Agriculture Contingency Plan, District Osmanabad

Tulja Bhavani Temple, Tuljapur, District Osmanabad

State: Maharashtra
Agriculture Contingency Plan: District Osmanabad

1.0 District Agriculture profile				
1.1	**Agro-Climatic/ Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Deccan Plateau, Hot Semi-Arid Eco-Region (6.1)		
	Agro-Climatic Region (Planning Commission)	Western Plateau and Hills Region (IX)		
	Agro Climatic Zone (NARP)	Central Maharashtra plateau Zone (MH-7) Western Maharashtra Scarcity Zone (MH-6)		
	List all the districts or part thereof falling under the NARP Zone	1. Aurangabad 2.Jalana 3. Parbhani 4. Hingoli 5. Beed 6. Osmanabad 7. Latur 8.Nanded 9. Dhule 10. Buldhana 11.Amravathi 12. Jalgaon 13. Akola 14. Yeotmal		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		18°10'12.00 N	76° 3, 00.00''	458m above MSL
	Name and address of the concerned ZRS / **ZARS** / RARA / RRA / RRTTS	National Agricultural Research Project (MAU) , Paithan Road, Aurangabad - 431 005		
	Mention the KVK located in the district	Krishi Vigyan Kendra (MAU), Ausa Road, Tuljapur, PO. Tuljapur- 413 601 Districts – Osmanabad.		

1.2	**Rainfall**	Normal RF (mm)	Normal Rainy days (number)	Normal Onset (Specify week and month)	Normal Cessation (Specify week and month)
	SW monsoon (June - Sep) :	693.9	36	June 2nd week (MW 23)	October 1st week (MW 40)
	NE monsoon (Oct - Dec) :	88.2	6	-	-
	Winter (Jan - Feb) :	8.1	0	-	-
	Summer (Mar - May) :	52.2	0	-	-
	Annual	842.4	42	-	-
	(Source: Meteorology Department, MAU, Parbhani				

1.3	**Land use pattern of the district (latest statistics)**	Geographical area (000 ha)	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable waste land	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
		748.5	582.9	4.4	17.9	18.2	48.9	1.9	6.5	101.1	71.1

Source: Agriculture Statistical Information Maharashtra Sate 2006 (Part – II)

1.4	**Major Soils types**	**Area ('000 ha)**	**Percent (%) of total**
	1.Deep black soils	171.69	23.14
	2.Medium deep black soils	79.54	10.72
	3.Shallow soils	490.81	66.14

(Source: NBSS and LUP, Nagpur)

1.5	**Agricultural land use**	**Area ('000 ha)**	**Cropping intensity %**
	Net sown area	519.310	161.00
	Area sown more than once	321.878	
	Gross cropped area	841.188	

1.6	**Irrigation**	Area ('000 ha)	Percent (%)	
	Net cultivated area	582.451	77.8	
	Net Irrigated area	106.656	15.6	
	Gross irrigated area	128.377		
	Rainfed area	412.66		
	Sources of Irrigation	**Number**	**Area ('000 ha)**	**(%)**
	Canals	-	18.727	-
	Tanks	-	6.900	-
	Open wells	68538	92.10	-
	Bore wells	-	10.644	-
	Lift irrigation	-	-	-
	Other sources (Farm ponds)	2000	-	-
	Total	-	128.377	15.6
	No. of tractors	3875	0.217	-
	Pump sets	-	-	-
	Micro-irrigation (2009-10) **(Drip 1.05 and Sprinklar 0.5 ha)**		1.55	
	Groundwater availability and use	No. of blocks	% area	**Quality of water**
	Over exploited	-	-	-
	Critical	-	-	-
	Semi-critical	-	-	-
	Safe	-	-	-
	Waste water availability and use	-	-	-

Area under major field crops & horticulture etc.

1.7	**Major Field Crops cultivated**	**Area ('000 ha)**								
		Kharif 2009-2010			**Rabi 2007-08**			**Summer**		
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**
	Pigeon pea	-	87.8	87.8	-	-	-	-	-	87.8
	Sorghum	-	73.7	73.7	-	-	-	-	-	73.7
	Black gram	-	51.6	51.6	-	-	-	-	-	51.6
	Soybean	-	30.5	30.5	-	-	-	-	-	30.5
	Sunflower	-	27.6	27.6	-	-	-	-	-	27.6
	Rabi Sorghum	-	-	-	-	243.7	243.7	-	-	243.7
	Gram	-	-	-	-	65.2	65.2	-	-	65.2

	R. Sunflower	-	-	-	-	46.2	46.2	-	-	46.2
	Wheat	-	-	-	-	38.0	38.0	-	-	38.0
	Safflower	-	-	-	-	28.2	28.2	-	-	28.2
	Sugarcane	-	-	-	**25.1**	-	**25.1**	-	-	**25.1**
	Horticulture crops – Fruits	**Total area (000 ha)**			**Irrigated**			**Rainfed**		
	Mango	1.800			1.800			-		
	Grape	1.600			1.600			-		
	Kagzi Lime	0.600			0.600			-		
	Gauva	0.500			0.500			-		
	Tammarind	0.500						0.500		
	Horticulture crops - Vegetables	Total area			**Irrigated**			**Rainfed**		
	Bhendi	1.000			1.000			-		
	Methi	0.800			0.800			-		
	Potato	0640			0640			-		
	Cauliflower	0.600			0.600			-		
	Sweet gourd	0.500			0.500			-		
	Medicinal and Aromatic crops	**Total area**			**Irrigated**			**Rainfed**		
	Plantation Crops	**Total area**			**Irrigated**			**Rainfed**		
	Fodder crops	**Total area**			**Irrigated**			**Rainfed**		
	Sorghum	NA								
	Maize	NA								
	Lucern	NA								
	Berseem	NA								
	Gajraj	NA								
	Total fodder crop area	NA								
	Grazing land	NA								
	Sericulture etc	17.260								

(Source: JDA's ZREAC report kharif, 2010 & C-DAP. Osmanabad)

1.8	**Livestock**	**Number ('000)**
	Cattle	373.501
	Buffaloes total	225.705
	Commercial dairy farms	-
	Goat	218.570
	Sheep	39.374
	Others (Camel, pig, Yak etc.)	-
1.9	**Poultry**	
	Commercial	396.700

	Backyard	237.232		
1.10	**Fisheries**	Area (000 ha)	Yield (t/ha)	Production (tones)
	Brackish water	NA		
	Fresh water	18.241	0.0959	1750
	Others	NA	-	-

Source: Maharashtra Animal and Fishery Sciences University, Nagpur

1.11	**Production and Productivity of major crops (Average of last 5 years: 2003 to 2008)**	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)
	Pigeon pea	58.2	663	-	-	-	-	58.2	663
	Sorghum	52.3	709	-	-	-	-	52.3	709
	Black gram	19.0	368	-	-	-	-	19.0	368
	Soybean	27.4	899	-	-	-	-	27.4	899
	Sunflower	13.9	505	-	-	-	-	13.9	505
	Rabi Sorghum	-	-	203.24	834	-	-	203.24	834
	Gram	-	-	39.25	602	-	-	39.25	602
	R. Sunflower	-	-	28.50	617	-	-	28.50	617
	Wheat	-	-	32.94	867	-	-	32.94	867
	Safflower	-	-	16.32	579	-	-	16.32	579

