State: ANDHRA PRADESH

Agriculture Contingency Plan for District: KURNOOL

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Region /Sub Region (ICAR)	Deccan Plateau hot arid eco region (7.1)		
	Agro-Climatic Region (Planning Commission)	Southern Plateau and Hills Region (X)		
	Agro Climatic Zone (NARP)	Scare rainfall zone of Andhra Pradesh (AP-6)		
	List all the districts or part thereof falling under the NARP Zone	Anantapur (entire district), Kurnool (entire district)		
	Geographic coordinates of district	**Latitude**	**Longitude**	**Altitude**
		14^0 54 ' & 16^0 18' N	76^0 58' & 79^0 34' E	311.2 feet MSL
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Agricultural Research Station, Noonepalli (P.O), Nandyal - 518 5602.		
	Mention the KVK located in the district	1.Krishi Vigyana Kendra, Yagantipalli - 518 124.Banaganapalli (M) Kurnool (Dist.) 2. Krishi Vigyana Kendra, Banavasi (P.O), Yemmiganur (M), Kurnool (Dist).		
1.2	**Rainfall**	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	455	1st week of June	1st week of October
	NE Monsoon(Oct-Dec):	149	2nd week of October	1st week of December
	Winter (Jan- March)	11		
	Summer (Apr-May)	55		
	Annual	670	-	-

1.3	**Land use pattern of the district** (latest statistics)	**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)	1765.8	340.7	137.8	3.6	48.4	1.7	127.3	128.8	84.0

1. 4	**Major Soils**	**Area (‘000 ha)**	**Percent (%) of total**
	1. Black soils	766	75.0
	2. Red soils	204	20.0
	3. Others	51	5.0
1.5	**Agricultural land use**	**Area (‘000 ha)**	**Cropping intensity %**
	Net sown area	889.5	111.6%
	Area sown more than once	104.0	
	Gross cropped area	993.5	

1.6	**Irrigation**	**Area (‘000 ha)**		
	Net irrigated area	207.1		
	Gross irrigated are**a**	258.2		
	Rainfed area	631.8		
	Sources of Irrigation	**Number**	**Area (‘000 ha)**	**% area**
	Canals		87.4	42.2
	Tanks		14.2	6.9
	Tube wells & filter points		96.4	46.5
	Lift irrigation			
	Other sources		9.1	4.4
	Total		**207.2**	100.0
	Pump sets		--	

	Micro-irrigation		--	
	Groundwater availability and use	**No. of blocks**	**% area**	**Quality of water**
	Over exploited			
	Critical			
	Semi- critical			
	Safe			
	Wastewater availability and use			

Area under major field crops & horticulture etc.

*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	Bengal gram	--	--	--	182	--	240.0
	2	Groundnut	--	103.5	15.1	--	--	118.6
	3	Sunflower	--	3.4	5.7	--	--	9.1
	4	Rice	74	--	27	--	--	101.0
	5	Sorghum	--	11	54	--	--	65.0
	6	Redgram	--	64	1.3	--	--	65.3
	7	Cotton	--	229	--	--	--	229.0
	8	Castor	--	25	--	--	--	25.0
	9	Maize	--	33	9.3	--	--	42.3
	10	Greengram	--	1.7	1.2	--	--	2.9
	11	Bajra	--	7.7	0.2	--	--	7.9
		Horticulture crops - Fruits	**Total area**					
	1	Mango	9.0					
	2	Banana	3.6					
	3	Orange & Batavian	1.9					
		Horticultural crops - Vegetables	**Total area**					
	1	Onion	16.2					
	2	Tomato	4.8					
	3	Chillies	26.3					

	4	Bhendi	2.6
	5	Brinjal	0.9
		Horticultural crops- flowers	**Total area**
	1	Jasmine	1.8
	2	Crossandra	1.2
		Spice crops	**Total area**
	1	Coriander	16.4
	2	Turmeric	1.7

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)			406.4
	Crossbred cattle			3.0
	Non descriptive Buffaloes (local low yielding)			410.7
	Graded Buffaloes			
	Goat			505.1
	Sheep			1504.3
	Others (Camel, Pig, Yak etc.)			20.0
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('number)**	
	Commercial		182905	
	Backyard		1201241	

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)	
		l	-	-	-	-

	ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**	**No. of Reservoirs**	**No. of village tanks**
		17	11	175
	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)	34	-	-
	Others	-	-	45200

