

Enhancing the preparedness for Agricultural Contingencies

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SONEPUR

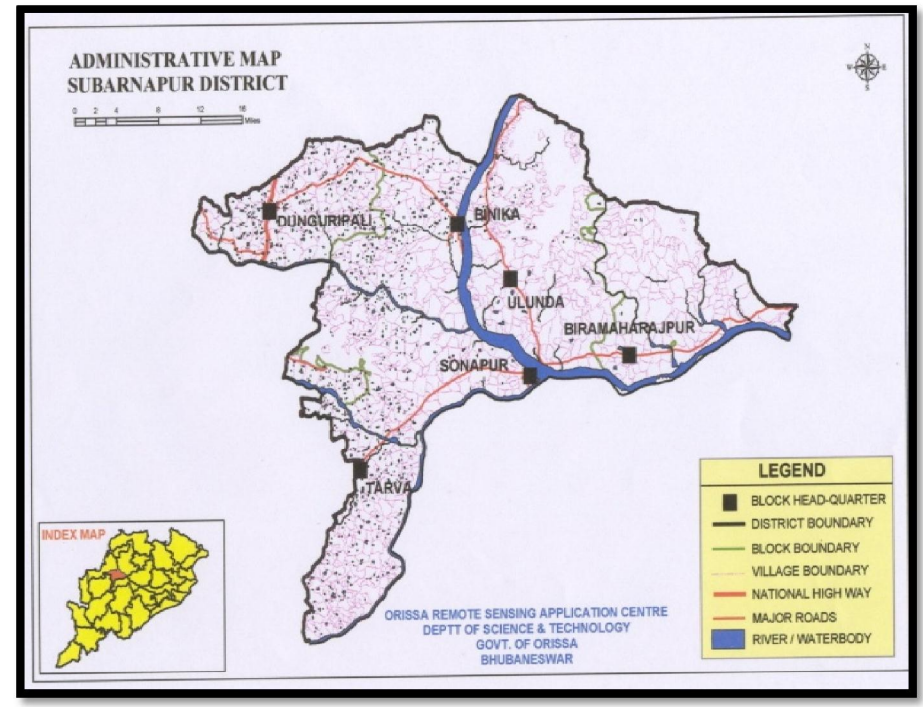
Welcomes you

Directorate of Extension

Odisha University of Agriculture and Technology, Bhubaneswar

DISTRICT PROFILE

Agro-climate Zone	Western Central Table Land Zone
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Latitude	20° 30' to 20° 10' N
No of blocks	06
No. panchayats	109
No of villages	962
No of Tehsils	06
Population	610183 Male : 311312 Female : 298871
Literacy %	74.42 %
Annual rainfall	1418.5 mm
Temperature	Max : 46°C Min : 10° C