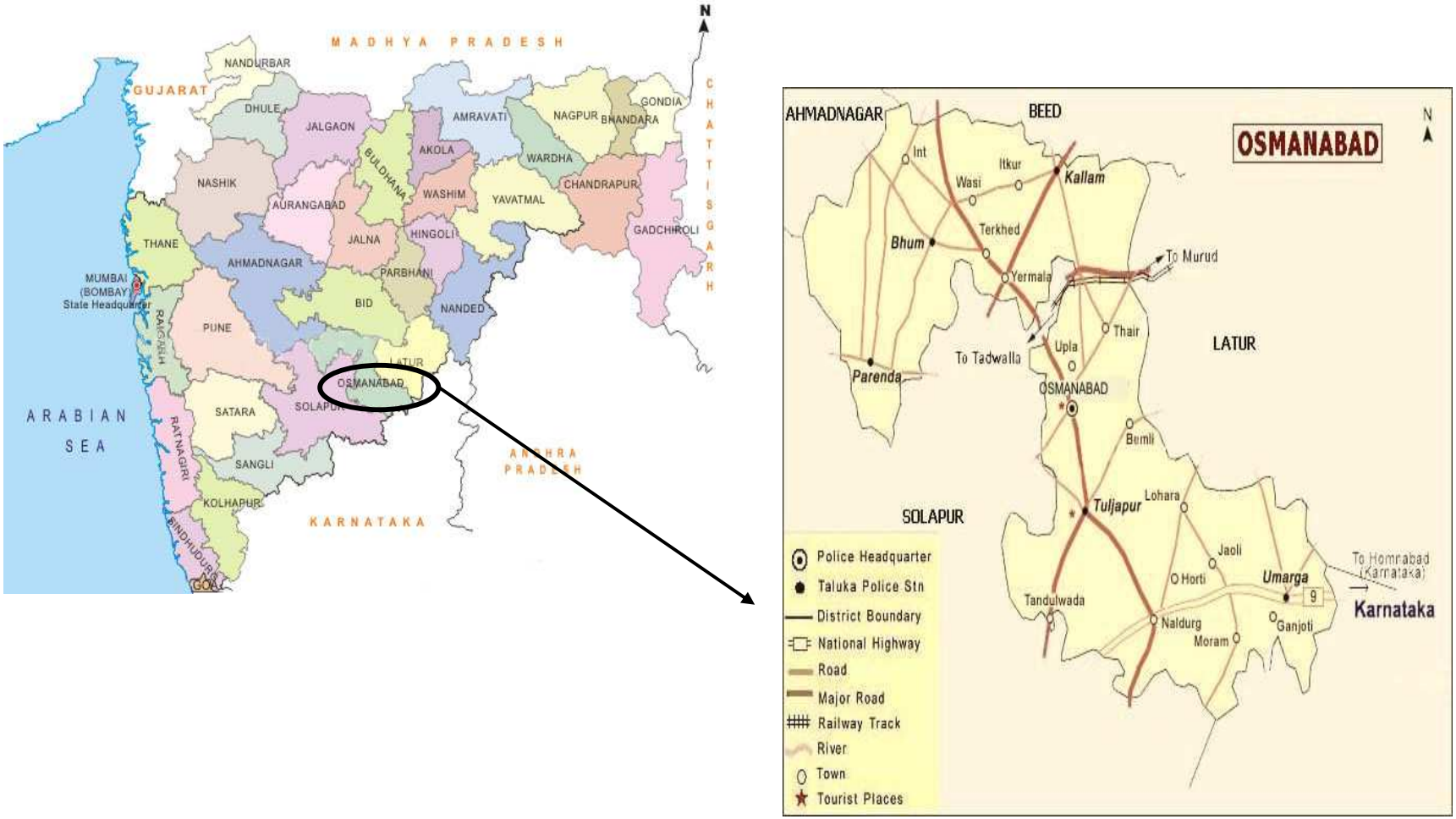
	Major Horticultural crops								
	Mango	16200	9000	-	-	-	-	16200	9000
	Grape	32000	20000	-	-	-	-	32000	20000
	Kagzi Lime	7800	13000	-	-	-	-	7800	13000
	Gauva	15000	30000	-	-	-	-	15000	30000
	Tammarind	7000	14000	-	-	-	-	7000	14000
Source: Regional Review Meeting Report, 2010-2011 Agril. Department Govt of Maharashtra and C-DAP. Osmanabad									

1.12	**Sowing window for 5 major crops (start and end of sowing period)**	Pigeon pea	Sorghum	Black gram	Soybean	: Sunflower
	Kharif - Rainfed	June 15 to July 15	June 15 to July 30	June 15 to July 30	June 15 to July 30	June 15 to July 15
	Kharif - Irrigated					
		Wheat	Sorghum	Gram	Safflower	
	Rabi - Rainfed		1 - 15 Oct	15-30 Oct -	Sep 15 to Oct 15	1 to 15 oct
	Rabi - Irrigated	1st to 20th Nov	15 Oct – 15 Nov	Oct 15 to Nov 15	Oct 15 to Nov 15	Oct 15 to Nov 15

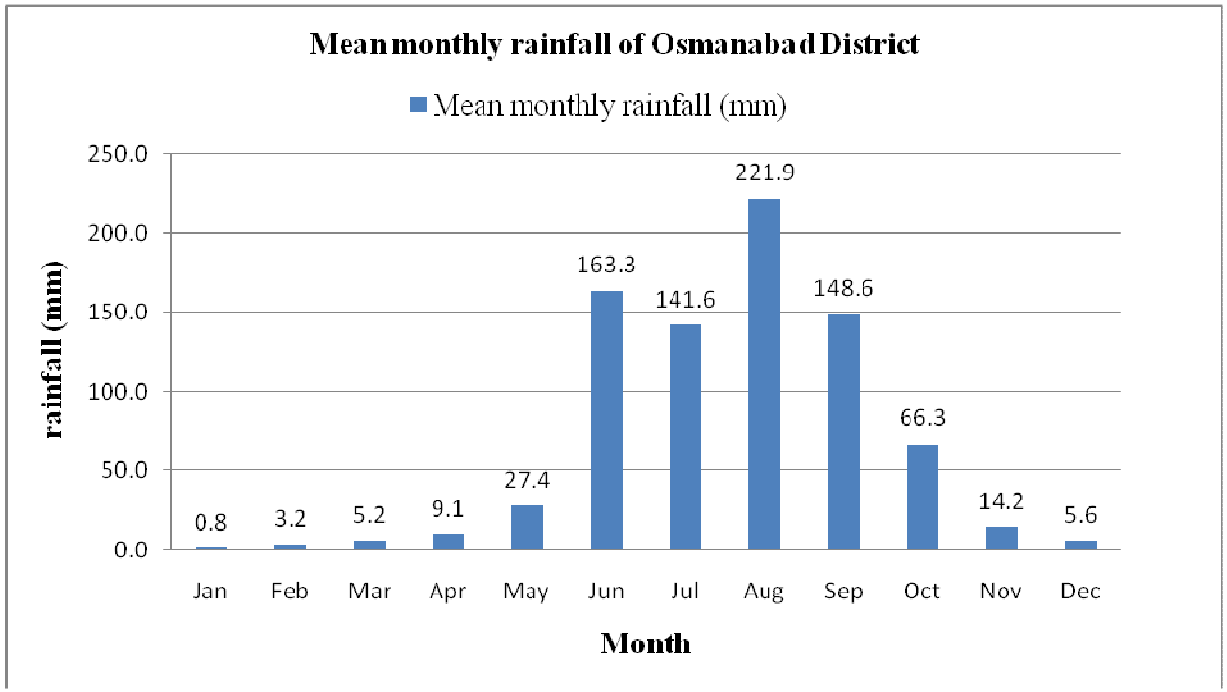
1.13	**What is the major contingency the district is prone to? (Tick mark** and mention years if known during the last 10 years period **)**	Regular	Occasional	None
	Drought	-	√	-
	Flood	-	-	√
	Cyclone	-	-	√
	Hail storm	-	-	√
	Heat wave	-	-	√
	Cold wave	-	-	√
	Frost	-	-	√
	Sea water inundation	-	-	√
	Pests and diseases	√ 1.Heliothis (pigeonpea , gram) 2.Spodoptera (Soybean) 3.Sphingid (Moong and Urd) 4.Jassids&whitefly (cotton)		

