

State: ANDHRA PRADESH

Agriculture Contingency Plan for District: ANANTHAPURAMU

1.0 District Agriculture profile					
1.1	Agro-Climatic/Ecological Zone				
	Agro Ecological Region /Sub Region (ICAR)	Karnataka plateau Rayalaseema as inclusive Agro Ecological Sub Region (3.0)			
	Agro-Climatic Region (Planning Commission)	Southern Plateau and Hills Region (X)			
	Agro Climatic Zone (NARP)	Scarc rainfall zone of Andhra Pradesh (AP-6)			
	List all the districts or part thereof falling under the NARP Zone	Ananthapuramu (entire district) and Kurnool (entire district)			
	Geographic coordinates of district	Latitude	Longitude	Altitude	
		14 ⁰ 41' N	77 ⁰ 37' E	350 m	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Agricultural Research Station, Nandyal			
	Mention the KVK located in the district	KVK, Reddipalli and KVK, Kalyandurg			
1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)	
	SW monsoon (June-Sep):	338	1 st week of June	2 nd week of October	
	NE Monsoon(Oct-Dec):	155	3 rd week of week October	1 st week of December	
	Winter (Jan- March)	3			
	Summer (Apr-May)	56			
	Annual	552			

1.3	Land use pattern of the district (latest statistics 2017-18)	Geographical area	Forest area	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)	1913.0	197.0	150.8	5.8	45.4	9.3	164.7	432.2	113.5
1.4	Major Soils		Area ('000 ha)		Percent (%) of total					
	1. Shallow red soils		934		78					
	2. Black soils		239		20					
	3. Others		23		2					
1.5	Agricultural land use		Area ('000 ha)		Cropping intensity %					
	Net sown area		793		106					
	Area sown more than once		49							
	Gross cropped area		842							

*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%

1.6	Irrigation	Area ('000 ha)	Percent (%)		
	Net irrigated area	136.5			
	Gross irrigated area	174.1			
	Rainfed area	656.5			
	Sources of Irrigation	Number	Area ('000 ha)	% area	
	Canals		10.997	6.4	
	Tanks		3.181	1.8	
	Tube wells & filter points		121.24	69.7	
	Lift irrigation		0.089	-	
	Other sources		0.866	0.5	
	Total		136.5		
	Pump sets				
	Micro-irrigation	28,692	33.55	19.3	

Groundwater availability and use	No. of blocks	% area	Quality of water
Over exploited	28	12	Normal
Critical	12	8	Saline /Alkaline
Semi- critical	9	15	Chloride
Safe	NA	65	Fluoride
Wastewater availability and use	1443.25	NA	

Area under major field crops & horticulture etc. (2017-18)

*If break-up data (irrigated, rainfed) is not available, give total area

1.7	Major Field Crops cultivated	Area ('000 ha)*					
		Kharif		Rabi		Summer	Total
		Irrigated	Rainfed	Irrigated	Rainfed		
1	Groundnut	-	402.4	20.7		-	423
2	Bengalgram				74		74
3	Sunflower		1.44	0.52			1.95
4	Rice	12.29	-	18.6	-	-	30.9
5	Redgram		72.8				72.8
6	Sorghum		18.4		4.45	-	22.9
7	Maize	19.0		4.22			23.26
8	Cotton	45.43	-	0.114			45.56
9	Ragi	1.64		0.8			2.46
	Horticulture crops - Fruits	Total area					
	Horticulture crops - Fruits	Total area					
1	Sweet orange	11.94					
2	Mango	20.35					
3	papaya	0.781					
4	Banana						
	Horticultural crops - Vegetables	Total area					
1	Tomato	14.2					
2	Chillies	7.53					
	Horticultural crops flowers						
1	Marigold	0.350					

1.8	Livestock (2012 censuses)		Male (number)	Female (number)	Total (number)		
	Non descriptive Cattle (local low yielding)		181203	255345	617270		
	Crossbred cattle						
	Non descriptive Buffaloes (local low yielding)		3362	218973	371127		
	Graded Buffaloes						
	Goat				785210		
	Sheep				3879840		
	Others (Camel, Pig, Yak etc.)				28556		
	Commercial dairy farms (Number)						
1.9	Poultry		No. of farms	Total No. of birds (number)			
	Commercial			1589288			
	Backyard						
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	
34		5		326			

1.11	Production and Productivity of major crops (Average of last 3 years: 2015, 2016,2017)	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
1	Groundnut	323.8	697					323.8	697
2	Bengal gram			30.2	463			30.2	463
3	Paddy							120.7	4103
4	Red gram	9.8	170					9.8	170
5	Sunflower							0.044	335

Others									
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1.11	Major Horticultural crops	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
Fruits (Crops to be identified based on total acreage)									
1	Sweet Orange							75.54	7776
2	Mango							23.81	1994
3	Papaya							26.18	39840
4	Banana								
Vegetables									
1	Tomato							188.1	17430
2	Chillies							42.67	8006
Horticultural crops flowers									
1	Marigold							2.414	8183

1.12	Sowing window for 5 major crops (start and end of sowing period)	Crop 1 (Specify the crop): Groundnut	Crop 2: Paddy	Crop 3: Bengalgram	Crop 4: Jowar	Crop 5: Redgram
	Kharif- Rainfed	July	---	---	Up to July 1 st week (grain) Up to Mid Sep (fodder)	June 2 nd FN – August 1 st FN
	Kharif-Irrigated	---	July 2 nd FN-Aug 1 st FN	---	---	---
	Rabi- Rainfed	---	---	Oct 2 nd FN- Nov 1 st FN	---	--
	Rabi-Irrigated	Nov 15 th – Dec 30 th	Dec 1 st - 30 th	---	---	---