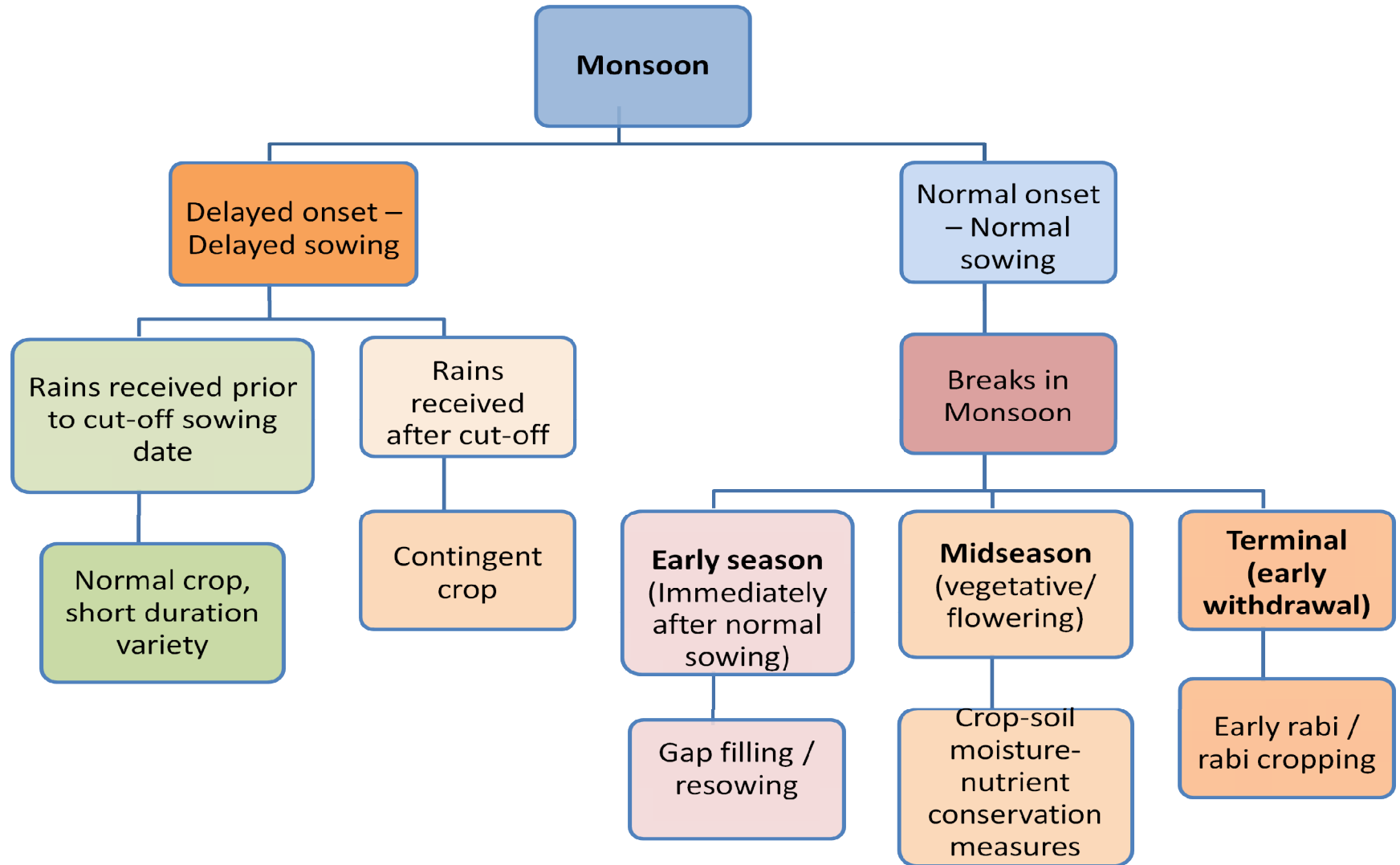


Geographical area	234000 ha
Irrigated (%)	26.31 %
Cropping intensity (%)	145 %
Gross cropped area	1,89,600 ha

RAINFALL STATUS OF SUBARNAPUR DISTRICT

Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
SW Monsoon (June- Sep):	1245.4	34	3r week June	2 week Sept.
NE Monsoon(Oct-Dec):	176.2	8	1 week Oct.	1 week Nov.
Winter (Jan- Feb)	235.3	10	1 week Jan.	4 week .Feb
Summer (Mar-May)	67.5	9	1 week Mar.	1 week May
Annual	1724.4	61	-	-
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Summer (Mar-May)	67.5	9	1 week Mar.	1 week May

Suggesting contingency measures for drought



CONTINGENCY MEASURE Drought and Rained situation

Condition		Suggested Contingency measures			
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Delay by 2 to 4 weeks (July 1 st week to 3 rd week of July)	Plain land (Rain fed)	Rice-fallow	Paddy (Short duration-Sahabagi Dhan, Khandagiri, Swarna shreya) - Paddy- Green gram	Apply FYM @ 5 t/ha, closer spacing and 20 % higher seed rate	
		Pulse	Arhar (Upas-120,Asha), Black gram(Prasad, PU-31)	Sowing behind the plough/ line sowing with seed drill Inoculation with bioinoculant Rhizobium @20g/kg of seed	
	Medium land	Paddy-Green gram	Paddy (Lalat, Manaswini, Mrunalini, Pooja, MTU-1010) Green gram)	Apply FYM @ 5 t/ha, closer spacing and 20 % higher seed rate , Growing of nursery near water source, Direct seeding of paddy	
		Pulse	Green gram(IPM-02-14, TARM-1,Durga, PDM-139)	Sowing behind the plough/ line sowing with seed drill, Inoculation with bioinoculant Rhizobium @20g/kg seed	

