CRISIS MANAGEMENT PLANS DURING 2014-15

DEPARTMENT – AGRICULTURE
WEST BENGAL

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INTRODUCTION:

West Bengal is a State where agriculture, especially the Kharif cultivation is dependent on monsoon to a large extent. It is experienced from recent past that weather aberration has much more increased in terms of onset of Monsoon, time, quantity & spread of rainfall, temperature fluctuation etc. which is taking toll on Kharif crops specially jute, Kharif rice, Kharif pulses, Kharif oilseeds, vegetables, sugarcane etc. leading to loss in production of Kharif crops.

In West Bengal, Rice covers nearly 95% of total area in Kharif season. Although in Kharif' 2013-14 there was no major weather aberration and Rice coverage was 42.26 lakh ha (estimated) but it's spatial distribution was not normal and the rainfall received during late part of monsoon was very high with mid monsoon period found to be less rainy. So considering this type of variation in weather in different years, preparing a contingency plan taking stock of all eventualities of weather condition is a necessity of time for the agricultural community of the state.

CRISIS PLANNING:

The Crisis Management Plans for natural disaster is otherwise known as ***contingency planning***. It is the plan which calls for preparedness for meeting unforeseen contingency like flood, drought, cyclone etc. Since Kharif cultivation in West Bengal is, largely dependent on nature, contingent crop planning is an integral part of agricultural production planning. The objective of contingency crop planning is to provide ways and means to the farmers as well as agricultural field staff to tackle the situation to be arisen out of the contingent situation. Such contingency planning is extremely useful in rain-fed areas of the State where frequent occurrence of drought and flood are the regular features.

A) Flood :

In West Bengal flood commonly occurs during monsoon season and sometimes in the post monsoon period and very rarely in the pre monsoon months. According to Inter Governmental Panel on Climate Change (IPCC) projection 43 % of the state area is under flood prone region of which considerable area in the coastal zone and this climate extremities are going to be intensified in the coming days, the same area may experience flood and drought in a single year at two different time due to these extremities.

In West Bengal, **Six nos**. **Flood Prone Zones** have so far been identified. These are:

a) Zone of Flash Flood: - Terai and Doors of North Bengal comprising of districts of Jalpaiguri, Coochbehar, Siliguri sub-division of Darjeeling and Islampur of Uttar Dinajpur.

b) Southern part of Sub-Himalayan West Bengal: - Maldah, Dakshin Dinajpur and adjoining areas of Raigunj Sub-division of Uttar Dinajpur

c) Left bank areas of river Bhagirathi-Hooghly comprising Murshidabad, Nadia and North 24-parganas.

d) Right Bank region of river Hooghly and Central part of Gangetic West Bengal.

e) Central and Eastern part of two Midnapur districts.

f) Coastal areas of Purba Midnapur and South 24-Parganas

The reasons are:

1) Heavy monsoon causing flood at different stages of crops' growth i.e. early flood, Mid flood, Late flood.

2) The breach of river embankment, spade of river embankments as well as release of excess water from the Major River Valley Projects during Kharif season.

Now contingencies arising out of the above reasons call for recommendations/suggestions, planning and actions to tackle the above situation as per guide lines of Govt. of India as well as High Power Committee (H.P.C.) under the Chairmanship of J.C. Pant, former Secretary to the Govt. of India befitting the local condition of the State in different agro-climatic sub-regions, specially in the prone areas of the sub-regions.

Drought :

In West Bengal we are concerned about **Agricultural Drought** which **is a prolonged period of abnormal moisture deficiency in different critical stages of crop growth**. It is interesting to note that in Kharif season drought or drought like situation does not occur extensively throughout the state. It differs from district to district and month to month as well. In the state remarkable drought have so far occurred in 1982-83 & 2010-11. However the effect of drought is much injurious than flood in terms of loss of agricultural crops.

The reasons are:

1) Delayed onset of Monsoon and occurrence of drought at the early stage of Kharif cultivation.

2) Long dry spell during the growth period of crops – Intermediate Drought.

3) Early withdrawal of Monsoon during the late period of Kharif season.

B) Plan and actions:

Contingent plan and actions are nothing but precautionary measures from the agricultural point of view to keep in force to reduce the adverse effect weather aberrations on the small & marginal farmers of the state as a whole.

