

Agriculture Contingency Plan, District Parbhani



MAU, Parbhani

State: Maharashtra
Agriculture Contingency Plan: Parbhani District

1.0 District Agriculture profile				
1.1	Agro-Climatic/ Ecological Zone			
	Agro Ecological Sub Region (ICAR)	Deccan Plateau, Hot Semi-Arid Eco-Region (6.2)		
	Agro-Climatic Region (Planning Commission)	Western Plateau and Hills Region (IX)		
	Agro Climatic Zone (NARP)	Central Maharashtra plateau Zone (MH-7)		
	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
		19° 15' 28.04'' N	76° 46' 25.47'' E	407 m above MSL
	Name and address of the concerned ZRS / <u>ZARS</u> / RARA / RRA / RRTTS	Marathwada Agriculture University Parbhani National Agricultural Research Project, Paithan Road ,Aurangabad 500431 (Maharashtra)		
Mention the KVK located in the district	Jeevan Joti Charitable Trust, Rajiv Gandhi, Krishi Vigyan Kendra, Jintur road, Parbhani - 431 402.			
Nearest AMFU unit	AMFU, Parbhani 431 402			

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) :	804.9	37	June 1st week (23MW)	October 1st week (40MW)
	NE monsoon (Oct - Dec) :	96.2	5	-	-
	Winter (Jan - Feb) :	12.2	1	-	-
	Summer (Mar - May) :	44.3	1	-	-
	Annual	957.6	44	-	-
(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
	Area	631.1	583.682	6.4	28.7	13.3	22.8	1.4	8.1	36.7	28.2

Source: Agriculture Statistical Information Maharashtra State 2005-2006 (Part – II)

1.4	Major Soils types	Area ('000 ha)	Percent (%) of total
	1.Deep black soils	413.12	53.79
	2.Medium deep soils	32.77	4.27
	3.Shallow soils	322.15	41.94

(Source: NBSS and LUP, Nagpur)

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	518.782	120
	Area sown more than once	103.75	
	Gross cropped area	622.53	

1.6	Irrigation	Area ('000 ha)	Percent (%)	
	Net Irrigated area	131.77	-	
	Gross irrigated area	182.269	-	
	Rainfed area	387.01	-	
	Sources of Irrigation	Number	Area ('000 ha)	(%)
	Canals	-	86.774	-
	Tanks	-	16.102	-
	Open wells	-	28.895	-
	Bore wells	-	-	-
	Lift irrigation	-	-	-
	Other sources (Farm ponds)	-	-	-
	Total	-	131.771	25
	No. of tractors	-	-	-
	Pump sets	-	-	-
	Micro-irrigation (2009 - 10) Drip 0.14 and sprinkler 1.37 ha	-	1.51	-
	Groundwater availability and use	No. of blocks	% area	Quality of water
	Over exploited	-	-	safe
	Critical	-	-	safe
	Semi-critical	-	-	safe
	Safe	-	-	safe
	Waste water availability and use	-	-	

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

Area under major field crops & horticulture etc.

1.7	Major Field Crops cultivated	Area ('000 ha)								
		Kharif			Rabi			Summer		
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated		Total
	Cotton	-	192.1	192.1	-	-	-	-	-	192.1
	Sorghum	-	90.2	90.2	-	168.8	168.8	-	-	259.0
	Soybean	-	63.4	63.4	-	-	-	-	-	63.4
	Green gram	-	62.9	62.9	-	-	-	-	-	62.9
	Black gram	-	16.7	16.7	-	-	-	-	-	16.7
	Pigeon pea	-	58.2	58.2	-	-	-	-	-	58.2
	Wheat	-	-	-	42.7	-	42.7	-	-	42.7
	Gram	-	-	-	-	46.8	46.8	-	-	46.8
	Safflower	-	-	-	-	27.1	27.1	-	-	27.1
	Sunflower	-	-	-	8.9	-	8.9	-	-	8.9
	Groundnut	-	-	-	-	-	-	4.9	-	4.9
	Sugarcane	-	-	-	15.6	-	15.6			15.6
	Horticulture crops – Fruits	Total area (000 ha) 2008-09			Irrigated			Rainfed		
	Mango	13.82			-			-		
	Sweet orange	8.32			-			-		
	Orange	2.89			-			-		
	Sapota	2.09			-			-		
	Lime	1.21			-			-		
	Horticulture crops – Vegetables	Total area (000 ha)			Irrigated			Rainfed		
	Brinjal	1.32			-			-		
	Tomato	1.22			-			-		
	Onion	0.83			-			-		
	Okra	0.56			-			-		
	Cauliflower	0.34			-			-		
	Medicinal and Aromatic crops	Total area			Irrigated			Rainfed		
	Chilli	1.13			-			-		
	Turmeric	0.80			-			-		
	Ginger	0.05			-			-		
	Garlic	0.43			-			-		