1.14	**Include Digital maps of the district for**	Location map of district within States as Annexure 1	Enclosed : Yes
		Mean annual rainfall as Annexure 2	Enclosed : Yes
		Soil map as Annexure 3	Enclosed : Yes

Annexure 1
Location map of Osmanabad district



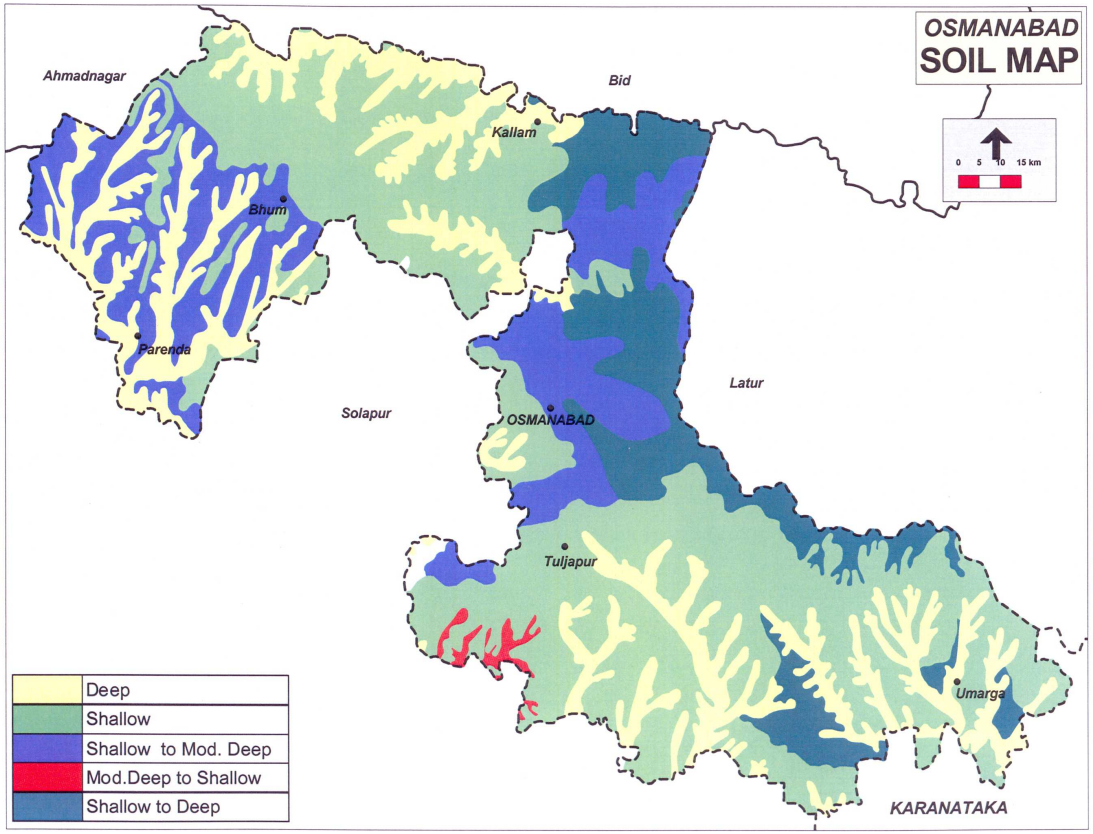
Annexure 2
Mean monthly rainfall of Osmanabad district



(Source: IMD) (1941-1990)

Annexure 3

Soil map of osmanabad district



Source: NBSS & LUP Regional Centre, Nagpur

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system including variety**	**Change in Crop / Cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks **4th week of June**	Medium deep to deep black soils with assured rainfall	Pigeonpea	No Change	Normal package of practices recommended by MAU, Parbhani	Linkage with MAU, Parbhani, MSSC, NSC for supply of seed
		Sorghum	-do-	-do-	
		Black gram	-do-	-do-	
		Soybean	-do-	-do-	
		Sunflower	-do-	-do-	
	Shallow soils with assured rainfall	Pigeonpea	-do-	-do-	
		Sorghum	-do-	-do-	
		Blackgram	-do-	-do-	
		Soybean	-do-	-do-	
		Pearl millet	-do-	-do-	
	Medium deep to deep black soils with low rainfall (Bhoom and Paranda tehsils)	Pigeonpea	-do-	-do-	
		Sorghum	-do-	-do-	
		Black gram	-do-	-do-	
		Soybean	-do-	-do-	
	Shallow soils with low rainfall (Bhoom and Paranda Tehsils)	Pigeonpea	-do-	-do-	
		Sorghum	-do-	-do-	
		Black gram	-do-	-do-	
		Pearl millet	-do-	-do-	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system including variety**	**Change in Crop/Cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks **2nd week of July**	Medium deep to deep black soils with assured rainfall	Pigeonpea	No change. Prefer varieties like BSMR 736, 853 BDN 708, 711	Normal package of practices recommended by MAU, Parbhani	• Linkage with MAU, Parbhani, MSSC, NSC for supply of foundation / certified / truthful seed
		Sorghum	Cotton / Maize/ Pigeonpea (BSMR 736, 853, BDN 708, BDN 711) / Pearl millet (Shradha, Saburi, AIMP-92901) /	Normal package of practices recommended by MAU, Parbhani	

			Sunflower (Morden, SS-56, LSFH-35, BSH-1)		• Supply of seed cum fertilizer drill under RKVY, ZILLA PARISHAD, MAIDC
		Black gram	Soybean (JS 335, MAUS-71) + Pigeonpea (BSMR 736, 853, BDN 708, BDN 711) intercropping in 4:2 or 6:3 row proportion	-do-	
		Soybean	-do-	-do-	
		Sunflower	No change. Prefer varieties like Morden, SS-56, LSFH-35, BSH-1		
	Shallow soils with assured rainfall	Pigeonpea	No change. Prefer varieties like BSMR 736, 853 BDN 708, 711	-do-	
		Sorghum	Cotton / Maize/ Pigeonpea (BSMR 736, 853, BDN 708, 711) / Pearl millet (Shradha, Saburi, AIMP-92901) / Sunflower (Morden, SS-56, LSFH-35, BSH-1)	-do-	
		Blackgram	Soybean (JS 335, MAUS-71) + Pigeonpea (BSMR 736, 853, BDN 708, BDN 711) intercropping in 4:2 or 6:3 row proportion	-do-	
		Soybean	-do-	-do-	
		Pearl millet	No change. Prefer varieties like Shradha, Saburi, AIMP-92901	-do-	
	Medium deep to deep black soils with low rainfall (Bhoom and Paranda tehsils)	Pigeonpea	No change. Prefer varieties like BSMR 736, 853 BDN 708, 711	-do-	
		Sorghum	Sorghum (CSH-9, 11, 16, PBK-401, 809) + Pigeonpea (BSMR 736, 853 BDN 708, 711) in 4:2 row proportion	-do-	
		Black gram	Soybean (JS 335, MAUS-71, 81) + Pigeon pea (BSMR 736, 853, BDN 708, 711) in 4:2 row proportion or cotton (Bt cotton hybrids like Bunny, Mahyco, Ankur, Ajit-51) + pigeonpea in 6:2 ratio	-do-	
		Soybean	-do-	-do-	
	Shallow soils	Pigeonpea	No change	-do-	