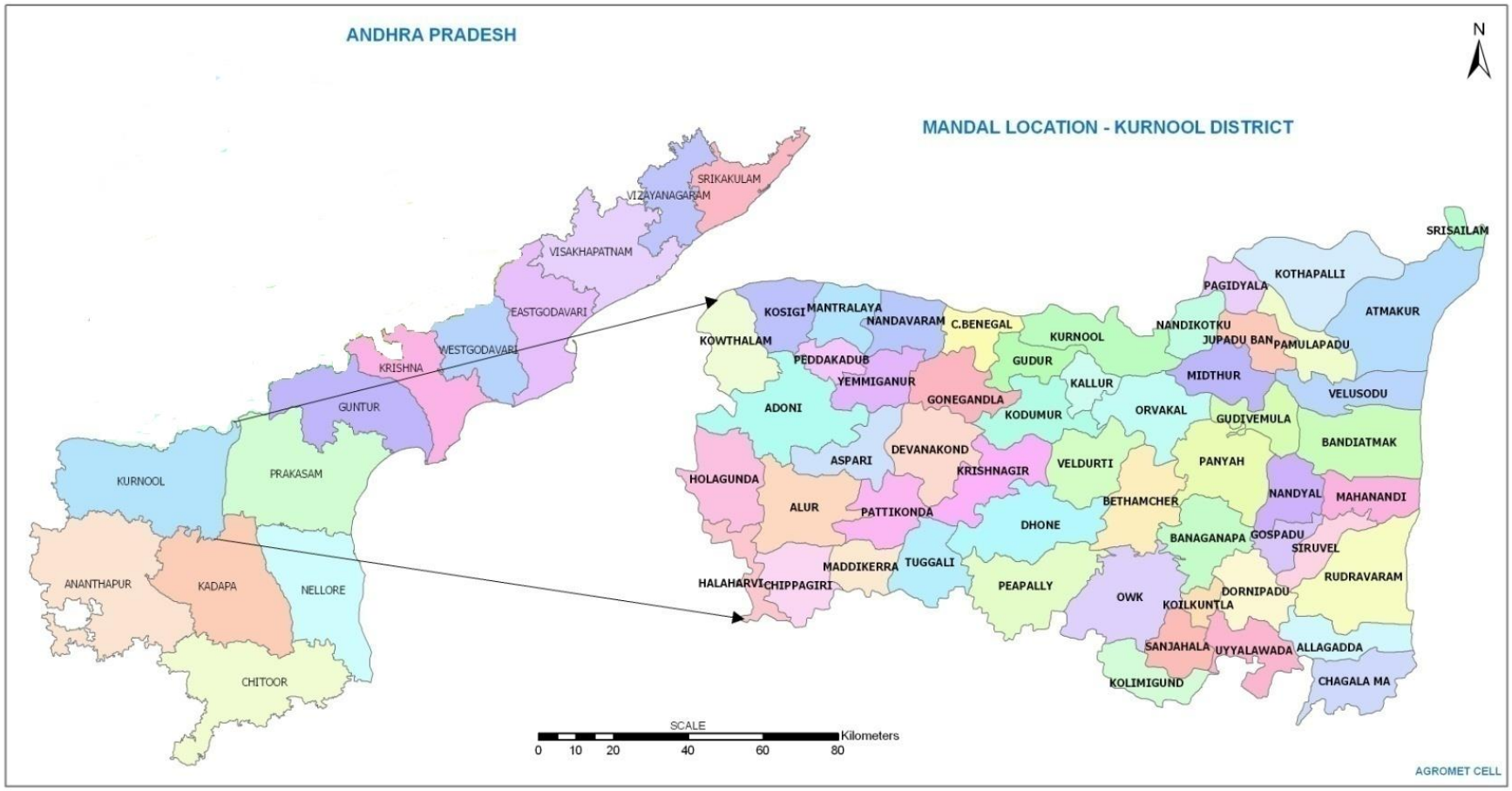
1.11	**Production and Productivity of major crops**	**Kharif**		**Rabi**		**Summer**		**Total**	
		Production ('000 t)	**Productivity (kg/ha)**	**Production ('000 t)**	**Productivity (kg/ha)**	**Production ('000 t)**	**Productivity (kg/ha)**	**Production ('000 t)**	**Productivity (kg/ha)**
1	Groundnut	89	929	14	1747	--	--	103	1338
2	Paddy	437	5767	170	5674	--		607	5720
3	Sunflower	52	1202	88	1100	--	--	140	1151
4	Cotton (lint)	81	1202	0	0			81	1202
5	Red gram	50	621	1.4	1100	--	--	51.4	860
6	Castor	24	1401	--	--	--	--	24	1401
7	Maize	199	5508	43	4646	--	--	242	5077
8	Sorghum	8.5	1901	129	2451	--	--	137.5	2176
9	Bajra	10	1300	0.3	1500	--	--	10.3	1400

10	Greengram	6	650	1	650	--	--	7	650
11	Bengal gram	--	--	109	902	--		109	902
Others									
	Major Horticultural crops								
	Horticulture crops - Fruits	**Total area** 16691 ha						373.763	170000
1	Mango	9162						91.62	10000
2	Banana	3670						190.84	52000
3	Orange &Batavian	1952						48.80	25000
4	Lemon	776						13.96	18000
5	Water melon	692						16.60	24000
6	Papaya	439						28.535	65000
	Horticultural crops - Vegetables	**Total area 72065 ha**							
1	Onion	31656						506.596	16000
2	Tomato	4082						102.050	25000
3	Chillies	24570						221.130	9000
4	Bhendi	2926						26.334	9000
5	Brinjal	1390						25.020	18000
6	Bitter gourd	676						10.140	15000
	Horticultural crops- flowers	**Total area 1225 ha**							
1	Jasmine	540						5.400	10000
2	Crossandra	685						6.850	10000
	Spice crops	**Total area 4812 ha**							
1	Ajwain	3135						31.350	1000
2	Turmeric	1667						10.002	6000

