State: ANDHRA PRADESH

Agriculture Contingency Plan for District: NIZAMABAD

1.0 District Agriculture profile					
1.1	**Agro-Climatic/Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	Deccan Plateau (Telangana) And Eastern Gh ESR (7.2)			
	Agro-Climatic Region (Planning Commission)	Southern Plateau hills Region (X)			
	Agro Climatic Zone (NARP)	Northern Telangana Zone (AP-4)			
	List all the districts or part thereof falling under the NARP Zone	Nizamabad, Adilabad, Karimnagar, parts of Medak, Warangal and Khammam			
	Geographic coordinates of district	Latitude		Longitude	Altitude
		18°05' - 19°05'		77° 04' - 78°37'	395 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RRS, Rudrur, Nizamabad-503188			
	Mention the KVK located in the district	KVK, Bodhan			
1.2	**Rainfall**	Average (mm)	Normal rainy days (no)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	696	37	2nd week of June	2nd week of October
	NE Monsoon(Oct-Dec):	72	6	2nd week of October	4th week of December
	Winter (Jan- March)	29	3	----	
	Summer (Apr-May)	16	2		
	Annual	813	48		

1.3	**Land use pattern of the district** (latest statistics)	Geographical Area (ha)	Forest area (ha)	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	795.6	169.3	87.6	24.1	15.6	2.4	47.1	98.2	82.8

1. 4	**Major Soils (common names like shallow red soils etc.,)**	**Area ('000 ha)**	**Percent (%) of total**
	1.Red soils	110	43
	2. Black soils	128	50
	3. Others	18	7
1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	255.3	161.5
	Area sown more than once	157.1	
	Gross cropped area	412.4	

1.6	**Irrigation**	Area (‘000 ha)		
	Net irrigated area	174.3		
	Gross irrigated area	302.1		
	Rainfed area	81.0		
	Sources of Irrigation	Number	Area (‘000 ha)	Percentage of total irrigated area
	Canals		15.5	9.1
	Tanks	-	6.2	3.6
	Tube wells & Filter point	-	142.8	84.0
	Lift irrigation	-	10	6
	Other sources	-	3	2
	Pump sets	-		
	Total Irrigated Area	-	170	
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	
	Over exploited	4	-	
	Critical	17	-	
	Semi- critical	10	-	
	Safe	14	-	
	Wastewater availability and use			
	Ground water quality			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe:<70%				

Area under Major field crops & Horticulture etc. (2008-09)

1.7		**Major Field Crops cultivated**	**Area ('000 ha)**					
			Kharif		***Rabi***		**Summer**	**Total**
			Irrigated	***Rainfed***	***Irrigated***	***Rainfed***		
	1	Groundnut						
	2	Redgram						
	3	Sunflower						
	4	Sorghum						
	5	Rice						
	6	Maize						
	7	Cotton						
		Horticulture crops - Fruits	**Total area**					
	1	Mango	1.55					
		Horticultural crops - Vegetables	**Total area**					
	1	Chillies	1.84					
	2	Tomato	2.33					

		Spices and Plantation crops	Total area		
	1	Turmeric	10.36		
		Fodder crops	Total area		
	1				
		Total fodder crop area			
		Grazing land			
		Sericulture etc			
		Others (Specify)			

1.8	**Livestock**	**Male (number)**	**Female (number)**	**Total (number)**
	Non descriptive Cattle (local low yielding)	250.2	170.4	420.7
	Crossbred cattle	1.3	3.1	4.4
	Non descriptive Buffaloes (local low yielding)	69.2	402.8	472.1
	Graded Buffaloes			
	Goat			509.4
	Sheep			912.0
	Others (Camel, Pig, Yak etc.)			
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds (number)**	
	Commercial		498888	

	Backyard				855477		
1.10	**Fisheries** (Data source: Chief Planning Officer)						
	A. Capture						
	i) Marine (Data Source: Fisheries Department)	**No. of fishermen**	**Boats**		**Nets**		**Storage facilities (Ice plants etc.)**
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
	ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
		15		3		492	
	B. Culture						
		Water Spread Area (ha)		**Yield (t/ha)**		**Production ('000 tons)**	
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	-		-		-	
	ii) **Fresh water** (Data Source: Fisheries Department)	53		-		0.3	
	Others	-		-		17.8	