	with low rainfall (Bhoom and Paranda tehsils)	Sorghum	Pearl millet (Shradha, Saburi, Shanti, ABPC 4-3) + Pigeonpea(BSMR 736, 853, BDN 708, 711) in 4:2 row proportion	-do-	
		Black gram	Soybean (JS 335, MAUS-71, 81) + Pigeon pea (BSMR 736, 853, BDN 708, 711) in 4:2 row proportion	-do-	
		Pearl millet	No change. Prefer varieties like Shradha, Saburi, AIMP-92901	-do-	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system including variety**	**Normal Crop / Cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks **4th week of July**	Medium deep to deep black soils with assured rainfall	Pigeonpea	No change	• Open furrows after every 6-8 rows with Balram plough • Intercultivation with hoe • Foliar spray with 2% urea and DAP	• Linkage with MAU, Parbhani, MSSC, NSC for supply of foundation / certified / truthful seed • Supply of seed cum fertilizer drill under RKVY, ZILLA PARISHAD, MAIDC
		Sorghum	Pearl millet (Shradha, Saburi, AIMP-92901) + Pigeon pea (BDN-708, 711) in 4:2 or 3:3 row proportion	-do-	
		Black gram	-do-	• Give protective irrigation • Foliar spray with 2% urea and DAP	
		Soybean	Soybean (MAUS-47, 71) + Pigeonpea (BDN-708, 711) in 4:2 row proportion	-do-	
		Sunflower	Sunflower (Morden, SS-56, LSH-36, Mahyco-17, BSH-1) + Sesamum (JLT-7, 26)	• Interculture with hoe • Protective irrigation	
	Shallow soils with assured rainfall	Pigeonpea	Pearl millet (Shradha, Saburi, AIMP-92901) + Pigeon pea (BDN-708, 711) in 4:2 or 3:3 row proportion	• Open furrows after every 6-8 rows with Balaram plough • Intercultivation with hoe	
		Sorghum	-do-	• Interculture with hoe • Protective irrigation	
		Blackgram	Fodder maize (African Tall), Fodder sorghum (Pusa Chaari) /	Plan for land preparation to take up rabi crops	

			Keep fallow, plan for rabi crops like sorghum		
		Soybean	Soybean (MAUS-47, 71) + Pigeonpea (BDN-708, 711) in 4:2 or 3:3 row proportion	• Give protective irrigation • Foliar spray with 2% urea and DAP	
		Pearl millet	No change. Prefer varieties like Shradha, Saburi, AIMP-92901	Give protective irrigation	
	Medium deep to deep black soils with low rainfall (Bhoom and Paranda tehsils)	Pigeonpea	No change / Pearl millet + Pigeonpea in 4:2 or 3:3 or sesamum (No.-85, JLT-7), Fodder sorghum (Nilwa)	• Open furrows after every 6-8 rows with Balaram plough • Intercultivation with hoe • Foliar spray with 2% urea and DAP	
		Sorghum	Castor (VI-9, Aruna, DCS-9 (Jyothi), GGH-4, 5, 6 and DCH-117 / 32)	-do-	
		Black gram	Keep fallow, plan for rabi crops like sorghum	• Plan for land preparation to take up rabi crops • Foliar spray with 2% urea and DAP	
		Soybean	Soybean + Pigeon pea 4:2 (MAUS-47, 71 + BSMR 853, BDN-708, 711)	-do-	
	Shallow soils with low rainfall (Bhoom and Paranda tehsils)	Pigeonpea	Pearl millet (Shradha, Saburi, AIMP-92901) + Pigeon pea (BDN-708, 711) in 4:2 or 3:3 row proportion	• Open furrows after every 6-8 rows with Balaram plough • Intercultivation with hoe • Foliar spray with 2% urea and DAP	
		Sorghum	-do-	-do-	
		Black gram	Fodder maize (African Tall), Fodder sorghum (Pusa Chaari) / Keep fallow, plan for rabi crops like sorghum	Plan for land preparation to take up rabi crops	
		Pearl millet	No change. Prefer varieties like Shradha, Saburi, AIMP-92901	Give protective irrigation	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system including variety**	**Change in Crop/Cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks **2nd week of Aug**	Medium deep to deep black soils with assured rainfall	Pigeonpea	Pearl millet + Pigeonpea in 3:3 or 4:2 row proportion. Prefer early maturing varities like BDN-708 / 711	• Open conservation furrow after every 6-8 rows with Balram plough. • Adopt closer spacing of 60 X 30 cm for pigeonpea. • Seed hardening i.e. 18 hrs soaking in water followed by 24 hrs shade drying.	• Supply of seed cum fertilizer drill under RKVY, ZILLA PARISHAD, MAIDC • Supply of seed through MSSC, NFSM, University, Village seed production programme
		Sorghum	-do-	• Open conservation furrow after every 6-8 rows with Balram plough. • Seed hardening i.e. 18 hrs soaking in water followed by 24 hrs shade drying.	
		Black gram	Niger **(**Local) / fodder sorghum / fallow for Rabi crops	Prepare land for early sowing of rabi crops	
		Soybean	*Kharif* fallow followed by *rabi* crops	-do-	
		Sunflower	Sunflower (Morden, SS-56, LSH-36, Mahyco-17, BSH-1) + Pigeonpea (BSMR 853, BDN-708, 711	*In situ* moisture conservation like conservation furrows with Balram plough and protective irrigation	
	Shallow soils with assured rainfall	Pigeonpea	Pearl millet + Pigeonpea in 3:3 or 4:2 row proportion. Prefer early maturing varities like BDN-708 / 711	Intercultivation with hoe or conservation furrows with Balram plough and protective irrigation at critical stages	
		Sorghum	-do-		
		Blackgram	Niger **(**Local) / fodder sorghum / fallow for Rabi crops	Prepare land for early sowing of rabi crops	
		Soybean	*Kharif* fallow followed by *rabi* crops	-do-	
		Pearl millet	No change. Prefer varieties like Shradha, Saburi, AIMP-92901	Interculture with hoe, protective irrigation	
	Medium deep to deep black soils with low rainfall (Bhoom and Paranda Tehsils)	Pigeonpea	Pearl millet + Pigeonpea in 3:3 or 4:2 row proportion. Prefer early maturing varities like BDN-708 / 711	Intercultivation with hoe or conservation furrows with Balram plough and protective irrigation at critical stages	

		Sorghum	-do-		
		Black gram	Niger (Local) / fodder sorghum / fallow for Rabi crops	Prepare land for early sowing of rabi crops	
		Soybean	*Kharif* fallow followed by *rabi* crops	-do-	
	Shallow soils with low rainfall (Bhoom and Paranda tehsils)	Pigeonpea	Pearl millet + Pigeonpea in 3:3 or 4:2 row proportion. Prefer early maturing varieties like BDN-708 / 711	Interculture with hoe, protective irrigation, if feasible	
		Sorghum	Sunflower / Castor	-do-	
		Black gram	Niger (Local) / fodder sorghum / fallow for Rabi crops	Prepare land for early sowing of rabi crops	
		Pearl millet	No change. Prefer varieties like Shradha, Saburi, AIMP-92901	Interculture with hoe, protective irrigation, if feasible	