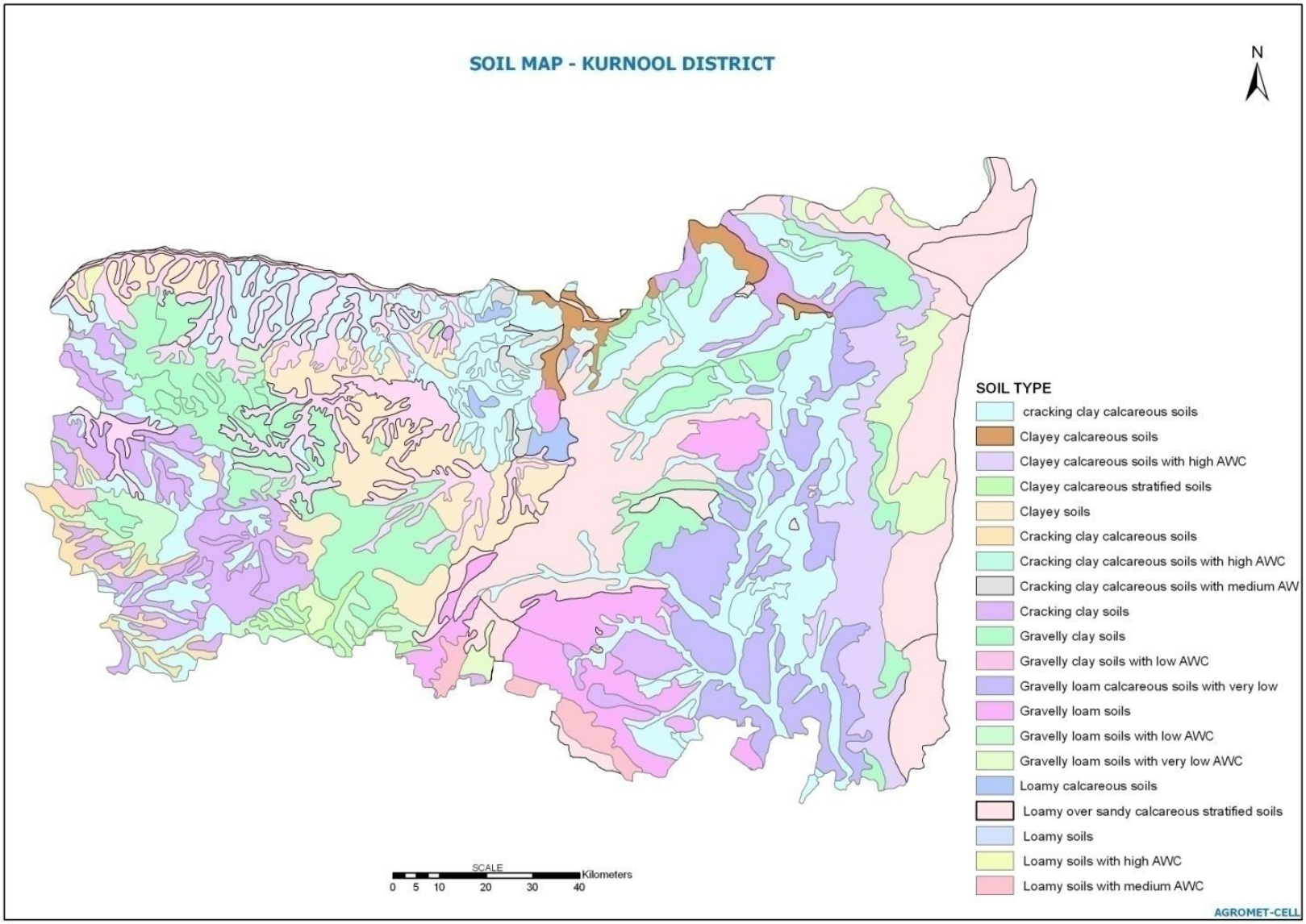
1.12	Sowing window for 5 major crops (start and end of sowing period)	crop 1 (Specify the crop): Groundnut	crop 2: Paddy	crop 4: Maize	crop 5: Jowar	crop 3: Bengal gram
	Kharif-Rainfed	2nd FN of June to up to 1st week of August Best time -1st FN of July	---	Red soils – June 15th to July 15th Black soils – August	1st week of June to 2nd week of July	---
	Kharif-Irrigated	---	July 2nd FN-Aug 1st FN	---	---	---
	Rabi- Rainfed	---	---	---	Maghi-September	October to November
	Rabi-Irrigated	November to December. Best time-1st FN of December	November-December	October 15th to November 15th	2nd fortnight of September to October end	---

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			√
	Fog	√		
	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√