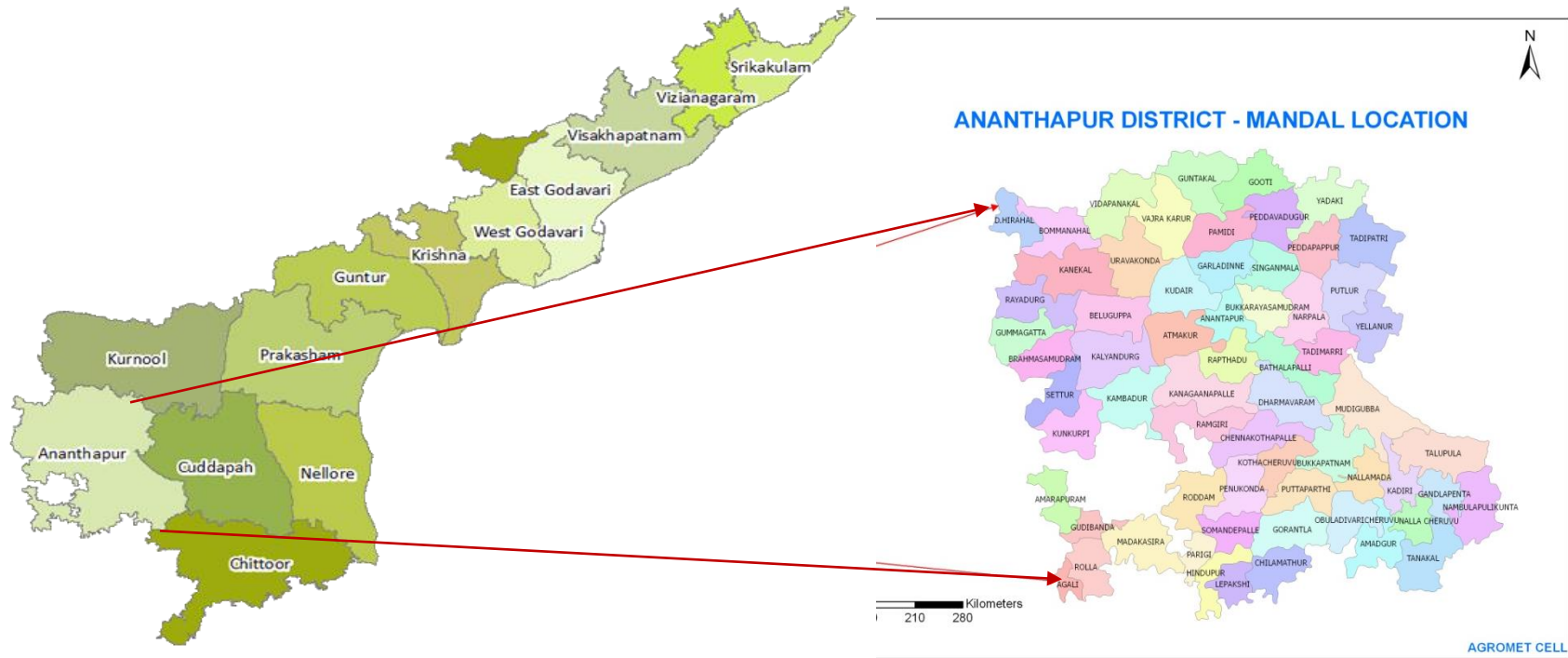
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None

	Drought	√		
	Flood			√
	High intense storms			√
	Cyclone			√
	Hail storm		√	√
	Heat wave			√
	Cold wave			√
	Frost			√
	Sea water inundation			√
	Pests and diseases (specify)	√		
		√		