Condition			**Suggested Contingency measures**		
Early season drought (Normal onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Crop management**	**Soil nutrient & moisture Conservation measures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing germination / crop stand etc.	Medium deep to deep black soils with assured rainfall	Pigeonpea	Gap filling within the rows with same or short duration cultivar to maintain at least 75% plant population	Interculture with hoe	Supply of intercultural implements (Harrow, hoe) through MAIDC, Zilla Parishad
		Sorghum	Gap filling with pearl millet / pigeonpea	-do-	
		Black gram	• Gap filling within the rows with the same variety • If the plant population is less than 50% of optimum, go for resowing of the alternate crops like pearl millet / sunflower / pigeonpea • If possible give protective irrigation with sprinkler.	-do-	
		Soybean	• Gap filling within the rows with same or short duration cultivar to maintain at least 75% of optimum plant population • If the plant population is less than 50% resow the crop	-do-	
		Sunflower	• Gap filling within the rows with same or short duration cultivar to maintain at least 75% plant	-do-	

			population		
	Shallow soils with assured rainfall	Pigeonpea	Gap filling within the rows with same or short duration cultivar to maintain at least 75% plant population	-do-	
		Sorghum	Gap filling with pearl millet / pigeonpea	-do-	
		Blackgram	• Gap filling within the rows with the same variety • If the plant population is less than 50% of optimum, go for resowing of the alternate crops like pearl millet / sunflower / pigeonpea • If possible give protective irrigation with sprinkler.	-do-	
		Soybean	• Gap filling within the rows with same or short duration cultivar to maintain at least 75% of optimum plant population • If the plant population is less than 50% resow the crop	-do-	
		Pearl millet	Gap filling or transplanting of seedlings either from the same field or from nursery or gap filling with pigeonpea	Interculture with hoe.	
	Medium deep to deep black soils with low rainfall (Bhoom and Paranda tehsils)	Pigeonpea	Gap filling within the rows with same or short duration cultivar to maintain at least 75% plant population	-do-	
		Sorghum	Gap filling with pearl millet / pigeonpea	-do-	
		Black gram	• Gap filling within the rows with the same variety • If the plant population is less than 50% of optimum, go for resowing of the alternate crops like pearl millet / sunflower / pigeonpea • If possible give protective irrigation with sprinkler.	-do-	
		Soybean	• Gap filling within the rows with same or short duration cultivar to maintain at least 75% of optimum	-do-	

			plant population • If the plant population is less than 50% resow the crop		
	Shallow soils with low rainfall (Bhoom and Paranda tehsils)	Pigeonpea	Gap filling within the rows with same or short duration cultivar to maintain at least 75% plant population	-do-	
		Sorghum	Gap filling with pearl millet / pigeonpea	-do-	
		Black gram	• Gap filling within the rows with the same variety • If the plant population is less than 50% of optimum, go for resowing of the alternate crops like pearl millet / sunflower / pigeonpea • If possible give protective irrigation with sprinkler.	-do-	
		Pearl millet	Gap filling or transplanting of seedlings either from the same field or from nursery or gap filling with pigeonpea	-do-	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop / Cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Medium deep to deep black soils with assured rainfall	Pigeonpea	• Interculture with harrow for weeding and to create soil mulch. • Protective irrigation if possible through farm pond water	• Avoid top dressing of fertilizers till sufficient soil moisture is available. • Opening of alternate furrows after every 6-8 rows with Balaram plough. • Mulching with crop residue @ 3-5 t / ha within the rows • Spraying of 2% urea or DAP	• Supply of intercultural implements (Harrow, hoe) through MAIDC, Zilla Parishad • Link farm ponds technology through watershed programme / NRGS implemented by
		Sorghum	• Protective irrigation if possible through farm pond water	• Avoid top dressing of fertilizers till sufficient soil	

			• Intrarow thinning • Intercultivation with harrow for weeding	moisture is available. • Opening of alternate furrows after every 6-8 rows with Balaram plough.	Agril. Department
		Black gram	• Interculture for weeding and to create soil mulch. • Protective irrigation if possible through farm pond water	• Spraying of 2% urea or DAP • Interculture with hoe	
		Soybean	Interculture for weeding and to create soil mulch.	• Opening of alternate furrows with Balaram plough. • Mulching with crop residue @ 3-5 t / ha within the rows • Spraying of 2% urea or DAP	
		Sunflower	-do-	-do-	
	Shallow soils with assured rainfall	Pigeonpea	• Interculture for weeding and to create soil mulch • Protective irrigation	• Spraying of 2% urea or DAP • Opening of alternate furrows	
		Sorghum	• Protective irrigation if possible through farm pond water • Intrarow thinning • Intercultivation with harrow for weeding	• Avoid top dressing of fertilizers till sufficient soil moisture is available. • Opening of alternate furrows with Balaram plough	
		Blackgram	• Interculture for weeding and to create soil mulch. • Protective irrigation if possible through farm pond water	Spraying of 2% urea or DAP	
		Soybean	Prepare shallow furrow while hoeing by tying ropes to prongs, which will provide soil support to crop plant and conserve soil moisture	Land leveling and bunding in case of regular dry spells	
		Pearl millet	• Avoid top dressing of fertilizers till sufficient soil moisture is available • Interculture with harrow for weeding and to create soil mulch. • Protective irrigation if possible through farm pond water	Opening of alternate furrows	
	Medium deep to deep black soils with low rainfall	Pigeonpea	• Interculture with harrow for weeding and to create soil mulch. • Protective irrigation if possible through farm pond water	• Avoid top dressing of fertilizers till sufficient soil moisture is available • Opening of alternate furrows	

	(Bhoom and Paranda tehsils)			with Balaram plough. • Mulching with crop residue • Spraying of 2% urea or DAP	
		Sorghum	• Protective irrigation if possible through farm pond water • Intrarow thinning • Interculture with harrow for weeding and to create soil mulch to conserve moisture.	• Avoid top dressing of fertilizers till sufficient soil moisture is available. • Opening of alternate furrows with Balaram plough	
		Black gram	• Interculture with harrow for weeding and to create soil mulch. • Protective irrigation if possible through farm pond water	Spraying of 2% urea or DAP	
		Soybean	Interculture with harrow for weeding and to create soil mulch.	• Spraying of 2% urea or DAP • Opening of alternate furrows	
	Shallow soils with low rainfall (Bhoom and Paranda tehsils)	Pigeonpea	• Interculture with harrow for weeding and to create soil mulch. • Protective irrigation if possible through farm pond water	• Avoid top dressing of fertilizers till sufficient soil moisture is available. • Opening of alternate furrows with Balaram plough. • Mulching with crop residue • Spraying of 2% urea or DAP	
		Sorghum	• Protective irrigation if possible through farm pond water • Intrarow thinning	• Avoid top dressing of fertilizers till sufficient soil moisture is available • Interculture for weeding and to create soil mulch to conserve moisture. • Opening of alternate furrows	
		Black gram	• Interculture for weeding and to create soil mulch. • Protective irrigation if possible through farm pond water	Spraying of 2% urea or DAP	
		Pearl millet	• Interculture with harrow for weeding and to create soil mulch. • Protective irrigation if possible through farm pond water	• Avoid top dressing of fertilizers till sufficient soil moisture is available. • Opening of alternate furrows	