1.11	Production and Productivity of major crops (Average of last 5 years: 2004,05,06, 07, 08)	Kharif		Rabi		Summer		Total		Crop residue as fodder (‘000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
1	Rice	301	3226	169	3214	-	-	469	3207	-
2	Maize	203	3970.8	52.6	4890.8	-	-	255.6	4162.4	-
3	Greengram	6.4	373.6	0.4	609	-	-	6.8	386.6	-
4	Blackgram	5.8	392.4	1	654.6	-	-	6.8	421	-
5	Redgram	2.2	63.8	0	0	-	-	2.2	63.8	-
6	Soybean	42.96	1462.6	0	0	-	-	42.96	1462.6	-
7	Sugarcane	1250.6	80983	21.6	0	-	-	1272.2	80983	-
Major Horticultural crops										
Horticulture crops - Fruits										
1	Mango							12.893	8267	
Horticultural crops - Vegetables										
2	Chillies							5.080	2750	
3	Tomat0							44.378	19000	
Spices and Plantation crops										
4	Turmeric							64.280	6200	

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Paddy	Maize	Cotton	Redgram	Greengram
	Kharif- Rainfed			June 2nd week to July 1st week	June 2nd fort night	June 2nd fort night
	Kharif-Irrigated	May 4th week to July 3rd week	June 2nd week to july 2nd week	June 2nd week to July 1st week		
	Rabi- Rainfed					
	Rabi-Irrigated	Octber 1st week to November 2nd week	Octber 2nd week to December 1st week			

1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought		√	
	Flood			√
	Cyclone			√
	Hail storm		√	
	Heat wave		√	
	Cold wave		√	
	Frost			
	Sea water intrusion			√
	Pests and diseases (specify)	√		

1.14	Include Digital maps of the district for	Location map of district within State as Annexure I	Enclosed: No
		Mean annual rainfall as Annexure 2	Enclosed: No
		Soil map as Annexure 3	Enclosed: No

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measured**	**Remarks on Implementation**
Delay by 2 weeks (Up to June 4th week)	Rainfed- Black Soils	Cotton	No change		
		Redgram	No change		
		Soybean	No change		
		Maize + Redgram (2:1)	No change		
		Greengram	No change		
	Rainfed red sandy loam	Maize+Redgram (2:1)	No change		
		Maize	No change		
		Redgram	No change		
		Turmeric + Maize	No change		

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 4 weeks (Up to July 2nd week)	Rainfed black Soils	Cotton	No change		
		Redgram	No change	Prefer wilt resistant medium duration varieties (Maruthi, PRG-158)	
		Soybean	No change		
		Maize + Redgram	No change	Prefer Wilt Resistant Medium Duration varieties (Maruthi, PRG-158)	
		Green gram	No change		
	2. Red sandy loam	Maize+Redgram	No change	Prefer Wilt Resistant Medium Duration varieties (Maruthi, PRG-158)	
		Maize	No change		
		Redgram	No change	Prefer Wilt Resistant Medium Duration varieties (Maruthi, PRG-158)	
		Sunflower	No change		
		Turmeric + Maize	Sunflower		

Condition			Suggested Contingency measures		
Early season drought (Upto July 4th week)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 6 weeks (Upto July 4th week)	Rainfed Black Soils	Redgram	No change	closer spacing	
		Maize + Redgram	Redgram	Prefer short duration variety / hybrids	
		Cotton	Redgram	closer spacing	
		Soybean	Redgram	Closer spacing	
		Greengram	Redgram		
	Rainfed red sandy loam	Redgram	Redgram/cluster bean	closer spacing (90x20 cm)	
		Maize + Redgram	Sunflower / Castor	Prefer medium duration variety / hybrid	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/croppig system[c]**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks (Upto August 2nd week)	Rainfed black Soils	Redgram	Sunflower/Castor/Horsegram	Adopt closer spacing	
	Rainfed red sandy clay loam	Maize + Redgram	Sunflower Hybrids: MSFH 8, MSFH 17, APSH 11, BSH 1 and popular private hybrids Varieties: Modern: EC 68414	Wilt resistant medium duration varieties (Maruthi, PRG -158.), Adopt closer spacing (90 x 20 cm)	