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

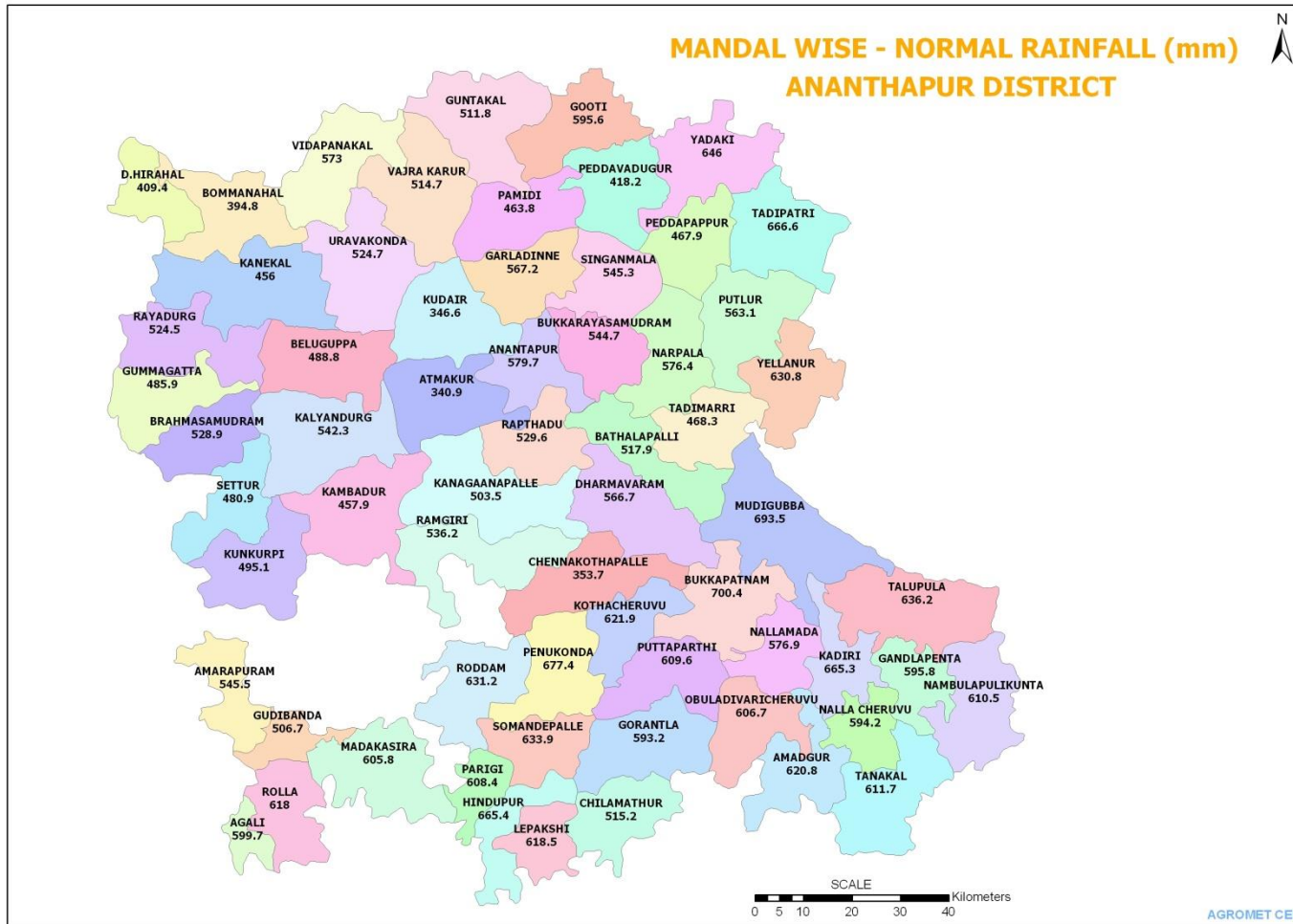
ANNEXURE-I

LOCATION MAP OF ANANTHAPUR WITH IN ANDHRA PRADESH

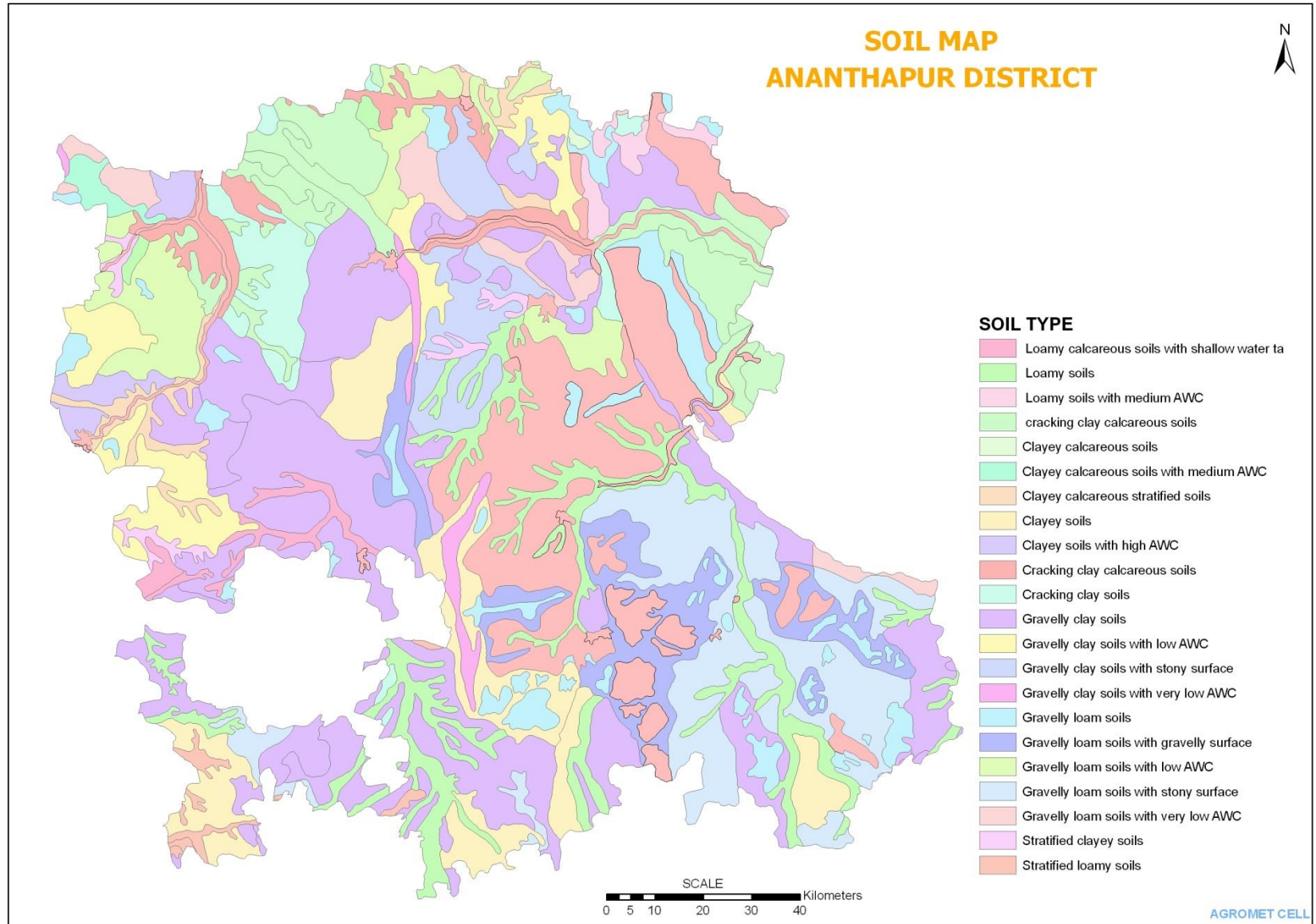


ANNEXURE-II

MEAN ANNUAL RAINFALL



ANNEXURE-III



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	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 2 weeks (Specify month) July 2 nd FN	Shallow red soils	Groundnut + Redgram intercropping (7:1)	No change	-	-
Delay by 4 weeks (Specify month) August 1 st FN	Shallow red soils	Groundnut + Redgram (15:1) inter cropping	Redgram	LRG-52, PRG 176	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 6 weeks (Specify month) August 2 nd FN	Shallow red soils	Groundnut + Redgram intercropping system	Pure crop of Jowar (CSH-9, 13, CSV-12, 13, NTJ1-3) / Pearl millet (ICTP 8203, ICMV-221, ICMH-451, ABV 04) / Cowpea / Greengram (WGG 42, LGG-460, IPM 2-14) / Setaria (SiA 3085, Suryanandi)	Jowar / pearl millet are cut for fodder at 45 DAS and 65 DAS and left for grains if rains are continued.	

Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 8 weeks (Specify month) September 1 st FN	Shallow red soils	Groundnut + Redgram intercropping system	Pure crop of Jowar (fodder) PGH-1 & 2) / Pearl millet (ICTP 8203, ICMV-221, ICMH-451, ABV 04) / Cowpea / Greengram (WGG 42, LGG-460, IPM 2-14)	1. Jowar / Pearl millet are cut for fodder at 45DAS and 65DAS and left for grains if rains are continued. 2. Top dressing of urea for millets (specify the dosage).	-
September 2 nd FN	shallow alfisols	Horse gram	Only horsegram is recommended.	No fertilizer to crop is recommended to horsegram.	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		Remarks on Implementation
Early season drought (Normal onset)	Major Farming situation	Crop/cropping system	Crop management	Soil management	Remarks on Implementation
15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	Shallow red soils	Groundnut + Redgram	----	--	--

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		Remarks on Implementation
Mid season drought (long dry spell, > 2 consecutive weeks rainless (>2.5 mm) period)	Major Farming situation	Crop/cropping system	Crop management	Soil management	Remarks on Implementation