ANDHRA PRADESH
MANDAL LOCATION - KURNOOL DISTRICT
N
SRIKAKULAM
VIZAYANAGARAM
VISAKHAPATNAM
EASTGODAVARI
WESTGODAVARI
KRISHNA
GUNTUR
PRAKASAM
NELLORE
KURNOOL
KADAPA
ANANTHAPUR
CHITOOR
KOSIGI
MANTRALAYA
NANDAVARAM
C.BENEGAL
KOWTHALAM
PEDDAKADUB
YEMMIGANUR
GONEGANDLA
ADONI
KODUMUR
ASPARI
DEVANAKOND
KRISHNAGIR
HOLAGUNDA
ALUR
PATTIKONDA
DHONE
MADDIKERRA
TUGGALI
HALAHARVI
CHIPPAGIRI
PEAPALLY
OWK
KOILKUNTLA
KOLIMIGUND
SANJAHALA
UYYALAWADA
ALLAGADDA
CHAGALA MA
DORNIPADU
RUDRAVARAM
SIRUVEL
GOSPADU
BANAGANAPA
NANDYAL
MAHANANDI
BETHAMCHER
PANYAH
VELDURTI
GUDIVEMULA
BANDIATMAK
ORVAKAL
KALLUR
MIDTHUR
VELUSODU
GUDUR
KURNOOL
NANDIKOTKU
JUPADU BAN
PAMULAPADU
PAGIDYALA
KOTHAPALLI
ATMAKUR
SRISAILAM
SCALE
0 10 20 40 60 80
Kilometers
AGROMET CELL


MANDAL WISE - NORMAL RAINFALL (mm)
KURNOOL DISTRICT
N
SRISAILAM 748.7
PAGIDYALA 662.9
KOTHAPALLI 797.5
ATMAKUR 775.1
KOSIGI 674.4
MANTRALAYA 629.7
NANDAVARAM 587.9
C.BENEGAL 627.5
KURNOOL 703.5
NANDIKOTKU 646.7
JUPADU BAN 742.5
KOWTHALAM 634.3
PEDDAKADUB 675.3
GUDUR 672.9
PAMULAPADU 719
YEMMIGANUR 652
GONEGANDLA 611.3
KALLUR 707
MIDTHUR 694.1
VELUGODU 799.3
ADONI 663
KODUMUR 620.1
ORVAKAL 578.7
GUDIVEMULA 691.9
BANDIATMAK 824.7
DEVANAKOND 611.5
ASPARI 585.1
VELDURTI 583
PANYAH 656.3
HOLAGUNDA 568.6
KRISHNAGIR 525
NANDYAL 835.8
MAHANANDI 809.6
ALUR 588.6
PATTIKONDA 638.8
BETHAMCHER 621.7
DHONE 543.9
BANAGANAPA 624
GOSPADU 741.2
SIRUVEL 822.6
MADDIKERRA 489.9
TUGGALI 619.2
RUDRAVARAM 902.2
HALAHARVI 502.1
CHIPPAGIRI 517.4
PEAPALLY 652.8
OWK 568.1
DORNIPADU 694.6
KOILKUNTLA 719.3
SANJAHALA 666.7
UYYALAWADA 723.1
ALLAGADDA 799.8
KOLIMIGUND 639.6
CHAGALA MA 797.6
SCALE
0 5 10 20 30 40 Kilometers
AGROMET CELL


SOIL MAP - KURNOOL DISTRICT
N
SOIL TYPE
cracking clay calcareous soils
Clayey calcareous soils
Clayey calcareous soils with high AWC
Clayey calcareous stratified soils
Clayey soils
Cracking clay calcareous soils
Cracking clay calcareous soils with high AWC
Cracking clay calcareous soils with medium AW
Cracking clay soils
Gravelly clay soils
Gravelly clay soils with low AWC
Gravelly loam calcareous soils with very low
Gravelly loam soils
Gravelly loam soils with low AWC
Gravelly loam soils with very low AWC
Loamy calcareous soils
Loamy over sandy calcareous stratified soils
Loamy soils
Loamy soils with high AWC
Loamy soils with medium AWC
SCALE
0 5 10 20 30 40
Kilometers
AGROMET-CELL