CONTINGENCY MEASURE

Drought and Rainfed situation

Condition		Suggested Contingency measures			
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Delay by 2 to 4 weeks (July 1 st week to 3 rd week of July)	Upland	Paddy-Fallow	Intercropping of " Rice + Arhar (5:2) " Arhar + groundnut (2:6) " Arhar + Sesame (2:4) " Arhar+ Green gram/ Black gram (2:3) " Arhar+ Cotton (6:2) " Sweet Potato	" Plough and sow the crops across the slope " Mechanization for timely and precise operations. " Liming @ 5 q/ha mixed with FYM @ 1.0 t/ha in furrows before sowing	Sowing with good quality seeds from reliable sources
		Arhar/ Green gram/ Sesame (Local) - Fallow	" Arhar (ICPL- 85063, UPAS-120) " Green gram (Durga, PDM-11, Dhauri) " Sesame (Uma, GT-2) " Kulthi (Local) " Cowpea(Local) " Sweet Potato		
		Vegetables-Fallow	" Brinjal (Utkalkeshari, Blue star, Pusa purple long) " Tomato (Utkal raja, BT-10) " Greengram (OBGG-52), PDM-54, TARM1, Dhauri, Durga	" Raising of seedlings under protected nursery " Seedling root dip with fungicide/ bactericide " liming @ 5 q/ha mixed with FYM @ 1.0 t/ha in furrows before sowing	
			Blackgram (Sarala, PU-30) Runner Bean		

CONTINGENCY MEASURE

Condition		Suggested Contingency measures			
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Delay by 6 to 8 weeks (August 3 rd week) August 6 September	Plain land Rainfed (Mal Land)	Rice-fallow	Paddy should be replaced with maize (Short duration hybrid maize Hishell, proagro, Decalbo double), cowpea, Blackgram (T9, Pant-U-19, Pant-U-30, Ujala and Sarala), sesame (Uma), pumpkin Adoption of intercropping of maize	Apply FYM, closer spacing and 20 % higher seed rate Intercropping of Maize/Cowpea/Greengram/ Bengalgram/ Sesame in Agrisilvi system Application of pre-emergence herbicide pendimethalin/	Sowing with good quality seeds from reliable source
		Pulse	Blackgram (PU-31, Prasad) Greengram (IPM-02-14, TARM-1)	Sowing behind the plough/ Broadcasting Inoculation	
	Medium land	Paddy-fallow	Paddy (Lalat, Mandakini, Manaswini, MTU-1010, Pooja) Greengram (TARM-1, PDM-54)	Apply FYM, closer spacing and 20 % higher seed rate Growing of nursery near water source/Direct sowing of sprouted	Sowing with good quality seeds from reliable source
		Paddy-green gram	Paddy (Mandakini, Jogesh), Sidhant) Greengram (TARM1, PDM-54)	Apply FYM, closer spacing and 20 % higher seed rate Growing of nursery near water source/Direct	
		vegetables-fallow	Cluster bean / cow pea (utkal manic)/Radish/Runner bean/okra, brinjal - Utkal anushree, Chilli-VNR-305)	Plough and sow the crops across the slope for moisture conservation Moisture conservation through mulching Mechanization for timely and precise operations. Liming @ 5	
	Low land	Paddy & Greengram/Black gram	Paddy (Puja, Ranidhan, Tejaswini) Green gram (IPM-02-14) Black gram- PU-31	Application of FYM @ 5 t/ha in kharif paddy Adopt Paira cropping with green gram/black gram Application of pre-emergence	

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measues	
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Plain land Rainfed	Rice-fallow	<p>~ When there is more than 50% mortality, re-sowing the crop up to July after receipt of sufficient rain water</p> <p>~ Sowing of green gram / Horse gram / Cow pea are encouraged</p>	<p>~ If mortality is less than 50%, the crops may be top dressed with 40 kg N/ha after receiving rain as tillering fertilizer.</p> <p>~ Ploughing across the slope.</p>	Sowing with good quality seeds from reliable source
		Pulse	Re-sowing behind the plough after available of moisture if crop stand is < 50% in furrow and ridge method across the slope	Inoculation with Rhizobium	