At vegetative stage	Shallow red soils	Groundnut + Redgram	Protect the crop from Thrips which act as vectors for PBNB and PSND, Chloropyriphos @ 2ml/L at 7-10 days interval	<ul style="list-style-type: none"> ✓ Formation of conservation furrows @ 3.6 m interval at 21 DAS ✓ Intercultivation for 	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, > 2 consecutive weeks rainless (>2.5 mm) period)	Major Farming situation	Crop/cropping system	Crop management	Soil management	Remarks on Implementation
				weed control and moisture conservation ✓ Mulching with groundnut shells	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Crop/cropping system	Crop management	Soil management	Remarks on Implementation
At reproductive stage	Shallow red soils	Groundnut + Redgram	✓ Supplemental irrigation with harvested rain water in ponds (20 mm depth.) by using micro-irrigation (Sprinklers) ✓ Foliar spray with 2% KNO ₃	--	Digging of farm ponds may be encouraged under NREC

Condition			Suggested Contingency measures		
Terminal drought	Major Farming situation	Crop/cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
	shallow red soils	Groundnut + Redgram	Supplemental irrigation with harvested rain water in ponds (20 mm depth) by using micro-irrigation.	--	Digging of farm ponds may be encouraged under NREC

2.1.2 Irrigated situation

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	1. Red soils 2. Black soils 3. Tankfed areas	Paddy	ID crops like Groundnut (NOV 15 th – Dec 31 st) and Castor (Oct)		

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Tail end areas	Groundnut and sunflower	Jowar / Greengram / Horsegram are recommended during September as rainfed crops.	---	

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Tankfed red soils Tankfed black soils	Paddy	Jowar	---	

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Bore well irrigated red soils and black soils	Groundnut	No change	1. Timely sowing is advised 2. Irrigation at critical stages through Micro irrigation systems 3. Limited number of irrigations are suggested	
		Sunflower			
Any other condition (specify)					