Condition			Suggested Contingency measures		
Early season drought **(Normal onset)**	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
Normal onset followed by 15-20	Rainfed black Soils	Cotton	Gap filling by raising nursery in polythene bags		

days dry spell after sowing leading to poor germination/crop stand etc.		Redgram	-		
		Maize + Redgram	-		
		Soybean	-		
		Greengram	-		
		Sesamum	-	Thinning	
	Rainfed red sandy loam	Maize + Redgram	-	Thinning	
		Maize	-		
		Turmeric + Maize	-		

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
At vegetative stage	Rainfed black Soils	Cotton	-	Frequent intercultivation Spray 2% urea or 2%DAP 2-3 times at 10-15 days interval	
		Redgram	-		
		Maize + Redgram	-		
		Soybean	-		

		Greengram	-		
		Sesamum	-		
	Rainfed red sandy loam	Maize + Redgram	-		
		Maize	-		
		Turmeric + Maize	-	Supplemental irrigation	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
At reproductive stage	Rainfed black Soils	Cotton	-	Frequent intercultivation Spray 2% urea or 2%DAP 2-3 times at 10-15 days interval	
		Redgram	-		
		Maize + Redgram	-		
		Soybean	-		
		Greengram	-		
		Sesamum	-		

	Rainfed red sandy loam	Maize + Redgram	-	Provide supplemental irrigation	
		Maize	-	Limited irrigation in alternate rows	
		Turmeric + Maize	-	Supplemental irrigation	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management**	**Rabi crop planning**	**Remarks on Implementation**
Terminal drought	Rainfed black Soils	Cotton	-	Spray 2% urea or 2%DAP 2-3 times at 10-15 days interval	
		Redgram	-		
		Maize + Redgram	-		
		Soybean	-	In case of crop failure, go for normal rabi crops of Jowar, Safflower, Sunflower	
		Greengram	-		
		Sesamum	-		
	Rainfed red sandy loam	Maize + Redgram	-	Provide supplemental irrigation	

		Maize	-	Limited irrigation in alternate rows	
		Turmeric + Maize	-	Supplemental irrigation	

2.1.2 Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed release of water in canals due to low rainfall	1. Irrigated Red & black soils	Paddy	Paddy	Wherever possible green manure crops like Sunhemp,Pillipesara, Greengram may be sown with little showers some portion of sunhemp may be fed as fodder left over may be incorporated as and when release of water Dry seeding of rice can also be taken-up Gallmidge resistant varieties like Eerramallelu, Kavya, Jagityal sannalu, Polasaprabha are preferred Nitrogen application in nurseries may be avoided Transplantation of aged seedlings by adjusting	
	2. Irrigated red sandy loam	Maize	No change	Select short duration hybrids.	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
				Irrigated at critical stages (silking and tasseling stages)	
		Cotton	No change	Select short duration Pvt. hybrids. Irrigated critical(square and boll formation stage)	

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Limited release of water in canals due to low rainfall	Irrigated medium black soils	Rice	Rice or ID crops like maize, sunflower	Alternate wetting and drying	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures[i]**	**Remarks on Implementation**
Non release of water in canals under delayed onset of monsoon in catchment	Irrigated red &black soils	Rice	Sunflower Castor		

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Irrigated red &black soils	Rice	Rice	1. Short duration varieties like Erramallelu, Jagtiala Sannalu, WGL-44, JGL-3844, MTU-1010 and Tellahamsa are preferred over	

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
				traditional varieties. 2. Sowing of green manure crops 3. Raising nurseries with medium duration rice varieties (JGL-384, WGL-14, WGL-32100, JGL-3824, JGL-11470). 4. Planting aged seedling	

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Insufficient groundwater recharge due to low rainfall	Irrigated red &black soils	Rice	Sunflower Redgram Chickpea Safflower	Irrigated critical stages .	