	Floriculture		-	-
	Marigold	0.028	-	-
	Rose	0.017	-	-
	Aster	0.012	-	-
	Mogra	0.011	-	-
	Gelirdia	0.006	-	-
	Plantation Crops	Total area	Irrigated	Rainfed
	Not Applicable			
	Fodder crops	Total area	Irrigated	Rainfed
	Sorghum			
	Maize	NA	-	-
	Lucern	NA	-	-
	Berseem	NA	-	-
	Gajraj	NA	-	-
	Total fodder crop area	NA	-	-
	Grazing land	NA	-	-
	Sericulture etc	-	-	-
	Others (Specify)	-	-	-

1.8	Livestock	Number ('000)		
	Cattle	367.725		
	Buffaloes total	134.042		
	Commercial dairy farms	-		
	Goat	192.744		
	Sheep	22.964		
	Others (Camel, pig, Yak etc.)	-		
1.9	Poultry	-		
	Commercial	208.587		
	Backyard	-		
1.10	Fisheries	Area (ha)	Yield (t/ha)	Production (tones)
	Brackish water	NA	NA	NA
	Fresh water	9.635	0.0934	900

Source: Maharashtra Animal and Fishery Sciences University, Nagpur

1.11	Production and Productivity of major crops (Average of last 5 years: (2004 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)
	Cotton	322.1	285	-	-	-	-	322.1	285
	Sorghum	97..2	1078	-	-	-	-	251.7	1004
	Soybean	64..9	1023	-	-	-	-	64.9	1023
	Green gram	23..3	371	-	-	-	-	23.3	371
	Pigeon pea	31..3	538	-	-	-	-	31.3	538
	Rabi sorghum	-	-	154.5	930	-	-	154.5	930
	Wheat	-	-	60..3	1463	-	-	60.3	1463
	Gram	-	-	30..5	633	-	-	30.5	633
	Safflower	-	-	22.4	620	-	-	22.4	620
	Sunflower	-	-	5.1	619	-	-	5.1	619
	Groundnut	-	-	-	-	5.4	1159	5.4	1159
	Sunflower	-	-	-	-	0.3	648	0.3	648
	Maize	-	-	-	-	0.3	1067	0.3	1067
	Source : JDA's ZREAC report kharif & rabi, 2010)								
	Major Horticultural crops mt/ha								
	Mango	50.60	6.25	-	-	-	-	50.60	6.25
	Sweet orange	1.34	30.0	-	-	-	-	1.34	30.0
	Orange	0.292	20.0	-	-	-	-	0.292	20.0
	Sapota	0.106	10.0	-	-	-	-	0.106	10.0
	Lime	0.33	5.00	-	-	-	-	0.33	5.00
	Banana			-	-	-	-		
	Horticulture crops - Vegetables								
	Brinjal	11.92	9	-	-	-	-	11.92	9
	Tomato	8.575	7	-	-	-	-	8.575	7
	Onion	6.640	8	-	-	-	-	6.640	8
	Okra	2.240	4	-	-	-	-	2.240	4
	Cauliflower	2.79	8	-	-	-	-	2.79	8
	Medicinal and Aromatic crops								
	Chilli	6.78	6	-	-	-	-	6.78	6
	Turmeric	6.42	8	-	-	-	-	6.42	8
	Ginger	0.25	5	-	-	-	-	0.25	5
	Garlic	1.37	4	-	-	-	-	1.37	4
	Floriculture								
	Marigold	0.112	4	-	-	-	-	0.112	4