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
Groundnut	----	Drain excess water Timely plant protection measures are to be taken against LLS, rust and stem rot	Weather based advisory to be followed for harvesting.	1. Shifting of produce immediately after drying 2 Threshing on 5 th day after harvest of groundnut crop.
Horticulture crops – Fruits				
Sweet Orange	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Spray 1% KNO₃ or Urea 2% solution 2-3 times. • Foliar spray of micronutrient mixture is also to be taken up. • Sand casting around the tree trunks should be removed up to the collar region of the tree to prevent fungal infections. • If the tree age is above eight years a booster dose of 500 g of Urea and 750 g MOP per tree should be 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Spray 1% KNO₃ or Urea 2% solution 2-3 times. • Foliar spray of micronutrient mixture is also to be taken up. • Sand casting around the tree trunks should be removed up to the collar region of the tree to prevent fungal infections. • If the tree age is above eight years a booster dose of 500 g of Urea and 750 g MOP per tree should be applied. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Harvest the mature fruits in a clear sunny day. 	<ul style="list-style-type: none"> • Store the fruits in well ventilated place temporarily before it can be marketed. • Market the fruits as soon as possible.

	<p>applied.</p> <ul style="list-style-type: none"> • .Wind damaged branches should be pruned using disinfected secateurs and cut ends must be smeared with Bordeaux paste 			
Mango	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray 1% KNO₃ or Urea 2% solution 2-3 times. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray 1% KNO₃ or Urea 2% solution 2-3 times. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Harvest the mature produce in a clear sunny day' 	<ul style="list-style-type: none"> • Store the fruits in well ventilated place temporarily before it can be marketed. • Market the fruits as soon as possible.
Papaya	<ul style="list-style-type: none"> • Drain out the excess water • outbreak of any sucking past should be controlled using systemic insecticides • Water logging near trunk should be prevented • Drench the plants with copper fungicides to prevent collar rot 	<ul style="list-style-type: none"> • Drain out the excess water • outbreak of any sucking pest should be controlled using systemic insecticides • Water logging near trunk should be prevented 	<ul style="list-style-type: none"> • Drain out the excess water • Harvest the marketable fruits in a clear sunny day • out break of any sucking pests should be controlled by using systemic insecticides • Water logging near trunk should be prevented • Micronutrient deficiencies should be corrected by foliar sprays of Fe, Mg, Zn, Bo and Mn 	<ul style="list-style-type: none"> • Store the fruits in well ventilated place temporarily before it can be marketed. • Market the fruits as soon as possible.

Banana	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Inter-cultivate the soil with gorru for aeration. • Spray 0.5 % KNO₃ or Urea 2% solution 2-3 times. • Topdressing of booster dose of 80 g MOP + 100 g Urea per plant at two to three times intervals. • Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop. • If the age of the plant is less than three months and submergence up to three feet better to replant the garden. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray 0.5 % KNO₃ or Urea 2% solution 2-3 times. • Topdressing of booster dose of 80 g MOP + 100 g Urea per plant at two to three times intervals. • If the age the plant is more than three months and less than seven months allow one sword sucker for ratoon and take up fertilization at monthly intervals for four months. • Staking with bamboos to prevent further lodging. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Harvest the marketable bunches in a clear sunny day. • Spray 0.5 % KNO₃ or Urea 2% solution 2-3 times for quick development of immature bunches. • Staking with bamboos to prevent further lodging. 	<ul style="list-style-type: none"> • Use ripening chambers for quick ripening • Market the produce as soon as possible.
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Horticulture crops vegetables				
Tomato	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Harvest the 	<ul style="list-style-type: none"> • Store the harvested fruits in well ventilated place temporarily before it can be marketed. • Market the fruits as soon as

	<p>solution 2-3 times.</p> <ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Topdressing of booster dose of 10 kg MOP + 30 kg Urea per acre as soon as possible. 	<p>marketable fruits in a clear sunny day'</p>	<p>possible.</p>
Chillies	-do-	-do-	-do-	<ul style="list-style-type: none"> • 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.

Horticulture crops flowers				
Mari gold	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% or 1% KNO₃ solution 2-3 times. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% or 1% KNO₃ solution 2-3 times. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% or 1% KNO₃ solution 2-3 times. • Harvest the marketable flowers as soon as possible 	<ul style="list-style-type: none"> • Store the flowers in well ventilated place temporarily before it can be marketed. • Market the flowers as soon as possible

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation¹				
Horticulture crops – Fruits				
Sweet Orange	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Spray 1% KNO₃ or Urea 2% solution 2-3 times. • Plant protection measures may be taken for control of insect vectors and diseases. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Spray 1% KNO₃ or Urea 2% solution 2-3 times. • Foliar spray of micronutrient mixture is also to be taken up. • Sand casting around the tree trunks should be removed up to the collar region of the tree to prevent fungal infections. • If the tree age is above eight years a booster dose of 500 g of Urea and 750 g MOP per tree should be applied. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Spray 1% KNO₃ or Urea 2% solution 2-3 times. • Foliar spray of micronutrient mixture is also to be taken up. • Sand casting around the tree trunks should be removed up to the collar region of the tree to prevent fungal infections. • If the tree age is above eight years a booster dose of 500 g of Urea and 750 g MOP per 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Harvest the mature 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.