Medium land	Paddy- fallow	<p>When there is more than 50% mortality, resowing the crop up to July after receive of sufficient rain water</p> <p>If mortality is less than 50%, the crops may be gap filled.</p>	1) Application of FYM @ 1 t/ha Ploughing across the slope.
	Paddy-Greengram	<p>Re sowing of paddy (Var ó Lalat, Konark, Manaswini)</p> <p>“ Sow the seeds at 5-6 cm depth by punji method (6 - 8 seeds at one point) at a spacing of 20 cm x 10 cm and cover it with FYM to avoid seedling mortality due to moisture stress.</p> <p>“ Use a seed rate of 100 to 120 kg per ha to maintain 400 - 600 plants/m².</p>	Storing excess rain water in refuges in medium land has been standardized by devoting 10% of the cultivable area

Upland	Paddy-fallow	<p>Re sowing of paddy (Var ó Pathara, , Vandana) or crop substitution with Green gram (TARM-1, PDM-54, Sujata)</p>	<p>Plough and sow the crops across the slope for moisture conservation.</p> <p>Mechanization for timely and precise operations.</p> <p>Liming @ 5 q/ha mixed with FYM @ 1.0 t/ha in furrows before sowing</p> <p>Follow ridge and furrow method of sowing</p>
	Arhar/ Greengram/ sesame (Local) - fallow	<p>Resowing of crop if crop stand is < 50%</p> <p>Agri-Horti System(Plantation of mango)</p>	<p>Cover with FYM after sowing of seed</p> <p>Mechanization for timely and precise operations.</p> <p>liming @ 5 q/ha mixed with FYM @ 1.0 t/ha in furrows before sowing</p> <p>Follow ridge and furrow method of sowing</p>
	Vegetables- fallow	<p>Cultivate vegetables-cowpea, guar, radish, runner bean, okra, cauliflower, brinjal, tomato wherever possible</p>	<p>Complete hoeing, weeding followed by ridging to the base of the crop</p> <p>Follow ridge and furrow method of sowing</p> <p>Mulching the inter row space with weeded plants</p>

Low land	Paddy ó Greengram/Blackgram	<p>Íf rice population is less than 50%, re sow the crop, re sowing of paddy (Var MTU7029, Puja, Raneedhan, Tejaswini)</p> <p>Íraise community nursery of rice for transplanting at a reliable water source to save time for further delay</p>	Íf the rice population is more than 50% carry out weeding and adjust the plant population by Khelua and top dressed with 40 kg N/ha as tillering fertilizer.	Sowing with good quality seeds from reliable source
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CONTINGENCY MEASURE

Condition			Suggested Contingency measures	
Mid season drought	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures
(long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Plain land	Rice-fallow	Reduce plant population by 25% than the recommended no.	" Weeding of the plot and mulching by the wooded plant. " Spraying of potash fertilizer @ 2%
	Medium land	Pulse	Foliar application of 2% urea at pre-flowering and flowering stage of green gram is helpful to mitigate drought.	" Complete hoeing and weeding in non paddy crop fields to provide dust mulch. " Spray 2% KCl + 0.1 ppm boron to black gram to overcome drought situations.
	Medium land & Low land	Paddy- fallow/ Paddy-green gram	" Do not practice beushaning in rice, if the crop is more than 45 days old. " Weed out the field without waiting for rainfall. " Go for gap filling If transplanting is delayed by 20 days " Close spacing " 25 % more N as basal " 4-5 seedlings/hill	" Strengthen the field bunds and close the holes to check seepage loss. " Withhold N fertilizer application up to receipt of rainfall. " Remove the weeds and follow plant protection measures against blast in the nursery i.e. Tricyclazole @ 0.06 % " Foliar application of 2% urea at pre-flowering and flowering stage of green gram is helpful to mitigate drought
	Upland	Paddy-Fallow	" Reduce population by 25% than the recommended no. " Agri-Horti System(Plantation of mango)	" Weeding of the plot and mulching by the weeded plant. " Spraying of potash fertilizer @ 2%
		Vegetables- Fallow	" Cultivate vegetables cowpea, guar, runner bean, okra, brinjal, tomato, chilli wherever possible " Spray 2% KCl + 0.1 ppm boron to overcome drought situations. " Foliar application of 2% urea at pre-flowering and flowering stage is helpful to mitigate drought	" Complete hoeing and weeding in non paddy crop fields to provide dust mulch. " Spraying with bio-pesticide formulation to manage infestation by insect pests " Implementation through NHM , ATMA