Rose	0034	2	-	-	-	-	0034	2
Aster	0.036	3	-	-	-	-	0.036	3
Mogra	0.044	4	-	-	-	-	0.044	4
Gelirdia	0.012	2	-	-	-	-	0.012	2

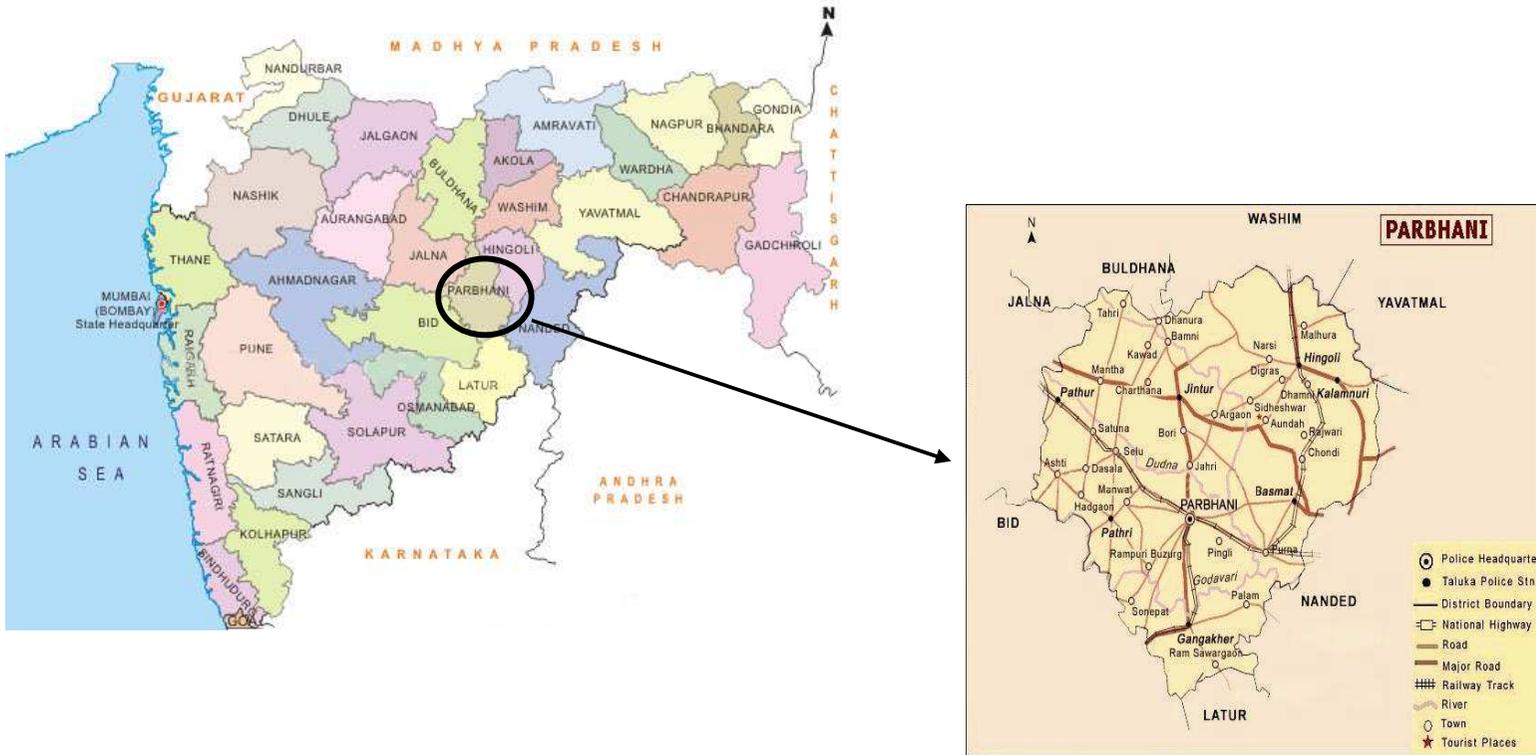
1.12	Sowing window for 5 major crops (start and end of sowing period)	Crop 1 : Cotton	2 : Sorghum	3 : Soybean	4 : Green gram	5 : Pigeon pea
	Kharif - Rainfed	June 15 to July 15	June 15 to July 15	June 15 to July 15	June 15 to July 07	June 15 to July 30
	Kharif - Irrigated	May 15 to June 15	NA	NA	NA	NA
		Wheat	Sorghum	Gram	Safflower	
	Rabi - Rainfed	NA	Sept 23 to Oct 15	Oct 1 to 15	Sept 23 to Oct 15	NA
	Rabi - Irrigated	Nov 1 to 20	Oct 15 to Nov 15	Oct 15 to Nov 15	Oct 15 to nov15	NA