			tree should be applied.	
Mango	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray 1% KNO₃ or Urea 2% solution 2-3 times. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray 1% KNO₃ or Urea 2% solution 2-3 times. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray 1% KNO₃ or Urea 2% solution 2-3 times. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Harvest the mature 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.
Papaya	-do-	-do-	-do-	-do-
Banana	.	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray 1% KNO₃ or Urea 2% solution 2-3 times. • Topdressing of booster dose of 80 g MOP + 100 g Urea per plant in two to three splits at monthly intervals. • If the age the plant is more than three months and less than seven months allow one sword sucker for ratoon and take up fertilization at monthly intervals for four months. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray 1% KNO₃ or Urea 2% solution 2-3 times. • Stake the plants with bamboos to prevent further lodging. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Harvest the mature bunches as soon as possible. • use ripening chambers for quick and uniform ripening • Store the harvested bunches in well ventilated place temporarily before it can be marketed. • Market the fruits as soon as possible.
Horticulture crops vegetables				
Tomato	<ul style="list-style-type: none"> • Drain the excess water as soon as possible 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray Urea 2% solution once. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Harvest the mature produce as soon as possible. • Store the produce in well ventilated place

		as possible.		temporarily before it can be marketed. <ul style="list-style-type: none"> Market the produce as soon as possible.
Chillies	<ul style="list-style-type: none"> Drain the excess water as soon as possible 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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.
Horticulture crops Flowers				
Marigold	<ul style="list-style-type: none"> Drain the excess water as soon as possible Spray Urea 2% solution 2-3 times. 	<ul style="list-style-type: none"> Drain the excess water from the field as early as possible. Apply booster dose of nutrients to promote the growth 	<ul style="list-style-type: none"> Drain the excess water from the field as early as possible. Apply booster dose of nutrients to promote the growth 	<ul style="list-style-type: none"> Drain the excess water from the field as early as possible. Apply booster dose of nutrients to promote the growth Take appropriate measures to check the soil borne pathogens and sucking pest complex. Harvest the flowers and market immediately

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

Extreme event type	Suggested contingency measurer			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Cyclone				
Horticulture crops – Fruits				
Sweet Orange	<ul style="list-style-type: none"> • Spray Carbendazim 1 g or COC 3g per litre to prevent spread of diseases • If the damage is severe, go for resowing. 	<ul style="list-style-type: none"> • Tress fallen on ground may be lifted and earthed up • Manuring and plant protection measures have to be taken up. • Broken and damaged branches may be pruned and applied with Bordeaux paste 	<ul style="list-style-type: none"> • Tress fallen on ground may be lifted and earthed up • Manuring and plant protection measures have to be taken up. • Broken and damaged branches may be pruned and applied with Bordeaux paste 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Harvest the mature fruits as soon as possible. • Collect the fallen fruits and sell immediately or go for preparation of processed products. • If to store, store the produce in well ventilated place temporarily before it can be marketed. • Broken and damaged branches may be pruned and applied with Bordeaux paste
Mango	-do-	-do-	-do-	-do-

Papaya	<ul style="list-style-type: none"> • Drain the excess water as soon as possible and drench the plants with any copper fungicide to prevent collar rot 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible and drench the plants with any copper fungicide to prevent collar rot • Spray 1% KNO₃ or Urea 2% solution 2-3 times. 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible • Spray 1% KNO₃ or Urea 2% solution 2-3 times. 	<ul style="list-style-type: none"> • 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. • Collect the fallen fruits and sell immediately or go for preparation of processed products.
Banana		<ul style="list-style-type: none"> • Wind damaged plants should be pruned using disinfected secateurs and cut ends must be smeared with Bordeaux paste • Drain the excess water as soon as possible • The fallen tress may be cut leaving two suckers • Inter-cultivate the soil with gorru for aeration. • Spray 0.5 % KNO₃ or Urea 2% solution 2-3 times. • Topdressing of booster dose of 80 g MOP + 100 g Urea per plant at two to three times intervals. 	<ul style="list-style-type: none"> • Wind damaged plants should be pruned using disinfected secateurs and cut ends must be smeared with Bordeaux paste • Drain the excess water as soon as possible • The fallen tress may be cut leaving two suckers • Topdressing of booster dose of 80 g MOP + 100 g Urea per plant at two to three times intervals • Mature bunches on the completely damaged plants be covered with Leaves and harvested with in 15-20days 	<ul style="list-style-type: none"> • Wind damaged plants should be pruned using disinfected secateurs and cut ends must be smeared with Bordeaux paste • Drain the excess water as soon as possible. • Harvest the mature bunches as soon as possible. use ripening chambers for quick and uniform ripening • Store the harvested bunches in well ventilated place temporarily before it can be marketed. • Market the produce as soon as possible. • 3-4 foliar application of KNO₃ on immature/developing

		<ul style="list-style-type: none"> • Gap filling may be taken up if the plants are two weeks old and sowing window is still available for the crop. • If the age of the plant is less than three months and submergence up to three feet better to replant the garden. 		<p>bunches and leaves at weekly intervals.</p> <ul style="list-style-type: none"> • Staking with bamboo for support
Horticulture crops vegetables				
Tomato	<ul style="list-style-type: none"> • Grow nursery on raised beds. • If damage is more go for resowing 	<ul style="list-style-type: none"> • Uprooted plants may be lifted and earthed up • Drain the excess water as soon as possible • Gap filling must be done immediately • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible. • If damage is more ,go for replanting 	<ul style="list-style-type: none"> • Uprooted plants may be lifted and earthed up • 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. 	<ul style="list-style-type: none"> • 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.
Chillies	<ul style="list-style-type: none"> • Grow nursery on raised beds. 	<ul style="list-style-type: none"> • Uprooted plants may be lifted and earthed up • Drain the excess water as soon as possible • Gap filling must be done immediately • If damage is more go for replanting 	<ul style="list-style-type: none"> • Uprooted plants may be lifted and earthed up • Drain the excess water as soon as possible • Spray Urea 2% solution 2-3 times. • Topdressing of booster dose of 15 kg 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Dry the pods on concrete floor/ tarpaulins immediately • use poly house solar driers for quick drying