West Bengal is categorized into six Agro Climatic zones namely i) Hill Zone, ii) Terai Teesta Alluvial Zone, iii) Vindhya Alluvial Zone, iv) Gangetic Alluvial Zone, v) Red & Lateritic undulating Zone, & vi) Coastal Saline Zone.

i) Hill Zone; ii) Terai teesta alluvial zone:

The zones comprise of Darjeeling, Jalpaiguri, Coochbehar and Islampur subdivision of Uttar Dinajpur district. The soil of this area is of coarse texture, shallow in depth, acidic in nature and it is prone to erosion. The nature of flood is mainly **flash flood which** usually washes away all and the

water stay for lesser time. The sand which accompanied the flood water stays in the agricultural field and converts the cultivable land to temporarily uncultivable.

A) Precautionary measures to be followed to overcome the adverse effects of flood:

Type of flood	Time of occurrence	Actions to be taken
Early Flood	July	i) Staggered sowing of rice seed in seedbed at 10 days interval. ii) Raised Seed bed areas are to be chosen at comparatively higher elevation. iii) Application of sufficient organic matter to avoid detrimental effect of sand infiltration in cultivable area to some extent. iv) If sand accumulation is high, then it is to be excavated either manually or mechanically.
Mid Flood	August	i) Staggered sowing of rice seed in seedbed at 10 days interval. ii) Raised Seed bed areas are to be chosen at comparatively higher elevation. iii) Double transplanting of medium to long duration rice varieties to avoid the flood time in the main field. iv) Application of sufficient organic matter to avoid detrimental effect of sand infiltration in cultivable area to some extent. v) If sand accumulation is high, then it is to be excavated either manually or mechanically.
Late Flood	September.	i) No scope for rice cultivation. ii) Post kharif cultivation of Kalai(Black Gram) varieties like Sarada, Gautam Sulata etc. iii) Early sowing of rabi crops like Toria, Yellow Sarson, Lentil, gram, mustard and sunflower etc. iv) Application of sufficient organic matter to avoid detrimental effect of sand infiltration in cultivable area to some extent. v) If sand accumulation is high, then it is to be excavated either manually or mechanically.

B) Precautionary measures to be followed to overcome the adverse effects of Drought:

To make preparedness effective at the grass root level, a joint monitoring of ground situation in the month of May, by the District level officers of Department of Agriculture, Irrigation and Waterways and WRI&D are to be made to find out the irrigation water availability from all Major, Medium and Minor Irrigation sources of that particular district, quantifying it at the block level, documenting the entire report and finally fortnight monitoring of the situation.

Type of Drought	Time of occurrence	Actions to be taken
Early season	June to 1st week of July	i) To harvest the runoff water, more number of surface water harvesting structures like pond, dug well etc. are to be excavated and as the land areas of terai zone are having good slope, the models like constructing dug well/water harvesting structures at lower elevation of the slope and pumping water from the well to give sustainable irrigation during drought

		can be explored. ii) Construction of earthen bunds around the individual plot to harvest runoff water. iii) Compulsory application of organic manure at recommended doses to improve the water holding capacity of the soil to combat adverse effects of drought in a better way. iv) Preparation of Community Seedbed of rice seedlings near common source of water body i.e. pond, dug well etc. and earmark at least 10 % area under each block at least a month before normal seedbed preparation of rice, suitable for this community seedbed. v) Staggered sowing of rice seed in seedbed at 10 days interval. vi) Double transplanting of medium to long duration rice varieties to avoid the drought time in the main field. vii) Application of 50% Nitrogen as basal dose and closer spacing with higher number of seedlings per hill are to be practiced. viii) Direct seeding of rice through Zero/Minimal Tillage machine as per recommendation. ix) In up land areas cultivation of arhar, black gram, groundnut and maize and mixed crop of maize and arhar are the better crop options.
Mid season	Rest of July	i) To harvest the runoff water, more number of surface water harvesting structures like pond, dug well etc. are to be excavated and as the land areas of terai zone are having good slope, the models like constructing dug well/water harvesting structures at lower elevation of the slope and pumping water from the well to give sustainable irrigation during drought can be explored. ii) Construction of earthen bunds around the individual plot to harvest runoff water. iii) Compulsory application of organic manure at recommended doses to improve the water holding capacity of the soil to combat adverse effects of drought in a better way. iv) Preparation of Community Seedbed of rice seedlings near common source of water body i.e. pond, dug well etc. and earmark at least 10 % area under each block at least a month before normal seedbed preparation of rice, suitable for this community seedbed. v) Double transplanting of medium to long duration rice varieties to avoid the drought time in the main field. vi) Staggered sowing of rice seed in seedbed at 7 days interval. vii) It is recommended to practice mechanical weeding in rice field under this situation and use the uprooted biomass of weeds as soil mulch or use other mulching materials like straw in the rice field to conserve soil moisture. Not only that, due to soil pulverization through mechanical weeding, the soil capillary tubes are broken resulting in further reduction of evaporation loss of soil moisture coming from the ground water through capillary rise. viii) It is also recommended not to apply nitrogenous fertilizers in the soil during this dry period to avoid the higher growth of weeds. However, depending upon the crop growth, foliar spray of either DAP or Urea @ 1-2% may be applied at the critical growth stages of the crop, to combat the adverse weather condition.