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

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post- harvest**
Paddy	Drain out excess water Take-up plant protection measures	Drain out excess water. Timely Plant protection Measures are to be taken up	Drain out excess water	Spray salt solution to prevent germination of paddy
Cotton	Drain out excess water Take-up plant protection measures	Drain out excess water. Timely Plant protection Measures	Drain out excess water	

		are to be taken up		
Maize	Drain out excess water Take-up plant protection measures	Drain out excess water. Timely Plant protection Measures are to be taken up	Drain out excess water	1.Shifting of cobs immediately after drying
Redgram	Drain out excess water Take-up plant protection measures	Drain out excess water. Timely Plant protection Measures are to be taken up	Drain out excess water	
Greengram	Drain out excess water Take-up plant protection measures	Drain out excess water. Timely Plant protection Measures are to be taken up	Drain out excess water	
Horticulture				
Mango	• Drain the excess water as soon as possible • Spray 1% KNO3 or Urea 2% solution 2-3 times. • Wind damaged branches should be pruned using disinfected secatures and cut ends must be smeared with Bordeaux paste	• Drain the excess water as soon as possible • Spray 1% KNO3 or Urea 2% solution 2-3 times.	• Drain the excess water as soon as possible • Harvest the mature produce in a clear sunny day'	• Store the fruits in well ventilated place temporarily before it can be marketed. • Market the fruits as soon as possible.
Horticultural crops - Vegetables				
Chillies	• Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible. • Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop. • In case of severe damage (considered as complete	• Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible.	• Drain the excess water as soon as possible • Harvest the matured fruits in a clear sunny day.	• Dry the pods on concrete floor immediately after the appearance of sunlight (or). • Use poly house solar driers for quick drying • Grade the pods and market as soon as possible. • Do not store such produce for long periods.

	economical loss), and the contingency period is between June to August, sowing of best alternative crop must be taken up.			
Tomato	• Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 12 kg MOP + 30 kg Urea per acre as soon as possible. • Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop. • In case of severe damage (considered as complete economical loss), and the contingency period is between June to August, sowing of best alternative crop must be taken up.	• Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 10 kg MOP + 30 kg Urea per acre as soon as possible.	• Drain the excess water as soon as possible • Harvest the marketable fruits in a clear sunny day'	• Store the harvested fruits in well ventilated place temporarily before it can be marketed. • Market the fruits as soon as possible.
Spices and Plantation crops				
Turmeric	• Drain the excess water as soon as possible • Spray Urea 2% or 1% KNO3 followed by Ferrous Sulphate 0.5% + Citric Acid 0.1 % solution 2-3 times. • Topdressing of booster dose of 40 kg MOP + 50 kg Urea along with 250 kg of Neem Cake per acre as soon as possible. • In case of severe damage (considered as complete	• Drain the excess water as soon as possible • Spray Urea 2% or 1% KNO3 solution 2-3 times.	• Drain the excess water as soon as possible • Harvest the rhizomes when field comes to normal	• Dry the rhizomes on concrete floor or use boilers (if available) for processing immediately • Grade and separate the rotten and mould affected rhizomes. • Pack the dried material in gunny bags disinfected with safe insecticides • Store in a well ventilated rooms

	economical loss or if inundation is more than for four days), and the contingency period is between June to August, sowing of best alternative crop must be taken up.			

2.3 Floods

Condition	**Suggested contingency measure[o]**			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Paddy	Drain out excess water Take-up plant protection measures	Drain out excess water. Timely Plant protection Measures are to be taken up	Drain out excess water	
Cotton	Drain out excess water Take-up plant protection measures	Drain out excess water. Timely Plant protection Measures are to be taken up	Drain out excess water	
Maize	Drain out excess water Take-up plant protection measures	Drain out excess water. Timely Plant protection Measures are to be taken up	Drain out excess water	
Redgram	Drain out excess water Take-up plant protection measures	Drain out excess water. Timely Plant protection Measures are to be taken up	Drain out excess water	
Greengram	Drain out excess water Take-up plant protection measures	Drain out excess water. Timely Plant protection Measures are to be taken up	Drain out excess water	
Horticulture				
Horticulture crops - Fruits				
Mango	• Drain the excess water as soon as possible • Spray 1% KNO3 or Urea	• Drain the excess water as soon as possible • Spray 1% KNO3 or Urea	• Drain the excess water as soon as possible	• Drain the excess water as soon as possible. • Harvest the mature