CONTINGENCY MEASURE

CONDITION			Suggested Contingency measures		
Terminal drought (Early withdrawal of monsoon)	Major Farming situation	Normal Crop/cropping system	Crop management		Soil nutrient & moisture conservation measures
	Upland	Paddy-fallow / Arhar/ Greengram/ Sesame (Local) - Fallow	" Harvest at physiological maturity " Provide life saving irrigation if possible	-	
		Vegetables- fallow	" Mulching in inter-row space " Harvest at green stage prior to maturity	-	
	Medium land	Paddy - fallow	" Harvest at physiological maturity " Provide life saving irrigation if possible " Spraying of $\text{-K}\phi$ fertilizer @2%	-	
	Low land	Paddy ó Greengram/Black gram	" Harvest at physiological maturity " Provide life saving irrigation if possible " Spraying of $\text{-K}\phi$ fertilizer @ 2%	" Priming of green gram seeds for 2 hrs prior to sowing " Partial /non mechanization to save time and moisture " Paira cropping of green gram/lathyrus/ black gram	

Drought- Irrigated situation

Condition			SUGGESTED CONTINGENCY MEASURES		
Delayed/ limited release of water in canals due to low rainfall	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks
	Plain land irrigated	Rice-rice	Taking of medium duration rice var. like lalat, Mrunalini monaswini, surendra etc in place of long duration var. <ul style="list-style-type: none"> If delayed by more than one month than Non paddy crops like Sesamum, may be taken up. High value vegetables may also be taken. 	Wet bed /dapog method of nursery should be followed SRI method may be followed. Rabi paddy may be taken little earlier by taking comparatively longer duration paddy. Emphasis should be given for application of bulky organic manures.	Seeds may be supplied through OSSC, NFSM, NHM Intercultural implements through NHM, ATMA

	Canal irrigated low land	Rice ó Rice	Take short duration var. depending upon the duration of water availability. If delayed by more than one month than Non paddy crops like Sesamum, may be taken up. High value vegetables may also be taken.	Emphasis should be given for application of bulky organic manures. Wet bed /dapog method of nursery should be followed SRI method may be followed	Seeds through OSSC, NFSM, NHM Intercultural implements through NHM, ATMA
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- **Flood Situation**
- **(Block-Sonepur, Tarva, Binka, BMPur)**

- **Early flood:-**
- If damage is more than 50% paddy can be re-transplanted with little earlier duration varieties.
- Partial damage plots can be felled up from excess nursery stand.
- Filled up gap and add additional dose of N &K.
- **Late Flood:-**
- Paddy affected can be re-transplanted even up to 45 to 60 days old seedlings.
- Clonal tillers can be transplanted.
- Short duration paddy can be broad casted with pre-germinated seeds.
- If there remote chance of revival pre-rabi crop like green gram, black gram, sessamum, Cucurbits can be taken.
- In river patha area groundnut can be grown in residual moisture.

- **Pest Attack**

- Swarming Caterpillar attack after a fresh flood becomes a common phenomenon. Make regular surveillance. Treat the bunds, Spray the bunds with Chloropyrifos/Trizophos @ 4ml/ltr.
- BPH is another grievous pest. Farmers are to be vigilant to the knock part of the hill. When there is crossing of ETL spray with Triazophos/Imidachloprid.
- In case of occurrence of cyclone there is possibility of attack of panicle mite spray prophylactic with propargite @ 2ml/ltr on hyprofezim 25%SC @ 1.5ml/ltr.
- Neck blast also can become grim to check it prophylactic spray at before flowering with tricyclazole @ 0.6gm/ltr and Kasugamycin @2ml/ltr.

Insect pest management

Due to dry spell or Drought condition there is every possibility of termites attack in Rice. Pulses, Oilseeds & Cotton. For this pest Chloropyriphos 20EC @ 4.5MI/Ltr can be applied.

Disease management

- “ Blast & brown spot infestations are observed during drought condition on paddy. The same can be controlled by tricyclazole, Kasugamycin @ 0.15 to 0.2% @ 10-12 days.
- “ For Alternaria & Cercospera infestation in oilseeds, vegetables, cucurbits spray Mancozeb+Carbandazim @ 0.2%.
- “ There should be regular pest surveillance to avoid pest attck above ETL and prevent any epidemic.