Late season	August.	i) To harvest the runoff water, more number of surface water harvesting structures like pond, dug well etc. are to be excavated and as the land areas of terai zone are having good slope, the models like constructing dug well/water harvesting structures at lower elevation of the slope and pumping water from the well to give sustainable irrigation during drought can be explored. ii) Construction of earthen bunds around the individual plot to harvest runoff water. iii) Compulsory application of organic manure at recommended doses to improve the water holding capacity of the soil to combat adverse effects of drought in a better way. iv) Double transplanting of medium to long duration rice varieties to avoid the drought time in the main field. v) It is recommended to practice mechanical weeding in rice field under this situation and use the uprooted biomass of weeds as soil mulch or use other mulching materials like straw in the rice field to conserve soil moisture. Not only that, due to soil pulverization through mechanical weeding, the soil capillary tubes are broken resulting in further reduction of evaporation loss of soil moisture coming from the ground water through capillary rise. vi) It is also recommended not to apply nitrogenous fertilizers in the soil during this dry period to avoid the higher growth of weeds. However, depending upon the crop growth, foliar spray of either DAP or Urea @ 1-2% may be applied at the critical growth stages of the crop, to combat the adverse weather condition.

iii) Vindhya & iv) Gangetic alluvial zone:

Districts of Maldah, Murshidabad, Nadia, Hoogly, parts of Howrah, Midnapur (W+E), Burdwan, Birbhum, Bankura, 24 Parganas(N+S) and Dinajpur(S) are included under these zones. The area is characterized with good ground water as well as surface water potential.

A) Precautionary measures to be followed to overcome the adverse effects of flood:

Same actions as prescribed under Terai Teesta alluvial zone.

B) Precautionary measures to be followed to overcome the adverse effects of Drought:

To make preparedness effective at the grass root level, a joint monitoring of ground situation in the month of May, by the District level officers of Department of Agriculture, Irrigation and Waterways and WRI&D are to be made to find out the irrigation water availability from all Major, Medium and Minor Irrigation sources of that particular district, quantifying it at the block level, documenting the entire report and finally fortnight monitoring of the situation.

Type of Drought	Time of occurrence	Actions to be taken

Early season	June to 1st week of July	i) To harvest the runoff water, more number of surface water harvesting structures like pond, dug well etc. are to be excavated and water harvesting structures at lower elevation following Land Shaping Models as followed in 24 PGS(S) or 5%/10% model of Pond within individual holding can be followed. ii) Construction of earthen bunds around the individual plot to harvest runoff water. iii) Compulsory application of organic manure at recommended doses to improve the water holding capacity of the soil to combat adverse effects of drought in a better way. iv) Preparation of Community Seedbed of rice seedlings near common source of water body i.e. pond, dug well etc. and earmark at least 10 % area under each block at least a month before normal seedbed preparation of rice, suitable for this community seedbed. v) Staggered sowing of rice seed in seedbed at 10 days interval. vi) Double transplanting of medium to long duration rice varieties to avoid the drought time in the main field. vii) Application of 50% Nitrogen as basal dose and closer spacing with higher number of seedlings per hill are to be practiced. viii) Direct seeding of rice through Zero/Minimal Tillage machine as per recommendation. ix) In upland areas cultivation of arhar, black gram, groundnut and maize and mixed crop of maize and arhar are the better crop options.
Mid season	Rest of July	i) To harvest the runoff water, more number of surface water harvesting structures like pond, dug well etc. are to be excavated and water harvesting structures at lower elevation following Land Shaping Models as followed in 24 PGS(S) or 5%/10% model of Pond within individual holding can be followed. ii) Construction of earthen bunds around the individual plot to harvest runoff water. iii) Compulsory application of organic manure at recommended doses to improve the water holding capacity of the soil to combat adverse effects of drought in a better way. iv) Preparation of Community Seedbed of rice seedlings near common source of water body i.e. pond, dug well etc. and earmark at least 10 % area under each block at least a month before normal seedbed preparation of rice, suitable for this community seedbed. v) Double transplanting of medium to long duration rice varieties to avoid the drought time in the main field. vi) Staggered sowing of rice seed in seedbed at 7 days interval. vii) It is recommended to practice mechanical weeding in rice field under this situation and use the uprooted biomass of weeds as soil mulch or use other mulching materials like straw in the rice field to conserve soil moisture. Not only that, due to soil pulverization through mechanical weeding, the soil capillary tubes are broken resulting in further reduction of evaporation loss of soil moisture coming from the ground water through capillary rise. viii) It is also recommended not to apply nitrogenous fertilizers in the soil during this dry period to avoid the higher growth of weeds. However, depending upon the crop growth, foliar spray of either DAP or Urea @