	2% solution 2-3 times.	2% solution 2-3 times.	• Spray 1% KNO3 or Urea 2% solution 2-3 times.	fruits as soon as possible. • Store the fruits in well ventilated place temporarily before it can be marketed. • Market the fruits as soon as possible.
Horticultural crops - Vegetables				
Chilies	• Drain the excess water as soon as possible	• Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible. • Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop.	• Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible.	• Drain the excess water as soon as possible. • Dry the pods on concrete floor/ tarpaulins. • Spray any drying oil after the pods are free from surface moisture for quick drying. • use poly house solar driers for quick drying • Remove the pest and disease infected pods. • Market the produce as soon as possible .
Tomato	• Drain the excess water as soon as possible	• Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 10 kg MOP + 30 kg Urea per acre as soon as possible.	• Drain the excess water as soon as possible • Spray Urea 2% solution once.	• Drain the excess water as soon as possible. • Harvest the mature produce as soon as possible. • Store the produce in well ventilated place temporarily before it can be marketed. • Market the produce as soon as possible.
Spices and Plantation crops				

Turmeric		• Drain the excess water as soon as possible • Spray Urea 2% or 1% KNO3 solution 2-3 times. • Spray ferrous sulphate 20g + citric acid 5g in 10 lit of water twice at weekly intervals	• Drain the excess water as soon as possible • Spray Urea 2% or 1% KNO3 solution 2-3 times. • Spray ferrous sulphate 20g + citric acid 5g in 10 lit of water twice at weekly intervals	• Drain the excess water as soon as possible. • Dry the rhizomes on concrete floor immediately after the appearance of sunlight. Mix thoroughly and periodically for quick and uniform drying of surface moisture. • Use boilers and polishers for processing • Remove and separate the rotten and mould affected rhizomes. • Cook and dry the rhizomes as soon as possible.
Continuous submergence for more than 2 days[2]	-NA-	-NA-	-NA-	-NA-
Sea water intrusion[3]	-NA-	-NA-	-NA-	-NA-

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone

Extreme event type	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave				
Paddy	Irrigation in early hours			
Maize	Mulching			
Cotton	Mulching	Spray 2% urea solution		
Horticulture				
Mango	• Cover the newly planted	• Mulch	• Increase the frequency of irrigation.	Harvest the fruits

	plants with dry leaves • Increase the frequency of irrigation.	the plant basins with dried leaves • Increase the frequency of irrigation	• Provide irrigation at critical stages viz;peanut size and lemon size	either in the morning or in the evening Use ripening chambers for getting quality fruits
Banana	• Cover the newly planted plants with dry leaves • Increase the frequency of irrigation.	• Mulch the plant basins with dried banana leaves • Increase the frequency of irrigation	• Cover the developing bunches with banana leaves • Increase the frequency of irrigation.	• Harvest the bunches either in the morning or in the evening • Use ripening chambers for getting quality fruits
Cold wave				
Paddy	Irrigating in night and removal of water During the day Application of double dose of p- fertilizers to the Nursery			
Frost				
Hailstorm				
Cyclone				

Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

General contingency measures

Before the event[s]	During the event	After the event
Feed and fodder availability		
1.Conserving fodder/crop residues/ forest grass by silage / hay making either by individual or on community basis 2. Preparing complete diets and storing in strategic locations 3. Organize procurement of dry fodders / feed ingredients from surplus areas 4. Establish fodder banks and feed banks 5. Livestock relief camps during floods/cyclones must be planned in the vicinity of relief camps for people 6. Capacity building and preparedness	1.Organise relief camps 2.Supply silage / hay to farmers with productive stock on subsidized rates 3.Segregate old, weak and unproductive stock and send for slaughter 4. Supply mineral mixture to avoid deficiencies 5. Dry fodder must be offered to the livestock in little quantities for number of times 6.Concentrate feed or complete feed must be offered to only productive and young stock only	1. Capacity building to stake holders on drought /cyclone/flood mitigation in livestock sector 2. Promote fodder cultivation. 3. Flushing the stock to recoup 4. Avoid soaked and mould infected feeds / fodders to livestock 5. Replenish the feed and fodder banks 6.Promote fodder preservation techniques like silage / hay making
Drinking water		
1.Construct drinking water tanks in herding places, village junctions and in relief camp locations 2.Plan for sufficient number of tanks for water transportation 3.Identify bore wells, which can sustain demand. 4.Procure sufficient quantities of water Sanitizers	1.Regular supply of clean drinking water to all tanks 2.Cleaning the tanks in regular intervals 3.Keep the livestock away from contaminated flood/cyclone/stagnated waters 3.Add water sanitizers	1.Hand over the maintenance of the structures to panchayats 2.Sensitize the farming community about importance of clean drinking water
Health and disease Management		