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[a]**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks (June 3rd week)	Rainfed – Red soils	Groundnut / Groundnut + Redgram intercropping	No change	K-6, K-9, ICGV 91114, TAG-24.	-
		Redgram	-do-	LRG 41, ICPL 85063, ICPL 8863 and PRG100, PRG 158	-
		Castor / Castor + Redgram	-do-	Kranti, Jyothi, GAUCH 4, PCH 1, PCH 111, PCH 222	-
		Jowar	-do-	CSH-9, CSH-13, CSH-14, CSV 12, CSV-13	-
		Bajra / Bajra + Groundnut	-do-	ICTP 8203, ABV-04, HB series	-
		Foxtail millet	-do-	Sri Laskshmi, Krishnadevaraya, Narsimharaya, Prasad, Surya nandi	
	Rainfed – black soils	Groundnut / Groundnut + Redgram	-do-	-do-	-
		Sunflower	-do-	NDSH 1, KBSH1 DRSH 1 and any popular hybrid	
		Cotton	-do-	Narasimha, NHH 44, Sivanandi, NDLHH 240, Any other popular Bt hybrids	-
		Redgram	-do-	-do-	
		Castor / Castor + Redgram	-do-	-do-	-
		Jowar / Jowar +Groundnut	-do-	-do-	-
		Foxtail millet	-do-	-do-	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks (July 1st week)	Rainfed – Red soils	Groundnut / Groundnut + Redgram intercropping	No change	-do-	-
		Redgram	-do-	-do-	-
		Castor (or) Castor + Redgram (7:1)	-do-	-do-	-
		Jowar	-do-	-do-	-
		Bajra (or) Bajra + Groundnut (1:5)	-do-	-do-	-
		Foxtail millet	-do-	-do-	
	Rainfed – black soils	Groundnut (or) Groundnut + Redgram(5:1)	-do-	-do-	-
		Sunflower	-do-	-do-	
		Cotton	-do-	-do-	-
		Redgram	-do-	-do-	
		Castor (or) Castor + Redgram (7:1)	-do-	-do-	-
		Jowar (or) Jowar +Groundnut(1:5)	-do-	-do-	-
		Foxtail millet	-do-	-do-	
		Maize	-do-	-do-	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks (July 3rd week)	Rain fed – Red soils	Groundnut / Groundnut + Redgram intercropping	No change	-	-
		Redgram	-do-	-	-
		Castor / Castor + Redgram	-do-	-	-
		Jowar	-do-	-	-
		Bajra / Bajra + Groundnut	-do-	-	-
		Foxtail millet	-do-		
	Rain fed – Black soils	Groundnut / Groundnut + Redgram	-do-	-	-
		Sunflower	-do-		
		Cotton	-do-	-	-
		Redgram	-do-		
		Castor / Castor + Redgram	-do-	-	-
		Jowar / Jowar +Groundnut	-do-		
		Foxtail millet	-do-		
		Maize	-do-		

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 8 weeks (Aug 1st week)	Rainfed – Red soils	Groundnut / Groundnut + Redgram intercropping	No change		
		Sunflower	No change		
		Redgram	No change		
		Castor / Castor + Redgram	Foxtailmillet Cowpea, Greengram, Horsegram, Fodder jowar,		
		Jowar	No change		
		Bajra / Bajra + Groundnut	No change	-	-
		Foxtail millet	No change		
	Rainfed – black soils	Groundnut / Groundnut + Redgram	No change	-	-
		Sunflower	No change	-	-
		Cotton	No change	Narasimha, NHH 44, Sivanandi, NDLHH 240, Any other popular Bt hybrids	-
		Redgram	Redgram (short duration varieties)	LRG-52, PRG 176	-
		Castor / Castor + Redgram	Foxtailmillet Cowpea, Greengram, Horsegram, Fodder jowar,	-	-
		Jowar / Jowar +Groundnut	No change	-	-
		Foxtail millet	No change		
		Maize	No change		

Condition			Suggested Contingency measures		
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.)	Rainfed – Red soils	Groundnut / Groundnut + Redgram intercropping	1. Initial drought of 15-20 days will not affect germination / crop stand. It actually helps groundnut crop for profuse and synchronous flowering	Formation of dead furrows at 3.6 mts	Link with MGNREGS
		Sunflower	Thinning, Re-sowing of short duration varieties (Morden, DRSF -1)/ hybrids (NDSH-1) if germination is poor.	-do-	
		Redgram	Resowing of short duration varieties (ICPL 87) if germination is poor.	-do-	
		Castor / Castor + Redgram	--	-do-	
		Jowar	--	-do-	
		Bajra / Bajra + Groundnut	--	-do-	
	Rainfed –Black soils	Groundnut / Groundnut + Redgram	1. Initial drought of 15-20 days will not affect germination / crop stand. It actually helps groundnut crop for profuse and synchronous flowering	Formation of dead furrows at 3.6 mts	
		Sunflower	15 – 20 days dry spell after sowing will not affect germination and growth especially in black soils	-do-	
		Cotton	-do-	-do-	
		Redgram	-do-	-do-	
		Castor / Castor + Redgram	-do-	-do-	
		Jowar / Jowar + Groundnut	-do-	-do-	

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**
At vegetative stage	Rainfed – Red soils	Groundnut / Groundnut + Redgram intercropping	Protect the crop from thrips to avoid PBND and PSND Spraying of 2 % urea	1. Mulching with groundnut shells 2. Frequent intercultivation to conserve soil moisture 3. Formation of dead furrows at 3.6 mt	Link with MGNREGS
		Sunflower	Spray urea or DAP @ 2 %, Resowing of short duration varieties(Morden,DRSF - 1)/ hybrids(NDSH-1)	Formation of dead furrows at 3.6 m.	
		Redgram	Spray urea or DAP @ 2 %,	-do-	
		Castor / Castor + Redgram	Do (or) Resowing of short duration varieties	-do-	
		Jowar	--	-do-	
		Bajra / Bajra + Groundnut	--	-do-	
	Rainfed – Black soils	Groundnut / Groundnut + Redgram	Protect the crop from thrips to avoid PBND and PSND Spraying of 2 % urea	1. Mulching with groundnut shells 2.Frequent Intercultivation to conserve soil moisture 3. Formation of dead furrows at 3.6 m.	
		Sunflower	Spray urea or DAP @2 %, Resowing of short duration varieties(Morden, DRSF - 1)/ hybrids(NDSH-1)	-do-	