		1-2% may be applied at the critical growth stages of the crop, to combat the adverse weather condition.
Late season	August.	i) To harvest the runoff water, more number of surface water harvesting structures like pond, dug well etc. are to be excavated and water harvesting structures at lower elevation following Land Shaping Models as followed in 24 PGS(S) or 5%/10% model of Pond within individual holding can be followed. ii) Construction of earthen bunds around the individual plot to harvest runoff water. iii) Compulsory application of organic manure at recommended doses to improve the water holding capacity of the soil to combat adverse effects of drought in a better way. iv) Double transplanting of medium to long duration rice varieties to avoid the drought time in the main field. v) It is recommended to practice mechanical weeding in rice field under this situation and use the uprooted biomass of weeds as soil mulch or use other mulching materials like straw in the rice field to conserve soil moisture. Not only that, due to soil pulverization through mechanical weeding, the soil capillary tubes are broken resulting in further reduction of evaporation loss of soil moisture coming from the ground water through capillary rise. vi) It is also recommended not to apply nitrogenous fertilizers in the soil during this dry period to avoid the higher growth of weeds. However, depending upon the crop growth, foliar spray of either DAP or Urea @ 1-2% may be applied at the critical growth stages of the crop, to combat the adverse weather condition.

v) Red & Laterite zone:

Districts like Purulia, parts of Bankura, Birbhum, Burdwan, Midnapur (W) are included under these zone.

A) Precautionary measures to be followed to overcome the adverse effects of flood:

Type of flood	Time of occurrence	Actions to be taken
Early Flood	July	i) Staggered sowing of rice seed in seedbed at 10 days interval. ii) Raised Seed bed areas are to be chosen at comparatively higher elevation. iii) Application of sufficient organic matter to avoid detrimental effect of sand infiltration in cultivable area to some extent. iv) If sand accumulation is high, then it is to be excavated either manually or mechanically.
Mid Flood	August	i) Staggered sowing of rice seed in seedbed at 10 days interval. ii) Raised Seed bed areas are to be chosen at comparatively higher elevation.

		iii) Double transplanting of medium to long duration rice varieties to avoid the flood time in the main field. This is feasible up to middle of August. iv) Application of sufficient organic matter to avoid detrimental effect of sand infiltration in cultivable area to some extent. v) If sand accumulation is high, then it is to be excavated either manually or mechanically.
Late Flood	September	i) No scope for rice cultivation. ii) Post kharif cultivation of Kalai(Black Gram) varieties like Sarada, Gautam Sulata etc. iii) Early sowing of rabi crops like Toria, Yellow Sarson, Lentil, gram, mustard and sunflower etc. iv) Application of sufficient organic matter to avoid detrimental effect of sand infiltration in cultivable area to some extent. v) If sand accumulation is high, then it is to be excavated either manually or mechanically.

B) <u>Precautionary measures to be followed to overcome the adverse effects of Drought:</u>

To make preparedness effective at the grass root level, a joint monitoring of ground situation in the month of May, by the District level officers of Department of Agriculture, Irrigation and Waterways and WRI&D are to be made to find out the irrigation water availability from all Major, Medium and Minor Irrigation sources of that particular district, quantifying it at the block level, documenting the entire report and finally fortnight monitoring of the situation.

Rest recommendations are similar to Vindhya & Gangetic alluvial zone except late drought in the month of August where there is no scope of rice cultivation. Early sowing of Rabi crop is the only viable option. Besides this other options are:-

i) More number of surface water harvesting structures like pond, dug well etc. is to be excavated. At lower elevation points.

ii) Construction of earthen bunds around the individual plot to harvest run off water.

<u>v) Coastal Saline zone:</u>

Districts including 24 Parganas, parts of Howrah, 24 Parganas(N) and Midnapur(E) are under this zone.