				with Balaram plough. • Mulching with crop residue • Spraying of 2% urea or DAP	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop / Cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At flowering / fruiting stage	Medium deep to deep black soils with assured rainfall	Pigeonpea	Life saving irrigation if possible through farm pond water	Foliar spray of 2% KNO_3, urea and DAP	• Farm ponds through watershed development • Supply of seed through MSSC, NFSM, MAU, Village seed production programme • Implements through MAIDC, Zilla Parishad
		Sorghum	• Life saving irrigation if possible through farm pond water • In case of severe stress, harvest as green fodder	If feasible spray anti-transparent 6% kaolin	
		Black gram	Life saving irrigation if possible through farm pond water	Spraying of 2% urea and DAP	
		Soybean	-do-	Foliar spray of 2% urea and DAP	
		Sunflower	-do-	-do-	
	Shallow soils with assured rainfall	Pigeonpea	Life saving irrigation if possible through farm pond water	Foliar spray of 2% urea and DAP	
		Sorghum	Life saving irrigation if possible through farm pond water.	• If feasible spray anti-transparent 6% kaolin • In case of severe stress, harvest as green fodder	
		Blackgram	• Life saving irrigation if possible through farm pond water • In case of severe stress harvest as green fodder	Spraying of 2% urea and DAP	
		Soybean	Life saving irrigation if possible through farm pond water	Foliar spray of 2% urea and DAP	
		Pearl millet	-do-	-do-	
	Medium deep to deep black soils with low rainfall (Bhoom and Paranda tehsils)	Pigeonpea	Life saving irrigation if possible through farm pond water	Foliar spray of 2% KNO_3, urea and DAP	
		Sorghum	-do-	-do-	
		Black gram	-do-	Spraying of 2% urea and DAP	
		Soybean	-do-	-do-	

	Shallow soils with low rainfall (Bhoom and Paranda tehsils)	Pigeonpea	Life saving irrigation if possible through farm pond water	Foliar spray of 2% urea and DAP	
		Sorghum	• Life saving irrigation if possible through farm pond water If feasible spray anti-transparent 6% kaolin. • In case of severe stress harvest as green fodder	-do-	
		Black gram	Life saving irrigation if possible through farm pond water	Spraying of 2% urea and DAP	
		Pearl millet	-do-	-do-	

Condition			**Suggested Contingency measures**		
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation**	**Normal Crop / Cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
	Medium deep to deep black soils with assured rainfall	Pigeonpea	Life saving irrigation	-	• Farm ponds through watershed development • Supply of seed through MSSC, NFSM, MAU, Village seed production programme • Implements through MAIDC, Zilla Parishad
		Sorghum	Life saving irrigation or harvest at physiological maturity	Plan for rabi crops chickpea / safflower	
		Black gram	Harvest at physiological maturity	Plan for rabi crops chickpea / safflower / rabi sorghum / sunflower	
		Soybean	Life saving irrigation	-do-	
		Sunflower	-do-	-do-	
	Shallow soils with assured rainfall	Pigeonpea	Life saving irrigation	-	
		Sorghum	Life saving irrigation or harvest at physiological maturity	Plan for rabi crops chickpea / safflower	
		Blackgram	Harvest at physiological maturity	Plan for rabi crops chickpea / safflower / rabi sorghum / sunflower	
		Soybean	Life saving irrigation	-do-	
		Pearl millet	Life saving irrigation or harvest at physiological maturity	-do-	
	Medium deep to deep black soils with low rainfall (Bhoom and Paranda tehsils)	Pigeonpea	Life saving irrigation	-	
		Sorghum	Life saving irrigation or harvest at physiological maturity	-do-	
		Black gram	Harvest at physiological maturity	Plan for rabi crops chickpea / safflower / rabi sorghum / sunflower	
		Soybean	Life saving irrigation	Plan for rabi crops chickpea / safflower	
	Shallow soils with	Pigeonpea	Life saving irrigation	Foliar spray of 2% KNO_3,	

	low rainfall (Bhoom and Paranda tehsils)			urea and DAP	
		Sorghum	• Life saving irrigation • In case of severe stress harvest as green fodder	Plan for rabi crops chickpea / safflower	
		Black gram	Harvest at physiological maturity	Plan for rabi crops chickpea / safflower / rabi sorghum / sunflower	
		Pearl millet	Life saving irrigation or harvest at physiological maturity	Plan for rabi crops chickpea / safflower after harvest of sole pearl millet	

2.1.2 Irrigated situation

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/Cropping system**	**Change in crop / cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed release of water in canals due to low rainfall	Medium deep to deep black cotton soil with assured rainfall	Sugarcane	No change or irrigated cotton	• Raising of nurseries with single budded setts to save the time and water for pre-seasonal planting • Drip system for enhancing the water productivity • Mulching with sugarcane trash between rows and frequent interculture to conserve moisture	Linkage with DSAO for micro-irrigation
		Turmeric	No change	Use drip irrigation	
		Vegetable crops	Cotton / Maize	-do-	
		Mango	No change	• Drip irrigation • Basin mulch	
	Shallow soils with assured rainfall	Grape	No change	-do-	
		Kagzilime	No change	-do-	
	Medium deep to deep black cotton soil with low rainfall (Bhoom and Paranda tehsils)	Wheat / Onion	No change	• Drip irrigation • Irrigation at critical crop growth stages	
	Shallow soils with low rainfall (Bhoom and Paranda tehsils)	Wheat	Rabi sorghum / chickpea	Irrigation at critical crop growth stages	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/Cropping system**	**Change in crop / cropping system**	**Agronomic measures**	**Remarks on Implementation**
Limited release of water in canals due to low rainfall	Medium deep to deep black cotton soil with assured rainfall	Sugarcane	No change or irrigated cotton	• Raising of nurseries with single budded setts to save the time and water for pre-seasonal planting • Drip system for enhancing the water productivity • Mulching with sugarcane trash between rows and frequent interculture to conserve moisture	Linkage with DSAO for micro-irrigation
		Turmeric	No change	Use drip irrigation	
		Vegetable crops	Cotton / Maize	-do-	
		Mango	No change	• Drip irrigation • Basin mulch	
	Shallow soils with assured rainfall	Grape	No change	-do-	
		Kagzilime	No change	-do-	
	Medium deep to deep black cotton soil with low rainfall (Bhoom and Paranda tehsils)	Wheat / Onion	No change	• Drip irrigation • Irrigation at critical crop growth stages	
	Shallow soils with low rainfall (Bhoom and Paranda tehsils)	Wheat	Rabi sorghum / chickpea	Irrigation at critical crop growth stages	

Condition	Major Farming situation	Normal Crop/Cropping system	Suggested Contingency measures: Change in crop / cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Medium deep to deep black cotton soil with assured rainfall	Sugarcane	Cotton	• Mulching • Interculture	Linkage with MAU, Parbhani, MSSC, NSC for seed
		Turmeric	Rabi sorghum, Chickpea and safflower	-do-	
		Vegetable crops	Pigeonpea	-do-	
		Mango	No change	-do-	
	Shallow soils with assured rainfall	Grape	No change	Arrange for water from some other source	
		Kagzilime	No change	-do-	
	Medium deep to deep black cotton soil with low rainfall (Bhoom and Paranda tehsils)	Sugarcane	Cotton	• Mulching • Interculture	
		Turmeric	Rabi sorghum, Chickpea and safflower	-do-	
		Vegetable crops	Pigeonpea	-do-	
		Mango	No change	-do-	
	Shallow soils with low rainfall (Bhoom and Paranda tehsils	Not applicable			