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	-	√ (Parbhani, Gangakhed purna, Pathri, tahsils)	-
	Cyclone	-	-	√
	Hail storm	-	-	√
	Heat wave	-	√	-
	Cold wave	-	√	-
	Frost	-		√
	Sea water inundation	-		√
	Pests and diseases (specify)	-	Jassids.White fly(Cotton).Heliothis (pigeonpea), Spodoptera (Soybean) Sphingid (Moong and Urd Shoot fly(sorghum)	√

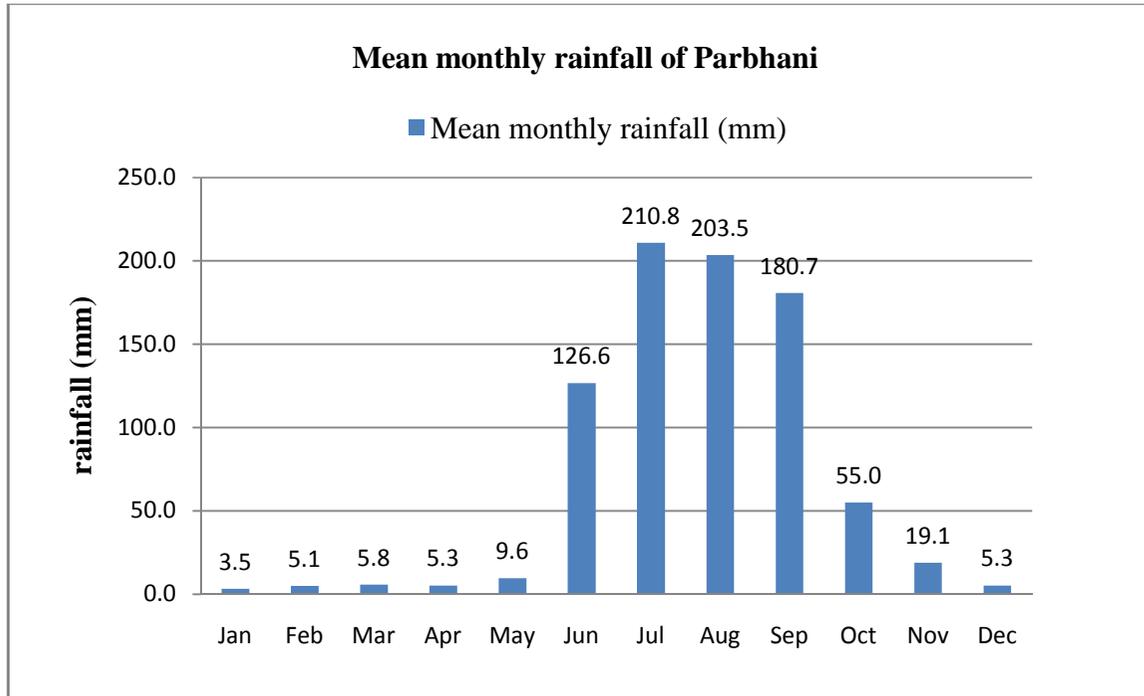
1.14	Include Digital maps of the district for	Location map of district within States as Annexure 1	Enclosed : Yes
		Mean annual rainfall as Annexure 2	Enclosed : Yes
		Soil map as Annexure 3	Enclosed : Yes