		Spray Urea 2% solution 2-3 times. <ul style="list-style-type: none"> • Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible. 	MOP+ 30 kg Urea per acre as soon as possible.	<ul style="list-style-type: none"> • Remove the pest and disease infected pods.
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Horticulture crops flowers				
Marigold	<ul style="list-style-type: none"> • Drain the excess water as soon as possible and drench the plants with any copper fungicide • Spray Urea 2% or 1% KNO₃ solution 2-3 times. • Gap filling must be done immediately • If damage is more ,go for replanting 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible and drench the plants with any copper fungicide Spray Urea 2% or 1% KNO₃ solution 2-3 times. • Gap filling must be done immediately If damage is more ,go for replanting 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible and drench the plants with any copper fungicide Spray Urea 2% or 1% KNO₃ solution 2-3 times. • Gap filling must be done i immediately • If damage is more ,go for replanting 	<ul style="list-style-type: none"> • Drain the excess water as soon as possible. • Harvest the marketable flowers as soon as possible. • Store the produce in well ventilated place temporarily before it can be marketed. • Market the produce as soon as possible

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave				
Horticulture crops - Fruits				
Sweet Orange, Mango, Papaya,	<ul style="list-style-type: none"> • Cover the newly planted plants with dry leaves • Increase the frequency of irrigation. 	<ul style="list-style-type: none"> • Mulch the plant basins with dried leaves • Increase the frequency of irrigation 	<ul style="list-style-type: none"> • Increase the frequency of irrigation. • Provide irrigation at critical stages viz; peanut size and marble size 	<ul style="list-style-type: none"> • Harvest the fruits either in the morning or in the evening • Use ripening chambers for getting quality fruits
Banana	<ul style="list-style-type: none"> • Cover the newly planted plants with dry leaves • Increase the frequency of irrigation. 	<ul style="list-style-type: none"> • Mulch the plant basins with dried banana leaves • Increase the frequency of irrigation 	<ul style="list-style-type: none"> • Cover the developing bunches with banana leaves • Increase the frequency of irrigation. 	<ul style="list-style-type: none"> • Harvest the bunches either in the morning or in the evening • Use ripening chambers for getting quality fruits

Horticultural crops - Vegetables		
Vegetable & Flowers	<ul style="list-style-type: none"> • Provide shade to the newly planted /seedlings • Irrespective of stage increase the frequency of irrigation. • Use mulches • Add bulky organic manures at the time of last ploughing 	<ul style="list-style-type: none"> • Harvest either in the morning or in the evening
Coconut	<ul style="list-style-type: none"> • Provide shade to the newly planted palms • Irrespective of stage increase the frequency of irrigation. • Use mulches • Add bulky organic manures at the time of last ploughing 	<ul style="list-style-type: none"> • Provide light irrigation • Delay the harvesting

2.5 Contingent strategies for Livestock, Poultry & Fisheries

General contingency measures for Livestock

Before the event	During the event	After the event
Feed and fodder availability		
<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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		

<p>1. Construct drinking water tanks in herding places, village junctions and in relief camp locations</p> <p>2. Plan for sufficient number of tanks for water transportation</p> <p>3. Identify bore wells, which can sustain demand.</p> <p>4. Procure sufficient quantities of water Sanitizers</p>	<p>1. Regular supply of clean drinking water to all tanks</p> <p>2. Cleaning the tanks in regular intervals</p> <p>3. Keep the livestock away from contaminated flood/cyclone/stagnated waters</p> <p>3. Add water sanitizers</p>	<p>1. Hand over the maintenance of the structures to panchayats</p> <p>2. Sensitize the farming community about importance of clean drinking water</p>
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Health and disease Management		
<p>1. Procure and stock emergency medicines and vaccines for important endemic diseases of the area</p> <p>2. All the stock must be immunized for endemic diseases of the area</p> <p>3. Carry out deworming to all young stock</p> <p>4. Keep stock of bleaching powder and lime</p> <p>5. Carry out Butax spray for control of external parasites</p> <p>6. Identify the Clinical staff and trained paravets and indent for their services as per schedules</p> <p>7. Identify the volunteers who can serve in need of emergency</p>	<p>1. Keep close watch on the health of the stock</p> <p>2. Sick animals must be isolated and treated Separately.</p> <p>3. Carry out deworming and spraying to all animals entering into relief camps</p> <p>4. Clean the animal houses regularly and apply disinfectants.</p> <p>5. Safe and hygienic disposal of dead animal carcasses</p> <p>6. Organize with community daily lifting of dung from relief camps</p>	<p>1. Keep close surveillance on disease outbreak.</p> <p>2. Undertake the vaccination depending on need</p> <p>3. Keep the animal houses clean and spray disinfectants</p>