Condition	Major Farming situation	Crop/Cropping system	Suggested Contingency measures: Change in crop / cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient / delayed onset of monsoon	Not applicable				

Condition	Major Farming situation	Normal Crop/Cropping system	Suggested Contingency measures: Change in crop / cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater	Medium deep to deep black cotton soil with	Sugarcane	Cotton	• Mulching • Interculture	Linkage with MAU, Parbhani, MSSC, NSC

recharge due to low rainfall	assured rainfall	Turmeric	Rabi sorghum, Chickpea and safflower	-do-	for seed
		Vegetable crops	Pigeonpea	-do-	
		Mango	No change	-do-	
	Shallow soils with assured rainfall	Grape	No change	Arrange for water from some other source	
		Kagzilime	No change	-do-	
	Medium deep to deep black cotton soil with low rainfall (Bhoom and Paranda tehsils)	Sugarcane	Cotton	• Mulching • Interculture	
		Turmeric	Rabi sorghum, Chickpea and safflower	-do-	
		Vegetable crops	Pigeonpea	-do-	
		Mango	No change	-do-	
	Shallow soils with low rainfall (Bhoom and Paranda tehsils)	Not applicable			

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**
Cotton, Sorghum	• Drain excess water • Interculture at optimum soil moisture • Apply 25KgN/Ha to cotton	Drain excess water	Drain out excess water Timely harvest	Protect picked cotton from drenching and soiling Dry wet cotton and market
Soybean, Pigeonpea and short duration pulses	Drain out excess water	-Do-	-Do-	Shift to safer place Dry the produce
Horticulture				
Mango	Opening of field channels to drain out excess water and avoid surface ponding, Interculture at optimum soil moisture	Opening of field channels to drain out excess water and avoid surface ponding, Interculture at optimum soil moisture	Collect fallen fruits, grade and market if feasible	Grading, cleaning and marketing of fruits
Grape	-do-	-do-	-do-	-do-
Pomogranate	-do-	-do-	-do-	-do-

Heavy rainfall with high speed winds in a short span				
Cotton, Sorghum	• Drain excess water • Interculture at optimum soil moisture • Apply 25KgN/Ha to cotton	Drain excess water	Drain out excess water Timely harvest	Protect picked cotton from drenching and soiling Dry wet cotton and marketing
Soybean, Pigeonpea and short duration pulses	Drain out excess water	-do-	-do-	Shift to safer place Dry the produce
Horticulture				
Mango	-do-	Provide support to prevent lodging and uprooting in young orchards	Apply multinutrient and hormonal spray to promote flowering	Shift produce to safer place
Grape	-do-	-do-	-do-	-do-
Pomogranate	-do-	-do-	-do-	-do-
Outbreak of pests and diseases due to unseasonal rains				
Cotton	Apply soil drench of carbendazim 0.1% or COC @ 3g/litre at base of plants to prevent wilt in low lying patches	Apply foliar spray of streptocycline sulphate @ 6g/60 litre + COC @ 25g/10 litre to prevent bacterial leaf blight Apply Sulphur 25g/10 litre (300 mesh) to prevent grey mildew Apply MgSO4 25 kg/ha soil application or 1% MgSO4 foliar spray to prevent leaf reddening	Foliar spray of carbendazim 0.1% or Ditane M45 0.2% to prevent boll rot	-
Sorghum			Apply Dithane M 45 0.2% on ear heads immediately after cessation of rains	
Soybean	Manually remove infested plants or plant parts from below the girdles Protect against semilooper when density reaches >4 larvae per meter row with foliar spray of NSKE 5% or dimethoate 30 EC 1 ml/litre	-		
Horticulture				
Mango	Spray imidacloprid 0.3 ml or dimethoate 1 ml/liter to control hopper Drench the seedlings with COC 0.25% against root rot	Protect against hopper	Spray Dithane M 45 3g/litre or carbendazim 1g/liter against anthracnose Spray sulphur 0.5% to control powdery mildew	Maintain aeration in storage to prevent fungal infection and blackening or fruits

Grape (Take from Nasik plan)	Soil drenching with COC 3g/litre to avoid rhizome rot	Spray Dithane M 45 3g/liter or propiconazole 1 ml/liter 2-3 times against Cercospora leaf spot		
Pomogranate	a) Insect pest - Shot hole borer - Use Geru paste with insecticides - Soil application of 10 g phorate @ 10g/plant in basin b) Disease - i) Bacterial blight – Spraying of bactinashak 250 ppm (2.5g/10 lit.) and captaf 0.25 % alternatively ii) Fungal fruit and leaf spot- Spraying of mancozeb 75 WP 0.25 % or carbendazim 50 WP 0.1 %Wilt	i) Shot hole borer - Use Geru paste with insecticides - Soil application of 10 g phorate @ 10g/plant in basin ii) Anar caterpillar - Spraying of Emamectin benzoate 5 SG @ 5g/10 lit. water. i) Bacterial spot – Spraying of bactinashak 250 ppm (2.5 g / 10 lit.) and captaf 0.25 % alternatively ii) Fungal fruit and leaf spot- Spraying of mancozeb 75 WP 0.25 % or carbendazium 50 WP 0.1 %	i) Fruit sucking moth - Protect the fruits either by bagging or by using repellents i) Bacterial spot – Spraying of bactinashak 250 ppm (2.5 g / 10 lit.) and captaf 0.25 % alternatively	

2.3 Floods: Not applicable

Condition	**Suggested contingency measure**			
Transient water logging / partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Continuous submergence for more than 2 days	Not applicable			
Sea water inundation				

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

Extreme event type	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave	Not applicable			
Cold wave	Not applicable			
Frost	Not applicable			
Hailstorm	Not applicable			
Cyclone	Not applicable			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event[s]	**During the event**	**After the event**
Drought			
Feed and fodder availability	Sowing of cereals (Sorghum/Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during North-East monsoon under dry land system for fodder production Collection of soya meal waste and sunflower/safflower/ groundnut seed cake for use as feed supplement during drought Motivating the sugarcane farmers to convert green sugarcane tops in to silage by the end of February Preserving the green maize fodder as silage Development of hortipastoral systems inexisting orchards Establishment of fodder bank at village level with available dry fodder (wheat straw, Sorghum/ Bajra stover, groundnut haulms, sugarcane tops) Development of silvopastoral models with Leucaena, Glyricidia, Prosopis as fodder trees and Marvel, Madras Anjan, Stylo, Desmanthus, etc., as under storey grass Encourage fodder production with Sorghum – stylo- Sorghum on rotation basis and also to cultivate short-term fodder crops like sunhemp Promote Azola cultivation at backyard Formation of village Disaster Management Committee Capacity building and preparedness of the stakeholders and official staff for the drought/floods/cyclones	Harvest and use biomass of dried up crops (Pearlmillet, Pigeon pea, Sorghum, maize, Wheat, Green gram, Black gram, Soybean, cluster bean) material as fodder Use of unconventional and locally available cheap feed ingredients especially soya meal waste and sunflower/safflower/ groundnut seed cake for feeding of livestock during drought Harvest all the top fodder available (Subabul, Glyricidia, Pipol, Prosopis etc) and feed the LS during drought Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured from Govt. Godowns for feeding high productive animals during drought Promotion of Horse gram as contingent crop and harvesting it at vegetative stage as fodder All the hay should be enriched with 2% Urea molasses solution or 1% common salt solution and fed to LS. Continuous supplementation of minerals to prevent infertility. Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals Arrangements should be made for mobilization of small ruminants across the districts where no drought exits Unproductive livestock should to be culled during severe drought Create transportation and marketing facilities for the culled and unproductive animals (10000-20000 animals) Subsidized loans (5-10 crores) should be provided	Encourage progressive farmers to grow multi cut 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 on their own lands with input subsidy Supply of quality seeds of COFS 29, Stylo and fodder slips of Marvel, Yaswant, Jaywant, Napier, guinea grass well before monsoon Flushing the stock to recoup Replenish the feed and fodder banks