Annexure 1

Location map of Parbhani district

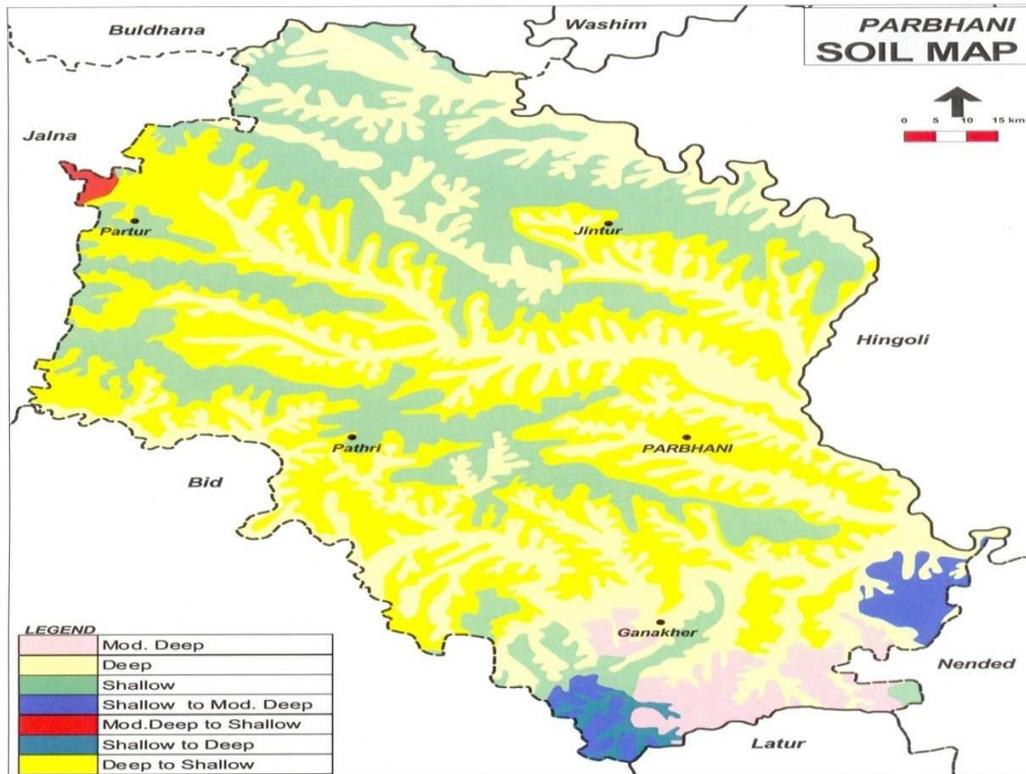


Annexure 2
Mean monthly rainfall of Parbhani district



Annexure 3

Soil Map of Parbhani district



(Source: NBSS & LUP Regional Centre, Nagpur)

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop/Cropping system	Suggested Contingency measures		
			Change in Crop/Cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 2 week (Specify month) * June 4th week 26MW	Medium deep to deep black soils	Cotton	No change	No change	Linkage with MAU, MSSC and NSC for seed. Linkage with MAIDC for implements. Linkage with MAU, KVK for agro techniques
		Sorghum	No change	No change	
		Soybean	No change	No change	
		Green gram	No change	No change	
		Pigeon pea	No change	No change	
		Black gram	No change	No change	
	Shallow soils	Cotton	No change	No change	
		Sorghum	No change	No change	
		Soybean	No change	No change	
		Green gram	No change	No change	
		Pigeon pea	No change	No change	
		Black gram	No change	No change	

Condition	Major Farming situation	Normal Crop/Cropping system	Suggested Contingency measures		
			Change in Crop/Cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 4 week (Specify month) July 2nd week 28MW	Medium deep to deep black soils	Cotton	Cotton + Pigeonpea 6:2 (BSMR 736, 853, BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani or adopt 15-20% more seed rate than recommended and reduce fertilizer dose by 25 per cent.	Linkage with MAU, MSSC and NSC for seed. Linkage with MAIDC for implements. Linkage with MAU, KVK for agro techniques
		Sorghum	Sorghum + Pigeonpea 4 : 2 (CSH-9, 11, 14, 16 PVK-401, 809) + (BSMR 736, 853, BDN 708, 711)	-----do-----	