1.Procure and stock emergency medicines and vaccines for important endemic diseases of the area 2. All the stock must be immunized for endemic diseases of the area 3. Carry out deworming to all young stock 4. Keep stock of bleaching powder and lime 5.Carry out Butax spray for control of external parasites 6.Identify the Clinical staff and trained paravets and indent for their services as per schedules 7.Identify the volunteers who can serve in need of emergency	1.Keep close watch on the health of the stock 2.Sick animals must be isolated and treated Separately. 3. Carry out deworming and spraying to all animals entering into relief camps 4. Clean the animal houses regularly and apply disinfectants. 5.Safe and hygienic disposal of dead animal carcasses 6. Organize with community daily lifting of dung from relief camps	1.keep close surveillance on disease outbreak. 2.Undertake the vaccination depending on need 3.Keep the animal houses clean and spray disinfectants

Detailed contingency strategies for Livestock

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Feed and Fodder availability	Available paddy straw and sorghum stover should be properly stored for future use. Chopping of fodder should be made as mandatory in every village through supply and establishment of good quality chaff cutters. Harvesting and collection of perennial vegetation particularly grasses which grow during monsoon Proper drying, bailing and densification of harvested grass from previous season Creation of permanent fodder, feed and fodder	Harvest and use biomass of dried up crops (Jowar, paddy, maize, greengram, blackgram etc.,) material as fodder. Harvest the tree fodder (Neem, Subabul, Acasia, Pipal etc) and unconventional feeds resources available and use as fodder for livestock (LS). Available feed and fodder should be cut from CPRs and stall fed in order to reduce the energy requirements of the animals Hay should be transported to the needy areas from the near by districts in case of mild	Short duration fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAINT BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 should be sown in unsown and crop failed areas where no further routine crop sowing is not possible

	seed banks in all drought prone areas	drought Advise the farmers about the practice of mixing available kitchen waste with dry fodder while feeding	
Cyclone	NA		
Floods	NA		
Heat & Cold wave	NA		

Vaccination programme for cattle and buffalo:

Disease	**Age and season at vaccination**
Anthrax	In endemic areas only, Feb to May
Haemorrhagic septicaemia (HS)	May to June
Black quarter (BQ)	May to June
Foot and mouth disease (FMD)	July/August and November/December

Vaccination schedule in small ruminants (Sheep & Goat)

Disease	**Season**
Foot and mouth disease (FMD)	Preferably in winter / autumn
Peste des Petits Ruminants (PPR)	Preferably in January
Black quarter (BQ)	May / June
Enterotoxaemia (ET)	May
Haemorrhagic septicaemia (HS)	March / June
Sheep pox (SP)	November

2.5.2 Poultry

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
Drought			
Shortage of feed ingredients	Storing of house hold grain like bajra, maize, broken rice, etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Supplementation to all survived birds
Drinking water		Use water sanitizer or offer cool drinking water	

Health and disease management	Culling of sick birds. Deworming and vaccination against RD and fowl pox	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water)	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
Floods	NA		
Cyclone	NA		
Heat and Cold wave	NA		

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
1) Drought			
A. Capture			
Inland			
(i) Shallow water depth due to insufficient rains/inflow	Stocking of advnced fingerlings in half or even less than the normal stocking density or stocking of common carp seed	Immediate harvesting or decreasing the density commensurate with the water quantity.	De weeding and deepening of tank to ensure retention of water for a longer period and provision of employment under MGNREGP
(ii) Changes in water quality	Regular monitoring of water quality parameters and application of geolites, soil probiotics, etc to maintain water qaulity	Immediate harvesting or changing the water quality by application of sanitisers.	Removal of top layer, deep ploughing of tank and application of lime
(iii) Any other			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Crop holiday or going for stocking of yearlings by reducing the density	Harvesting of fish and leaving the	Removal of top layer, deep ploughing of tank and application of