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**
		Cotton	Spray urea or DAP @2 %,	-do-	
		Redgram	Do (or) Resowing of short duration varieties	-do-	
		Castor / Castor + Redgram	--	-do-	
		Jowar / Jowar +Groundnut	--	-do-	

Condition	Suggested Contingency measures				
Mid season drought (long dry spell)	**Major Farming situation**	**Crop/cropping system**	**Crop management[c]**	**Soil management[d]**	**Remarks on Implementation[e]**
At reproductive stage	Rainfed –Red soils	Groundnut / Groundnut + Redgram intercropping	Supplemental irrigation with harvested rain water in farm ponds (10 mm depth.) 2.2% Urea spray	Top dressing of urea with receipt of rains after dry spell Mulching	Link with MGNREGS for digging farm ponds
		Sunflower	Supplemental irrigation with harvested rain water in ponds (10 mm depth.) Boran application @0.2% 2 % Urea spray		
		Redgram	2 % Urea spray		
		Castor / Castor + Redgram	2 % Urea spray		
		Jowar	--		
		Bajra / Bajra + Groundnut	--		
	Rainfed –Black soils	Groundnut / Groundnut + Redgram	Supplemental irrigation with harvested rain water in farm ponds (10 mm depth.)	Top dressing of urea with receipt of rains after dry spell	

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**
			2% Urea spray	Mulching	
		Sunflower	Supplemental irrigation with harvested rain water in ponds (10 mm depth.) Boron application @0.2% 2 % Urea spray		
		Cotton	2% Urea spray		
		Redgram	2% Urea spray		
		Castor / Castor + Redgram	--		
		Jowar / Jowar +Groundnut	--		

Condition	Suggested Contingency measures				
Condition	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil management**	**Remarks on Implementation**
Terminal drought	Rainfed – Red soils	Groundnut / Groundnut + Redgram intercropping	Protective irrigation through farm ponds		Link with MGNREGS for digging farm crops
		Sunflower			
		Redgram			
		Castor / Castor + Redgram			
		Jowar			
		Bajra / Bajra + Groundnut			

Condition	Suggested Contingency measures				
Condition	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil management**	**Remarks on Implementation**
	Rainfed – Black soils	Groundnut / Groundnut + Redgram	Protective irrigation through farm ponds		
		Sunflower			
		Cotton			
		Redgram			
		Castor / Castor + Redgram			
		Jowar / Jowar +Groundnut			

2.1.2 Irrigated situation

Condition	Suggested Contingency measures				
	Major Farming situation[f]	**Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Delayed/ limited release of water in canals due to low rainfall	Canal irrigated red soil. Canal irrigated black soils	Paddy	No change	Planting of aged seedlings of paddy Close planting, 4 – 5 seedlings / hill, 20 % additional fertilizer for Paddy	
	Tankfed areas	Direct sown paddy	No change	Converted in to wet paddy after release of water. Correction of iron deficiency	

Condition	Suggested Contingency measures				
	Major Farming situation[f]	**Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Non release of water in canals under delayed onset of monsoon in catchment	Red and black soils under canals	Foxtailmillet, Cowpea, Greengram, Horsegram, Bajra, Fodder jowar, Maize	No change	Recommended practices of respective crops will be followed.	
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Tank fed red soils	Sunflower, Maghi jowar	No change	---	
	Tank fed black soils	Sunflower, jowar and Bengal gram are recommended.	No change		

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 wells in irrigated red soils	Groundnut Sunflower Castor	Blackgram, Greengram, Maize,Foxtailmillet, Bajra, Horsegram, cowpea	1. Timely sowing is advised 2. Irrigation at critical stages through Micro irrigation systems 3. Limited irrigation may be followed instead of intensive irrigations	
	Bore wells in irrigated black soils	Paddy	Sunflower, Blackgram, Maize, Greengram, Foxtail millet, Bajra, Horsegram, cowpea		
Any other condition	-	-	-	-	

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[k]**	**Flowering stage[l]**	**Crop maturity stage[m]**	**Post harvest[n]**
Groundnut	1. Drain out excess water 2. spraying of $FeSO_4$ to for iron deficiency 3. spraying of Bavistin 0.1% + Mancozeb 0.25% against Tikka LS	1.Drain out excess water 2. Spraying of $FeSO_4$ to avoid iron deficiency 3. spraying of Carbendazim 0.1% + Mancozeb 0.25% against Tikka LS 3.Application of 20 Kg urea & 15 kg MOP immediately after rain	Weather based advisory to be followed for harvesting.	1. Keep the produce in uproot position 2.Use Mechanization (Wet pod thresher)
Sunflower	1.Drain out excess water 2. Spraying of Mancozeb to avoid Alternaria blight	1. Drain out excess water 2. Spraying of Mancozeb to avoid Alternaria blight 3.Application of 20 Kg urea & 15 kg MOP immediately after rain	Weather based advisory to be followed for harvesting.	Use Mechanization - Threshing
Cotton	1. Drain out excess water 2. Spraying of Mancozeb to avoid Leaf blight	1. Drain out excess water 2. Spraying of Mancozeb to avoid Leaf blight 3.Application of 20 Kg urea & 15 kg MOP immediately after rain	Weather based advisory to be followed for harvesting.	--