		Soybean	No change / Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81)	Normal package of practices recommended by MAU, Parbhani
		Green gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81)	-----do-----
		Pigeon pea	NO change / Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81)	-----do-----
		Black gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81)	-----do-----
	Shallow soils	Cotton	Cotton + Pigeonpea 6:2 (BSMR 736, 853, BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani or adopt 15-20% more seed rate than recommended and reduce fertilizer dose by 25 per cent.
		Sorghum	Sorghum + Pigeonpea 4 : 2 (CSH-9, 11, 14, 16 PVK-401, 809) + (BSMR 736, 853, BDN 708, 711)	-----do-----
		Soybean	Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81)	Normal package of practices recommended by MAU, Parbhani
		Green gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81)	-----do-----
		Pigeon pea	NO change / Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81)	-----do-----
		Black gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81)	-----do-----

Condition	Major Farming situation	Normal Crop/Cropping system	Suggested Contingency measures		
			Change in Crop/Cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 6 week (Specify month) July 4th week 30MW	Medium deep to deep black soils	Cotton	Cotton + Pigeonpea 6:2 (BSMR 736, 853, BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani or adopt 15-20% more seed rate than recommended and reduce fertilizer dose by 25 per cent.	Linkage with MAU, MSSC and NSC for seed. Linkage with MAIDC for implements. Linkage with MAU, KVK for agro techniques
		Sorghum	Sorghum + Pigeonpea 4 : 2 (CSH-9, 11, 14, 16 PVK-401, 809) + (BSMR 736, 853, BDN 708, 711)	-----do-----	
		Soybean	No change / Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81) + (BSMR 736 853, BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani	
		Green gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736 853, BDN 708, 711)	-----do-----	
		Pigeon pea	NO change / Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736 853, BDN 708, 711)	-----do-----	
		Black gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736 853, BDN 708, 711)	-----do-----	
		Shallow soils	Cotton	Cotton + Pigeonpea 6:2	Normal package of

			(BSMR 736, 853, BDN 708, 711)	practices recommended by MAU, Parbhani or adopt 15-20% more seed rate than recommended and reduce fertilizer dose by 25 per cent.
		Sorghum	Pearlmillet + Pigeonpea 3 :3 or 4:2 (Shradha, Saburi, Shanti AIMP-92901) + (BSMR 853, BDN 708, 711)	-----do-----
		Soybean	Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81) + (BSMR 853, BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani
		Green gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 853, BDN 708, 711)	-----do-----
		Pigeon pea	NO change / Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 853, BDN 708, 711)	-----do-----
		Black gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 853, BDN 708, 711)	-----do-----

Condition	Major Farming situation	Normal Crop/Cropping system	Suggested Contingency measures		
			Change in Crop/Cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 8 week (Specify month) August 2 nd week 33MW	Medium deep to deep black soils	Cotton	Pigeonpea (BDN 708, 711)	Prefer early maturing varieties recommended by MAU, Parbhani. Reduce intera row spacing and adopt 15-20% more seed rate than recommended	Linkage with MAU, MSSC and NSC for seed. Linkage with MAIDC for implements. Linkage with MAU, KVK for agro techniques
		Sorghum	Pearlmillet + Pigeonpea 3 :3 or 4:2 (Shradha, Saburi, Shanti AIMP-92901) + (BDN 708, 711)	-----do-----	
		Soybean	Sunflower (Morden, SS-56, LSFH-35, BSH-1)	Normal package of practices recommended by MAU, Parbhani	
		Green gram	Pigeonpea (BDN 708, 711) or Keep fallow and plan for Rabi Crops like Sorghum, Chickpea, Sunflower and Safflower.	-----do-----	
		Pigeon pea	Pigeonpea(BDN 708, 711)	-----do-----	
		Black gram	Pigeonpea (BDN 708, 711) or Keep fallow and plan for Rabi Crops like Sorghum, Chickpea, Sunflower and Safflower.	-----do-----	