2.5.1 Livestock Detailed Contingency strategies

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			

<p>Feed and Fodder availability</p>	<p>As chronically drought prone district, it should have reserves of the following at any point of the year for mobilization to the needy areas (for feeding 5000 ACU (maintenance ration) for about 1-3 weeks period)</p> <p>Silage:20-50 t Urea molasses mineral bricks (UMMB):50-100 t Hay:100-250 t Concentrates: 20-50 t Minerals and vitamin supplements mixture:1-5 t</p> <p>Establishment of silvi-pastoral system in CPRs with <i>Stylosanthus hamata</i> and <i>Cenchrus ciliaris</i> as grass with <i>Leucaena leucocephala</i> as tree component (or suggest suitable similar system to your district)</p> <p>Top dressing of N in 2-3 split doses @ 20-25 kg N/ha in common property resources (CPRs) like temple lands, panchayat lands or private property resources (PPRs) like waste and degraded lands with the monsoon pattern for higher biomass production</p> <p>Promote cultivation of short duration fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAIN T BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 and also sunhemp</p> <p>Chopping of fodder should be made as mandatory in every village through supply and establishment of good quality</p>	<p>Harvest and use biomass of dried up crops (Groundnut, jowar, ragi, Rice, maize, black gram, green gram, horsegram) material as fodder.</p> <p>Harvest the tree fodder (Neem, Subabul, Acasia, Pipal etc) and unconventional feeds resources available and use as fodder for livestock (LS).</p> <p>Available feed and fodder should be cut from CPRs and stall fed in order to reduce the energy requirements of the animals and supplemented with groundnut haulms.</p> <p>UMMB, hay, concentrates and vitamin & mineral mixture should be transported to the needy areas from the reserves at the district level initially and latter stages from the near by districts. Hay should be enriched with 2% Urea molasses solution or 1% common salt solution and fed to LS</p> <p>Herd should be split and supplementation (either groundnut haulms or concentrate mixture) should be given only to the highly productive and breeding animals</p> <p>Provision of emergency grazing/feeding (Cow-calf camps or other special arrangements to protect high productive & breeding stock)</p> <p>Motivate the farmers to mix the dry fodder with available kitchen waste or groundnut haulms while feeding</p> <p>Arrangements should be made for mobilization of small ruminants across the villages where no drought exits with subsidized road/rail transportation and temporary shelter provision for the shepherds</p> <p>Unproductive livestock should to be culled during severe drought</p> <p>Create transportation and marketing facilities for the culled and unproductive animals.</p> <p>Supply silage and or hay on subsidized rates to the</p>	<p>Concentrates supplementation should be provided to all the animals.</p> <p>The farmers may be advised to practice “flushing the stock” to recoup either with groundnut haulms or concentrate mixture</p> <p>Short duration fodder crops of should be sown in unsown and crop failed areas where no further routine crop sowing is not possible</p> <p>Supply of quality seeds of fodder varieties and motivating the farmers to cultivate at least 10% of their land holding for fodder production</p>
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	<p>chaff cutters.</p> <p>Harvesting and collection of perennial vegetation particularly grasses which grow during monsoon</p> <p>Proper drying, bailing and densification of harvested grass from previous season</p> <p>Creation of permanent fodder, feed and fodder seed banks in all drought prone villages</p>	<p>farmers having high productive stock</p> <p>Subsidized loans should be provided to the livestock keepers</p>	
Heat wave	<p>As the district chronically prone to heat waves the following permanent measures are suggested</p> <ul style="list-style-type: none"> i) Plantation of trees like Neem, Pipal, Subabul around the shed ii) Spreading of husk/straw/coconut leaves on the roof of the shed iii) Water sprinklers / foggers in the animal shed iv) Application of white reflector paint on the roof to reduce thermal radiation effect 	<p>Allow the animals preferably early in the morning or late in the evening for grazing during heat waves</p> <p>Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves</p> <p>Put on the foggers / sprinklers during heat waves and heaters during cold waves in case of high productive animals</p> <p>In severe cases, vitamin 'C' (5-10ml per litre) and electrolytes (Electoral powder @ 20g per litre) should be added in water during severe heat waves.</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>
Health and Disease management	<p>List out the endemic diseases (species wise) in the district and store vaccines for those diseases</p> <p>Timely vaccination (as per enclosed vaccination schedule) against all endemic diseases</p> <p>Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</p>	<p>Constitution of Rapid Action Veterinary Force</p> <p>Procurement of emergency medicines and medical kits</p> <p>Close observation of animals for heat stress symptoms</p>	<p>Conducting mass animal health camps</p> <p>Conducting fertility camps</p> <p>Mass deworming camps</p>
Insurance	<p>Encouraging insurance of livestock</p>	<p>Listing out the details of the dead animals</p>	<p>Submission for insurance claim and availing insurance benefit</p> <p>Purchase of new productive animals</p>

Drinking water	Identification of water resources Rain water harvesting and create water bodies / watering points (when water is scarce use only as drinking water for animals)	Restrict wallowing of animals in water bodies/resources	Bleach (0.1%) drinking water / water sources Provide clean drinking water
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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	During the event	After the event
Drought			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice, bajra 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 sanitizers 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)	Hygiene and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
Heat wave			

Shelter/environment management	Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day	Routine practices are followed
Health and disease management	Deworming and vaccination against RD and fowl pox	Supplementation of house hold grain Provide cool and clean drinking water with electrolytes and vit. C (5-10 ml per litre) In hot summer, add anti-stress probiotics in drinking water or feed (Restobal etc., 10-20ml per litre)	Routine practices are followed

2.5.3 Contingency strategies for Fisheries: Not applicable for the district