Redgram	Drain out excess water	1. Drain out excess water 2. Spraying of Mancozeb against Leaf blight 3.Application of 20 Kg urea & 15 kg MOP immediately after rain	Weather based advisory to be followed for harvesting.	Use Mechanization-
Castor	Drain out excess water Spraying of Mancozeb against Leaf blight	do	Weather based advisory to be followed for harvesting.	-Do-
Jowar	--	--	Weather based advisory to be followed for harvesting.	Use mechanization- Threshers, Dryers
Bengal gram	Drain out excess water Spraying of Mancozeb against Leaf blight	Drain out excess water Spraying of Mancozeb against Leaf blight	Weather based advisory to be followed for harvesting.	Use Mechanization – Combine harvesters
Horticulture crops - Fruits				
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.
Banana	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.	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	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.	Use ripening chambers for quick ripening. Market the produce 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. If the age of the plant is less than three months and submergence up to three feet better to replant the garden. Wind damaged branches should be pruned using disinfected secatures and cut ends must be smeared with Bordeaux paste	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.	Staking with bamboos to prevent further lodging.	
Orange & Batavian	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. Wind damaged branches should be pruned using disinfected secatures	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.	Drain the excess water as soon as possible. Harvest the mature fruits 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.

	and cut ends must be smeared with Bordeaux paste			
Horticultural crops - Vegetables				
Onion	Drain the excess water as soon as possible Spray Urea 2% solution 2-3 times.	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 mature produce in a clear sunny day	Dry the harvested onions in thin layers under shade in well ventilated places Store the produce in well ventilated place temporarily before it can be marketed. Market the produce as soon as possible.
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.
Chillies	Drain the excess water as soon as possible	Drain the excess water as soon as possible	Drain the excess water as soon as possible	Dry the pods on concrete floor immediately after

	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 economical loss), and the contingency period is between June to August, sowing of best alternative crop must be taken up.	Spray Urea 2% solution 2-3 times. Topdressing of booster dose of 15 kg MOP + 30 kg Urea per acre as soon as possible.	Harvest the matured fruits in a clear sunny day.	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.
Bhendi	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. Spray COC 30 g in 10 liters of water, 2-3 times against leaf spots. 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 12 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.

	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. Intercultivate the soil with gorru for better aeration Spray ferrous sulphate 20g + citric acid 5g in 10 lit of water twice at weekly intervals			
Horticulture flowers				
Jasmine/ Crossandra	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 Spray Urea 2% or 1% KNO3 solution 2-3 times.	Drain the excess water as soon as possible Harvest the marketable flowers as soon as possible.	Store the flowers in well ventilated place temporarily before it can be marketed. Market the flowers as soon as possible.
Spice & plantation crops				
Coriander	Drain the excess water as soon as possible Spray Urea 2% or 1% KNO_3 solution 2-3 times.	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 marketable umbels as soon as possible.	Dry the produce immediately Market the produce immediately after drying.
Turmeric	Drain the excess water as soon as possible Spray Urea 2% or 1% KNO_3 followed by Ferrous Sulphate 0.5% + Citric Acid 0.1 % solution 2-3 times.	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.

	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 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.			Pack the dried material in gunny bags disinfected with safe insecticides Store in a well ventilated rooms

2.3 Floods : -Not applicable-

2.5 Live Stock

General Contingency measures for livestock:

Before the event	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 Contingent strategies for Livestock, Poultry & Fisheries

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Feed and Fodder availability	Establishment of silvi-pastoral system in CPRs with ***Stylosanthus hamata*** and ***Cenchrus ciliaris*** as grass with ***Leucaena leucocephala*** as tree component (or suggest suitable similar system to your district) 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 Promote cultivation of 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 Chopping of fodder should be made as mandatory in every village through supply and establishment of good quality chaff cutters. Establishment of backed yard cultivation of para grass with drain water from bath room/washing area 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 seed banks in all drought prone villages	Harvest and use biomass of dried up crops (Groundnut, Rice, sorghum, Maize, Bajra, Horse gram, black gram) 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 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. Educate the farmers about mixing ground nut haulms and paddy straw (1:3) before feeding the animals. All the hay should be enriched with 2% Urea molasses solution or 1% common salt solution and fed to LS Herd should be split and supplementation should be given only to the highly productive and breeding animals Provision of emergency grazing/feeding (Cow-calf camps or other special arrangements to protect high productive & breeding stock) Motivate the farmers to mix the dry fodder with available kitchen waste while feeding 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	Concentrates supplementation should be provided to all the animals. The farmers may be advised to practice "flushing the stock" to recoup Short duration fodder crops of should be sown in unsown and crop failed areas where no further routine crop sowing is not possible Supply of quality seeds of fodder varieties and motivating the farmers to cultivate at least 10% of their land holding for fodder production