	Shallow soils	Cotton	Pigeonpea (BDN 708, 711)	Prefer early maturing varieties recommended by MAU, Parbhani. Reduce intera row spacing and adopt 15-20% more seed rate than recommended	
		Sorghum	Pearlmillet + Pigeonpea 3 :3 or 4:2 (Shradha, Saburi, Shanti AIMP-92901) + (BDN 708, 711)	-----do-----	
		Soybean	Sunflower (Morden, SS-56, LSFH-35, BSH-1)	Normal package of practices recommended by MAU, Parbhani	
		Green gram	Keep fallow and plan for early Rabi Crops like Sorghum, Chickpea, Sunflower and Safflower.	-----do-----	
		Pigeon pea	Keep fallow and plan for early Rabi Crops like Sorghum, Chickpea, Sunflower and Safflower.	-----do-----	
		Black gram	Keep fallow and plan for early Rabi Crops like Sorghum, Chickpea, Sunflower and Safflower.	-----do-----	

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	Major Farming situation	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	Cotton	Gap filling 7-10 days after sowing by pot watering within the rows with same cultivar or pigeonpea to maintain at least 75% plant population. Raise cotton seedlings in polythene bags and transplant when sufficient soil moisture is available. Give protective irrigation wherever possible	Making of conservation furrows for moisture conservation When the crop is 2 weeks old take up Interculture with harrow. Spray 2 % urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition	Linkage with MAU, MSSC and NSC for seed. Linkage with MAIDC for implements. Linkage with MAU, KVK for agro techniques
		Sorghum	Gap filling with pigeonpea	When the crop is 2 weeks old take up Interculture with hoe	
		Soybean	Gap filling within the rows with same or short duration cultivar to maintain at least 75% plant population or if the plant population is less than 50% re sow the crop	Avoid applying fertilizers till sufficient soil moisture is available	
		Green gram	If the plant population is less than 75% of optimum, go for resowing of the alternate crops like sunflower / pigeonpea . If possible give protective irrigation with sprinkler.	When the crop is 2 weeks old take up Interculture with hoe	
		Pigeon pea	Gap filling within the rows with same or short duration cultivar to maintain at least 75% plant population	When the crop is 2 weeks old take up Interculture with hoe	
		Black gram	If the plant population is less than 75% of optimum, go for re sowing of the alternate crops like sunflower / pigeonpea .	--do--	

			If possible give protective irrigation with sprinkler.	
	Shallow soils	Cotton	Gap filling within the rows with same cultivar or pigeonpea to maintain at least 75% plant population. Raise cotton seedlings in polythene bags and transplant when sufficient soil moisture is available. Give protective irrigation wherever possible	Avoid applying fertilizers till sufficient soil moisture is available Making of conservation furrows for moisture conservation Interculture with harrows
		Sorghum	Gap filling with pigeonpea	Interculture with hoe
		Soybean	Gap filling within the rows with same or short duration cultivar to maintain at least 75% plant population	Interculture with hoe
		Green gram	If the plant population is less than 75% of optimum, go for resowing of the alternate crops like sunflower / pigeonpea . If possible give protective irrigation with sprinkler.	When the crop is 2 weeks old take up Interculture with hoe
		Pigeon pea	Gap filling within the rows with same or short duration cultivar to maintain at least 75% plant population	When the crop is 2 weeks old take up Interculture with hoe
		Black gram	If the plant population is less than 75% of optimum, go for resowing of the alternate crops like sunflower / pigeonpea . If possible give protective irrigation with sprinkler.	--do--

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major Farming situation	Crop/Cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
At vegetative stage	Medium deep to deep black soils Shallow soils	Cotton	Give protective irrigation wherever possible Maintain weed free conditions	Avoid applying fertilizers till sufficient soil moisture is available Making of conservation furrows for moisture conservation Interculture with harrows Two sprays of 2% MgSO ₄ , Zn, Boron at weekly interval when the crop is encountered reddening symptoms Spray 2 % urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition.	Linkage with MAU, MSSC and NSC for seed. Linkage with MAIDC for implements. Linkage with MAU, KVK for agro techniques
		Sorghum	Avoid top dressing of fertilizers till sufficient soil moisture is available. Intra row thinning Protective irrigation if possible	Opening of alternate furrows with Balaram plough. Interculture with harrows for weeding	
		Soybean	Interculture for weeding and to create soil mulch. Give protective irrigation wherever possible	Opening of alternate furrows with Balaram plough. Spraying of 2% urea and DAP	
		Green gram	Inter culture for weeding Protective irrigation if possible	Spraying of 2% urea and DAP	
		Pigeon pea	Inter culture for weeding Protective irrigation if	Spraying of 2% urea and DAP	