Unusual rains (untimely, unseasonal etc) (for both rainfed and irrigated situations)

Continuous high rainfall in a short span leading to water logging	Vegetative stage	Flowering stage	Crop maturity stage	Post harvests
Paddy	Provide deep drains at frequent intervals for adequate irrigation	Provide drainage If possible	Drain water for drying Harvest at physiological maturity stage Cut the crop, leaving 1.5 ft stubbles so that panicle will not touch the ground.	Mechanization of harvesting for speed up the process. Shifting to a safer place Dry in shade in a well ventilated space
Arhar	Provide drainage	Provide drainage	Drain water for drying.	Safe storage against storage pests & diseases
Cowpea	Provide timely and adequate drainage. Necessary PP measures should be undertaken against the diseases and pests.	Provide drainage	Drain water for drying Harvest for vegetable Purpose Shifting to a safer place	Dry in shade in a well ventilated space Safe storage against pest and diseases

Horticulture				
Fruits (Mango, Citrus Banana, Papaya)	Provide drainage. Earthing up of plant at the base/root zone. Spray mancozeb @3 g/ltr and Bavistin @ 2 g/ltr alternately preventive measures against sigatoka disease.	Provide drainage Earthing up of plant base/root zone	Harvesting at green stage for table purpose, No problem for marketing as it has buyers preference	Dry the fruits, Keep at safer place, may be sold at green stage, Store for ripening in closed godowns for marketing
Cucurbit vegetables	Seedling in raised nursery beds, Adequate and timely drainage,	Vines should be staked along elevated frames, Application of hormones to induce more flowering	Ensure drainage Harvesting at tender stages	Ensure drainage Harvesting at tender stages
Solanaceous/ cruciferous vegetables	Seedling in raised nursery beds, Adequate and timely drainage,	Provide drainage Application of hormones to induce more flowering	Provide Adequate and timely drainage,	Ensure drainage Harvesting at tender stages

Heavy rainfall with high speed winds in a short span.				
Paddy	Drainage if water logging persists Small seedlings withstand the problem	Drainage if water logging persists	Lodged panicles may be harvested at physiological maturity stage	Ensure drainage harvesting at physiological maturity stage
Horticulture				
Mango	Plantation of wind breakers around The mango field Drainage of excess water	Drainage of excess water, spraying of planofix for good fruit setting	Fallen fruits may be collected and value addition is to be undertaken for higher income	Fruits should be harvested before ripening/grading/Value addition for getting more income
Banana	Plantation of wind breakers around the field Drainage of excess water, Provide staking support to the plants	Drainage of excess water, Provide staking support to plants	Drainage of excess water, Provide staking support to plants	Fruits should be harvested before ripening/grading/Value addition for fetching higher market price

Outbreak of pests and diseases due to unseasonal rains				
Paddy	Spray Tricyclazole @ 0.06 % against blast, Chloropyriphos 0.2 % against stem borer, Indoxacarb against Swarming caterpillar @ 0.04%	Spray Tricyclazole @ 0.06 % against blast, Chloropyriphos @ 0.2 % against stem borer, Indoxacarb against Swarming caterpillar & leaf folder @ 0.04 %	0.2 % Malathion spray against Gundhy bug	Sun drying / disinfection of gunny bags with malathion or heat treatment to manage the stored grain pests
Arhar	Removal of	Hand picking &	Spray of	Store in clean

	infested tips to manage leaf webber	destruction of blister beetles	flubendiamide @ 0.05 % against pod borer Installation of pheromone traps @ 20 nos/ha	godown, disinfection of gunny bags / storage structure with malathion (0.2%)
Blackgram/ Greengram	Application of imidacloprid @ 6 ml/ 15 litre of water against YMV Installation of yellow sticky traps @20nos/ha	Application of Malathion @ 0.2 % against Flea beetle	Spray of HaNPV @ 250LE/ha or Fipronil (5%SC)@0.2% against pod borer	Disinfection of storage structure to manage stored grain pests

Horticulture				
Solanaceous vegetables	Spraying Profenophos+Cypermethrin @ 0.2 % against hadda beetle, hand collection of egg mass Soil drenching of COC & Streptocycline against wilting	Application of Neem oil @ 0.5%& Cartap hydrochloride 0.2 % alternatively against brinjal fruit & shoot borer	Spraying of Profenophos @ 0.2 % against fruit borer Difenoconazole+Azoxystrobin @ 0.1 % against Anthracnose and dieback	Segregation of infested fruits & destruction either by burning or deep inside the soil
Cucurbit vegetables	Spraying of Indoxacarb @ 0.04 % against Red pumpkin beetle, Collection & destruction of eggs/grubs, Soil drenching of COC & Streptocycline @ 0.01 % against wilting	Spraying Fipronil 5%SC@ 0.2 % against leaf eating caterpillars Wettable sulphur @ 0.5 % against Powdery mildew, Carbendazim +Mancozeb @ 0.2 % against leaf spot & blight	Poison baiting with Malathion & Jaggery against fruit fly Installation of parapheromone traps @20ns/ha with cuelure developed by CHES, BBSR	Destruction of overripe & infested fruits