		Unproductive livestock should to be culled during severe drought Create transportation and marketing facilities for the culled and unproductive animals. Supply silage and or hay on subsidized rates to the farmers having high productive stock Subsidized loans should be provided to the livestock keepers	
Floods	In case of early forewarning (EFW), harvest all the crops (Groundnut, Maize, Rice, Bajra) that can be useful as fodder in future (store properly) and also sugar cane tops Don't allow the animals for grazing if severe floods are forewarned Motivate the farmers to store a minimum required quantity of hay (25-50kg) and concentrates (25kgs) per animals in farmer / LS keepers house / shed for feeding animals during floods Arrangement for transportation of animals from low lying area to safer places and also for rescue animal health workers to get involve in rescue operations	Transportation of animals to elevated areas Stall feeding of animals with stored hay and concentrates Proper hygiene and sanitation of the animal shed In severe floods, un-tether or let loose the animals Emergency outlet establishment for required medicines or feed in each village Spraying of fly repellants in animal sheds	Repair of animal shed Bring back the animals to the shed Cleaning and disinfection of the shed Bleach (0.1%) drinking water / water sources Deworming Vaccination against possible disease out breaks like HS, BQ, FMD and PPR Proper disposable of the dead animals / carcasses by burning / deep burying (4-8 feet) with lime powder (1kg for small ruminants and 5kg for large ruminants) in pit Drying the

			harvested crop material and proper storage for use as fodder.
Heat wave	As the district being chronically prone to heat waves the following permanent measures are suggested i) Plantation of trees like Neem, Pipal, Subabul around the shed ii) Spreading of husk/straw/coconut leaves over the roof top 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	Allow the animals preferably early in the morning or late in the evening for grazing during heat waves Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves Put on the foggers / sprinkerlers during heat weaves in case of high productive animals 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.	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)
Health and Disease management	Timely vaccination (as per enclosed vaccination schedule) against all endemic diseases Procurement of emergency medicines and medical kits Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district	Carryout deworming to all animals entering into relief camps Identification and quarantine of sick animals Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of any outbreak Restricting movement of livestock in case of any epidemic Rescue of sick and injured animals and their treatment	Conducting mass animal health camps Conducting fertility camps Mass deworming camps Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer Keeping vigil on disease outbreak

Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	Submission for insurance claim and availing insurance benefit Purchase of new productive animals
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) Construction of drinking water tanks in herding places/village junctions/relief camp locations	Restrict wallowing of animals in water bodies/resources	Bleach (0.1%) drinking water / water sources Provide clean drinking water

Vaccination programme for cattle and buffalo:

Disease	**Age and season at vaccination**
Anthrax	In endemic areas only, Feb to May
Hemorrhagic septicemia (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

Hemorrhagic septicemia (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 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		Sanitation of drinking water	Give sufficient water as per the bird's requirement
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			
Shortage of feed ingredients	In case of early forewarning of floods, shift the birds to safer place Storing of house hold grain like maize, broken rice, bajra etc,	Use stored feed as supplement Don't allow for scavenging Culling of weak birds	Routine practices are followed Deworming and vaccination against RD
Drinking water		Use water sanitizers or offer cool drinking water	
Health and disease management	In case of EFW, add antibiotic powder (Terramycin/Ampicillin	Prevent water logging surrounding the sheds through proper drainage facility Assure supply of electricity by generator	Sanitation of poultry house Treatment of affected birds Disposal of dead birds by burning / burying

	e/ Ampiclox etc., 10g in one litre) in drinking water to prevent any disease outbreak	or solar energy or biogas Sprinkle lime powder to prevent ammonia accumulation due to dampness	with line powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD
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 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 advanced 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	Immediate harvesting or changing the water quality by	Removal of top layer, deep ploughing of tank and application

	of geolites, soil probiotics, etc to maintain water quality	application of sanitizers.	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 according to availability of water	Harvesting of fish and leaving the pond fallow till next season	Removal of top layer, deep ploughing of tank and application of 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	Frequent 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			
Inland			
(i) Average compensation paid due to loss of human life	Shifting the people from low lying areas to relief camps	Deployment of specially trained persons for rescue operations by providing life bouys, jackets, ropes, boats, etc	Payment sufficient ex-gratia to the families
(ii) No. of boats / nets/damaged	Shifting and relocating boats and nets to safer places when warnings are issued, to avoid fishing, etc	Shifting and relocating boats and nets to safer places	Assessment of damages to boats and nets and provision of boats and nets for restoration of livelihoods
(iii) No. of houses damaged	Avoidance of construction of houses in flood prone ares, construction of pucca houses at elevated places,	Shifting of people by relief boats to the relief camps	Assessment of damages to houses and provision of compensation in case of partial damage and sanction house under existing schemes
(iv) 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	Erection of nets at spill ways	Taking up compensatory stocking

	spill way or just beyond it		
(v) 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	
(vi) Health and diseases	Sometimes there may be heavy accumulation of nutrients and organic matter.	There may be break out of Hemorrhagic septicemia. Addition of antibiotics like Chloro Tetra Cycline or Oxy Tetra Cycline to the feed to control 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 riveting 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 Hemorrhagic septicemia. Addition of antibiotics like Chloro Tetra Cycline or Oxy Tetra Cycline to the feed to control 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, accessoires, etc., Shifting of aerators, pumps soon after warnings are issued	Relocating pumps, aerators to elevated places	Assessment of damages and provision of them on subsidy
(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			