		to the livestock keepers	
Drinking water	Make available wholesome clean drinking water throughout the year for livestock Adopt various water conservation methods at village level to improve the ground water level for adequate water supply. 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 Drinking water troughs should be provided in shandies /community grazing areas	Provide wholesome clean drinking water throughout the day Restrict wallowing of animals in water bodies/resources Add alum in stagnated water bodies	Watershed management practices should be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources Desilting of ponds Sensitize the farming community about importance of clean drinking water for livestock
Health and disease management	Procure and stock emergency medicines and vaccines for important endemic diseases of the area All the stock must be immunized for endemic diseases of the area before the onset of monsoon Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district Adequate refreshment training on disaster management to be given to animal husbandry department staff Procure and stock multivitamins & area specific mineral mixture	Conduct mass animal health camps in every village Keep close watch on health of different livestock species Identification and quarantine of sick animals Performing ring vaccination (8 km radius) in case of any outbreak Tick control measures should be implemented to prevent tick borne diseases in productive animals Keep the animal houses clean and spray disinfectants Safe and hygienic disposal of dead animal carcasses	Keep close surveillance on disease outbreak. Undertake the vaccination depending on need Restricting movement of livestock in case of any epidemic Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer

Cyclone/ Floods	Harvest all the possible immature and or wetted grain (Pearlmillet, Pigeon pea, Sorghum, Wheat, Green gram, Black gram, maize, Soybean, cluster bean etc) and store properly for use as animal feed. Protect the stored dry roughage feed (wheat straw/sorghum stover etc.,) from wetting and inundation of stagnated water Procure and stock vaccines for important endemic diseases Make available emergency medicines, anti-diarrheal drugs and electrolytes for transport to the needy areas Keep stock of bleaching powder and lime Don't allow the animals for grazing in case of early forewarning (EFW) Incase of EFW of severe cyclone/floods, shift the animals to safer places Surveillance and disease monitoring network to be established at Animal Husbandry Department in each district Arrange transportation facilities for animals to shift from low lying areas to safer places and also for animal health workers for rescue operations	Arrange relief camps to save productive and high valued animals Shift productive and high valued animals from affected areas to relief camps Carryout deworming to all the animals entering into relief camps Proper hygiene and sanitation of the relief camps, animal sheds and surroundings Avoid feeding soaked and mould infected feeds / fodders to livestock Treatment of the sick, injured and affected animals through arrangement of mobile emergency veterinary hospitals / rescue animal health workers. Spray fly repellants like neem oil, Butax etc., in animal sheds and relief camps Identification and quarantine of sick animals Perform ring vaccination (8 km radius) in case of any disease outbreak Sprinkle lime in relief camps and animal sheds Proper disposal of dung from relief camps and animal sheds	Restrict movement of animals in case of epidemic Repair of animal shed Cleaning and disinfection of the shed Bleach (0.1%) drinking water / water sources Deworm all the animals through mass camps Vaccinate against possible disease out breaks like HS, BQ, FMD and PPR Proper dispose 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 Bleach / chlorinate (0.1%) drinking water or water resources Collect drowned crop material, dry it and store for future use Sowing of short duration fodder crops in unsown and water logged areas when crops are damaged and no chance to replant Application of urea (20-25kg/ha) in the inundated areas and CPR's to enhance the bio mass production.
Heat & Cold wave	Arrangement for protection from **heat wave** i) Plantation around the shed ii) Arrangement of H_2O sprinklers / foggers in the shed **iii)** Application of white reflector paint on the roof **iv)** Thatched sheds should be provided as a shelter to minimize heat stress **Cold wave :** Covering all the wire meshed walls / open area with gunny bags/ polyethylene sheets (with a mechanism for lifting during the day time and putting down during night time)	**Heat wave:** Allow the animals early in the morning or late in the evening for grazing Feed green fodder/silage / concentrates during day time and roughages / hay during night time Put on the foggers / sprinkerlers during day time In severe cases, vitamin 'C' and electrolytes should be added in H_2O during day time **Cold wave :** Allow for grazing between 10AM to 3PM Add 25-50 ml of edible oil in concentrates and fed to the animals Put on the heaters during night time Apply / sprinkle lime powder in the animal shed to neutralize ammonia accumulation	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)

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

2.5.2 Poultry

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
Drought			
Shortage of feed ingredients	Storing of grain like maize, bajra, jowar, broken wheat/ rice etc, to use as supplemental feed during drought	Feed with house hold grain to all the birds in the noon i.e., after morning scavenging Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Feed supplementation to all the survival birds
Drinking water	Store adequate good quality water	Use water sanitizers and offer cool hygienic drinking water	Provide clean and hygienic drinking water
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and IBD	Supplementation 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 grain like maize, bajra, jowar, broken wheat/ rice 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	Protect the stored water from contamination	Use water sanitizers Offer hygienic drinking water	Provide clean and hygienic drinking water
Health and disease management	In case of EFW, add antibiotic powder (Terramycin/Ampicilline/ Ampiclox etc., 10g in one litre) in drinking water to prevent any disease outbreak	Prevent water logging around the sheds Provide proper drainage facility to clear stagnated water Assure supply of electricity by generator or solar energy or biogas Sprinkle lime powder to prevent ammonia accumulation due to dampness Sanitation of poultry house	Sanitation of poultry house Treatment of affected birds Disposal of dead birds by burning / burying with line powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD
Cyclone			
Shortage of feed ingredients	In case of EFW, shift the birds to safer place Storing of grain like maize,	Use stored feed as supplement Don't allow for scavenging Protect from thunder storms	Routine practices are followed

	bajra, jowar, broken wheat/ rice etc Culling of weak birds		
Drinking water	Protect the stored water from contamination	Use water sanitizers Offer hygienic drinking water	Provide clean and hygienic drinking water
Health and disease management	In case of EFW, add antibiotic powder in drinking water to prevent any disease outbreak	Sanitation of poultry house Treatment of affected birds Prevent water logging around the sheds Assure supply of electricity Sprinkle lime powder (5-10g per square feet) to prevent ammonia accumulation due to dampness	Disposal of dead birds by burning / deep burying with lime powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against Ranikhet Disease
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 in the shed 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 with house hold grain Provide cool and clean drinking water with electrolytes and vit. C In hot summer, add anti-stress probiotics in drinking water or feed	Routine practices are followed
Cold wave			
Shelter/environment management	Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity	Close all openings with polythene sheets In severe cases, arrange heaters in the shed Don't allow for scavenging during early morning and late evening	Routine practices are followed
Health and disease management	Deworming and vaccination against IBD	Supplementation with house hold grain Sanitation of poultry house Sprinkle lime powder (5-10g per square feet) to prevent ammonia accumulation due to dampness	Routine practices are followed

[a] based on forewarning wherever available

2.5.3 Fisheries: Not applicable