	according to availability of water	pond fallow till next season	lime
(ii) Impact of salt load build up in ponds / change in water quality	Stocking of salinity tolerant fish / shrimp, application of geolites and other buffers	Frenquent change of water with fresh water	Frequent draining of the pond with fresh water, removal of top layers
(iii) Any other			
2) Floods			
A. Capture			
Marine	No intervention	No intervention	No intervention
Inland			
Loss of stock	Avoidance of surface species like catla, silver carp since they are vulnerable in tanks prone to floods, erection of nets across the spill way or just beyond it	Erection of nets at spill ways	Taking up compensatory stocking
Changes in water quality		When dissolved oxygen levels go down, aerators, recirculation of water, etc are to be attempted to maintain DO levels, going for partial harvest, etc	
Health and diseases	Sometimes there may be heavy accumulation of nutrients and organic matter.	There may be break out of Heamorrhagic septicimea. Addition of antibiotics like Chloro Tetra Cycline or Oxy Tetra Cycline to the feed to constrol the disease	Removal of weeds, top layer of soil, deep ploughing of tank and application of lime, exposing to sun light
B. Aquaculture			
(i) Inundation with flood water	Raising and rivetting the bunds, construction of spill way to release excess water, erection of nets to avoid escape of fish	Continuous pumping of excess water, erection of nets low lying areas	Strengthening of bunds, excavating channels along the sides of the ponds for free escape of water
(ii) Water continuation and changes in water quality		When dissolved oxygen levels go down, aerators, recirculation of	

		water, etc are to be attempted to maintain DO levels, going for partial harvest, etc	
(iii) Health and diseases	Sometimes there may be heavy accumulation of nutrients and organic matter.	There may be break out of Heamorrhagic septicimea. Addition of antibiotics like Chloro Tetra Cycline or Oxy Tetra Cycline to the feed to constrol the disease	Removal of weeds, top layer of soil, deep ploughing of tank and application of lime, exposing to sun light
(iv) Loss of stock and inputs (feed, chemicals etc)	Advance erection of nets, strengthening of bunds where they are prone to breaches, harvesting or reducing the density	Suspension of feeding, application of organic manures	Compensatory stocking, assessment of values and payment of subsidy on inputs
(v) Infrastructure damage (pumps, aerators, huts etc)	Insuring pond, accessories, etc., Shifting of aerators, pumps soon after warnigs are issued	Relocating pumps, aerators to elevated places	Assessment of damages and provision of them on subsidy
(vi) Any other			
3. Cyclone / Tsunami			
A. Capture			
Inland	Erection of protective nets acroos the surplus weir to prevent fish loss due to overflows	Continuous monitoring to prevent or minimise escape of fish along with surplus water	Compensatory stocking of seed
B. Aquaculture			
(i) Overflow / flooding of ponds	The design of the pond must be in such a manner as to bail out surplus water and to prevent loss of stanidng crop	Continuous monitoring to prevent or minimise escape of fish along with surplus water	Compensatory stocking of seed
(ii) Changes in water quality (fresh water / brackish water ratio)	Recircualtion water to repleish and ensure sufficient dissolved oxygen levels in the pond. Maintenance of salinity levels by pumping in water from creecks.	Continuation of the same process.	Restoration of physical and chemical parameters

(iii) Health and diseases	Removal of stress causing factors to maintain the health of the animal	Removal of stress causing factors to maintain the health of the animal	Restoration of physical and chemical parameters
(iv) Loss of stock and inputs (feed, chemicals etc)	Preventive nets must be erected to minimise loss of stock	Continuation of the same process.	Compensatory stocking of seed
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	Pumps, aerators, etc must be protected by moving them to safe locations	To avoid use of aerators, pumps and other appliances	Overhauling of the eqipment to prevent from being damaged
(vi) Any other			
4. Heat wave and cold wave			
A. Capture			
Inland	Monitoring dissolved oxygen levels	Monitoring dissolved oxygen levels	No intervention
B. Aquaculture			
(i) Changes in pond environment (water quality)	Reduction of biomass by partial harvest in the event of heat as the DO levels will be very low.	Avoidance of fishing	Compensatory stocking of seed and restoration of all physical and chemical parameters
(ii) Health and Disease management	Removal of stress causing factors to maintain the health of the animal	Removal of stress causing factors to maintain the health of the animal	Compensatory stocking of seed and restoration of all physical and chemical parameters
(iii) Any other			