Livestock, Poultry & Fisheries

Suggested contingency measures				
	Before the event	During the event	After the event	
Drought				
Non availability feed and fodder	Awareness camp, Reserve stock of feeding material Essential to produce fodder bank , use of multicut fodder variety.	Dried feed @6kg/day, fodder cultivation with limited water	Application of multivitamins, minerals	
Shortage of drinking water	Cement pit near tube well, Use of rain harvesting structures, Awareness campaign among the villagers, NGOs & SHG	Judicious use of the available water	small water bodies to be created, preventive measures,	
Occurrence of diseases	Awareness, deployment of officials	Diagnosis of the disease and curative measures ,food and nutrient support	Disease preventive and curative measures	
Heat wave and cold wave				
Shelter/environment management	Temporary shelter, green cover	Temporary shelter, don't leave for grazing, sufficient water	Application of multivitamins and nutrients	
Non availability feed and fodder	Awareness camp, Reserve stock of feeding material Essential to produce fodder bank	Dried feed @6kg/day, fodder cultivation with limited water	Application of multivitamins, minerals	
Shortage of drinking water	Cement pit near tube well, Use of rain harvesting structures, Awareness campaign among the villagers, NGOs & SHG	Judicious use of the available water	small water bodies to be created, preventive measures,	

Poultry

	Before the event	During the event	After the event
Drought			
Shortage of feed ingredients	Awareness through Farmers Club, SHGs, for feed reserve stock	Distribution of poultry feed	Emphasis on availability of feed from locally available ingredients
Shortage of drinking water	Awareness through SHGs, Farmers Club	Drinking water sufficiently provided	Pure drinking water and vaccines to be given
Occurrence of diseases	Awareness through SHGs, Farmers Club	Vaccines to be given	Minimum health care, sanitation, hygiene and preventive cares to be taken
Heat wave and cold wave			
Shelter/environment management	Awareness through Farmers club, SHGs, Youth Clubs	Should be weed free without wild fish, soil and water pH to be maintained	Soil, water, all environment should be ideal.
Occurrence of diseases and health problem	Awareness through, SHGs, Youth Clubs.	Medicines should be kept and given as and when necessary	Soil and water should be tested periodically and steps should be taken in this regard.

Fisheries/ Aquaculture

Suggested contingency measures			
	Before the event	During the event	After the event
Drought			
Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Building deep ditches in culture ponds for shelter of the fish to over come high temperature and sudden death	1. Recharge the ponds with bore well, reservoir water or water from other sources. 2. Partial harvesting of the aged stock to reduce stocking density and enlarge the environment periphery 3. Artificial shelter by putting aquatic floating weeds, bushy plants in	awareness campaign regarding the multi-purpose use of short seasonal ponds and carry out short seasonal pisciculture practices like fingerling production

		1/3rd area	
(ii) Impact of salt load build up in ponds / change in water quality	Application of organic manure (Cow dung, Poultry manure) in culture system	Recharge the ponds with bore well water or water from other sources	Application of seasoned organic manure in culture system followed by the application of Urea /DAP
Heat wave and cold wave			
(i) Changes in pond environment (water quality)	During hot waves adequate water depth (1.5-2m) should be maintained.	During hot waves mixing of water with fresh water should be done. While adding water net should be provided in the inlet point to avoid the entry of unwanted/predatory fishes. Aeration of ducks should be introduced in the culture ponds to avoid oxygen depletion due to high temperature during hot waves. Partial harvesting of the aged fish can be done to avoid loss of crop and sudden mortality of the fish due to excess stress	Proper post stocking management of the pond environment should be carried out.
(ii) Health and Disease management	Application of lime and turmeric.	ÉFeeding should be minimized as per the feed intake ÉIf cold waves persists EUS outbreak takes place	Application of CIFAX to control EUS disease in fish and lime to balance the pH.