A) <u>Precautionary measures to be followed to overcome the adverse effects of flood:</u>

Type of flood	Time of occurrence	Actions to be taken
Early Flood	July	i) Staggered sowing of rice seed in seedbed at 10 days interval. ii) Raised Seed bed areas are to be chosen at comparatively higher elevation. iii) Application of sufficient organic matter to avoid detrimental effect of salt infiltration in cultivable area to some extent. iv) Due to flood, saline water is intruded in agricultural field. So salt tolerant varieties of rice like SR26-B, Lunishree, Jarava and Mohan are to be cultivated.
Mid	August	i) Staggered sowing of rice seed in seedbed at 10 days interval.

Flood		ii) Raised Seed bed areas are to be chosen at comparatively higher elevation. iii) Double transplanting of medium to long duration rice varieties to avoid the flood time in the main field. iv) Application of sufficient organic matter to avoid detrimental effect of salt infiltration in cultivable area to some extent. v Due to flood, saline water is intruded in agricultural field. So salt tolerant varieties of rice like SR26-B, Lunishree, Jarava and Mohan are to be cultivated).
Late Flood	September.	i) No scope for rice cultivation. ii) Sowing of rabi crops like Yellow Sarson, Lentil, mustard, sunflower, chili and bhendi etc. iii) Application of sufficient organic matter to avoid detrimental effect of salt infiltration in cultivable area to some extent.

B) <u>Precautionary measures to be followed to overcome the adverse effects of Drought:</u>

Recommendations are similar to Vindhya & Gangetic alluvial zone.

<u>Some Additional Measures</u> – needed to be taken care of for Crisis Management:

i) Every major and minor irrigation projects should have local committee, for arranging rational irrigation system in the command areas of the irrigation projects as per prior programme on the basis of the Land & Weather situation.

ii) In case of natural calamities like cyclone, hailstorm, tornado, no specific advance crop planning can be made for its sudden and un-notified occurrence from time to time. However, prior forecasting from the concerned department (IMD) may be taken into account for saving the standing crops as far as practicable as well as for adopting proper relief measures befitting to the situation.

iii) In case of early flood, planning for delayed transplantation, Double transplantation where possible, in addition, planning for distribution of post kharif seeds as a part of alternative cropping where no further transplantation of Aman paddy would be possible due to inundation of Aman lands.

iv) In case of late flood, it is desirable to draw intensive Rabi/Summer Production programme as there would be no scope for alternative cropping to compensate the loss in production during Kharif season.

v) In case of Drought during part or the whole period of Kharif season advice may be given to the farmers through monitoring of situation involving block/sub-division and district level Agricultural Officers in the following suggestive line.

Strategy to combat Weather Aberration

Weather Condition	***Farming Situation***	***Normal crop in normal weather***	***Alternate crop proposed in unsown land due to change of weather***

Deficit rain upto June	**Upland**	**Rice**	**Sow Maize/Moong /Kalai/Pigeon Pea /Kulthi/ Sesame/Niger within 1st week of July**
	Medium land	**Rice**	**Wait for rain**
	Low land	**Rice**	**Wait for rain**
Deficit rain upto July	**Upland**	**Rice**	**Covered as above**
	Medium land	**Rice**	**Sow Niger or others as suggested for upland within 1st wk of August**
	Low land	**Rice**	**Wait for rain**
Deficit rain upto August	**Upland**	**Rice**	**Covered as above**
	Medium land	**Rice**	**Covered as above**
	Low land	**Rice**	**Sow Toria/Maize/Kalai/Niger within 1st wk of September**

vi) In this State there are several State Plan Scheme like Establishment of Seed Bank, Distribution of improved, high-yielding and hybrid seeds of different crops through Minikits, subsidized sale of quality seeds etc. to take up relief measures through distribution of paddy seeds out of Seed Bank, distribution of Minikits of different crops to the small and marginal farmers as well as distribution of different seeds specially paddy and wheat on subsidized rate in addition to the relief measures which are to be taken up out of the State Disaster Response Fund (SDRF).

vii) A programme of a Model contingency Plan will be circulated to the District Officers of the State for preparation of Block wise contingency plan, suited to the local situation of different districts of the State.

viii) Pre-positioning of different varieties of Seeds, fertilizers, pesticides at all levels is to be made sufficiently ahead for the convenience of the farmers in the matter of making those inputs available at right time of occurrence of any such Natural.

CONCLUSION :--

It is hopefully expected that like previous years, the Agricultural Deptt. of the State Govt. will be in a position to tackle the situation for the eventuality of any natural calamity, extending technical assistance through distribution of seeds, fertilizers, pump set, inputs loans and such other agricultural inputs either free of cost or on subsidy with the advantage of several on-going State budget schemes as well as out of State Disaster Response Fund (SDRF) during the **ongoing Kharif season, 2014-15**.