers and used for gap filling. Swarna etc. varieties performed well with split tillers and they withstood the submergence for about one week and survived with 2-3 tillers.
 ii. A booster dose of 50 Kg of Urea and 25 Kg of Muriate of Potash per Ha. are to be applied to hasten the establishment and promote more Tilling.
 iii. Growing of Swarna Sub-1, IR-64 Sub-1 to withstand flood situation.

i. Harvesting should be done before rain as far as possible
 ii. Drying of produces before storage to optimum moisture level
 iii. Seed treatment with insecticide and fungicide against insects & diseases respectively during the period of storage

Remarks on implementation
 Mobilization of inputs

APPS

Complete damaged	Low land situation	Rice-rice	<p>i. Wherever the crop is completely damaged replanting of varieties like Swarna Sub-1, IR 64 Sub-1, MTU 1010 can be taken up by raising nurseries</p> <p>ii. Re-plantings should be done immediately after receding of flood water.</p> <p>iii. N, P, K at 80: 40: 40 Kg/ha is recommended. 50% of the recommended N and entire P and K should be applied as basal dose before planting. 25% of the N should be applied at 20 days after planting. A final dose of 25% recommended dose (N) should be applied at PI stage.</p> <p>iv. A Spacing of 15-x 15-cm (44 hills/m²) is to be adopted.</p> <p>v. Adoption of SRI practices.</p>	Do
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Pest Management

Outbreak of pests and diseases due to unseasonal rains	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
<p>Rice</p> <p>Pulses</p> <p>Oilseed</p>	<p>i. Application of bio-pesticides and chemical pesticides as prophylactic Measures .</p> <p>ii. Application of <i>Pseudomonas fluorescens</i> powder @ 2.5kg/Ha and <i>Trichoderma viridi</i> . Carbendazime 0.1% (1g/Lit) may be sprayed at an interval of ten days for the management of sheath blight and blast.</p> <p>iii. Leaf folder, green leafhopper, stem borer, Rice Hispa, are likely to infest the rice crop . Monocrotophos @ 1.6 ml/l or Chlorpyrifos @ 2.0 ml/l may be sprayed as soon as incidence is noticed keeping in view of the ETL</p> <p>iv. Swarming caterpillar may infest rice crop at this stage. Apply immediately after noticed Chlorpyrifos + Cypermethrin @1ml/lt</p> <p>v. Application of fresh cow dung solution</p>	<p>i. Rouging of infected plant,</p> <p>ii. Application of 2 per cent Potash solution by spraying,</p> <p>iii. Leaf folder, green leafhopper, stem borer, BPH are likely to infest the rice crop . Monocrotophos 1.6 ml/l or Chlorpyrifos 2.0 ml/l, Imidacloprid 1ml/5lts. Of water may be sprayed as soon as incidence is noticed keeping in view of the ETL</p> <p>iv. Draining out of water from Rice field</p> <p>v. Application of fresh cow dung solution</p>	<p>i. At this stage Ear head cutting caterpillar may infest standing rice crop.</p> <p>ii. Application of Dichlorovos 75% @1ml/Lt or Chlorpyrifos + Cypermethrin @1ml/lt</p> <p>iii. Draining out of water from Rice field</p> <p>iv. Apply pesticide and ITK measures</p>	<p>Ensure proper drying of harvested materials before bagging</p>