			possible	
		Black gram	Inter culture for weeding Protective irrigation if possible	Spraying of 2% urea and DAP
		Cotton	Give protective irrigation wherever possible Maintain weed free conditions	Avoid applying fertilizers till sufficient soil moisture is available Making of conservation furrows for moisture conservation Interculture with harrows Two sprays of 2% MgSO ₄ , Zn, Boron at weekly interval when the crop is encountered reddening symptoms Spray 2 % urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition.
		Sorghum	Avoid top dressing of fertilizers till sufficient soil moisture is available. Protective irrigation if possible Intra row thinning	Interculture for weeding and to create soil mulch to conserve moisture.
		Soybean	Give protective irrigation wherever possible	Spraying of 2% urea and DAP
		Green gram	Inter culture for weeding Protective irrigation if possible	Spraying of 2% urea and DAP
		Pigeon pea	Inter culture for weeding Protective irrigation if possible	Spraying of 2% urea and DAP
		Black gram	Inter culture for weeding Protective irrigation if possible	Spraying of 2% urea and 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 or At reproductive stage	Medium deep to deep black soils	Cotton	Give protective irrigation wherever possible	Avoid applying fertilizers till sufficient soil moisture is available Making of conservation furrows for moisture conservation Interculture with harrows Two sprays of 2% MgSO ₄ , Zn, Boron at weekly interval when the crop is encountered reddening symptoms Spray 2 % urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition.	Linkage with ongoing govt. scheme to encourage adoption of micro irrigation for better water use efficiency (WUE) Linkage with MAU and KVK for agro techniques
		Sorghum	Protective irrigation if possible	--	
		Soybean	Give protective irrigation wherever possible	Opening of alternate furrows with Balaram plough. Spraying of 2% urea and DAP	
		Green gram	Protective irrigation if possible	--	
		Pigeon pea	Protective irrigation if possible	Opening of furrows with Balaram plough. Spraying of 2% urea and DAP	
		Black gram	Protective irrigation if possible	--	
		Shallow soils	Cotton	Give protective irrigation wherever possible	

				<p>Interculture with harrows</p> <p>Two sprays of 2% MgSO₄, Zn, Boron at weekly interval when the crop is encountered reddening symptoms</p> <p>Spray 2 % urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition.</p>	
		Sorghum	Protective irrigation if possible	--	
		Soybean	Give protective irrigation wherever possible	<p>Opening of alternate furrows with Balaram plough.</p> <p>Spraying of 2% urea and DAP</p>	
		Green gram	Protective irrigation if possible or in case of sever moisture stress use as fodder / green manuring	--	
		Pigeon pea	Protective irrigation if possible	<p>Opening of furrows with Balaram plough.</p> <p>Spraying of 2% urea and DAP</p>	
		Black gram	Protective irrigation if possible or in case of sever moisture stress use as fodder / green manuring	--	

Condition			Suggested Contingency measures		
Terminal drought (Early withdrawal of monsoon)	Major Farming situation	Crop/Cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
	Medium deep to deep black soils Shallow soils	Cotton	Give protective irrigation with drip Picking	If possible, adopt relay cropping of chickpea, safflower, rabi sorghum	Linkage with MAIDC / DSAO for harvesting implements (thresher, harvester).
		Sorghum	Life saving irrigation or harvest at physiological maturity	Plan for rabi crops like chickpea and safflower	
		Soybean	Give life saving irrigation or harvest at physiological maturity	Sowing of rabi crops like sorghum, chickpea, safflower immediately after harvest of soybean with minimum tillage	Linkage with DSAO for farm ponds and micro irrigation system through RKVY
		Green gram	Harvest at physiological maturity or in case of severe drought use as fodder/ green manuring	Plan for rabi crops chickpea / safflower / rabi sorghum / sunflower	
		Pigeon pea	Life saving irrigation Foliar spray of 2% KNO ₃ , urea and DAP	---	Linkage with MAU, MSSC and NSC for seed. Linkage with MAU, KVK for agro techniques
		Black gram	Harvest at physiological maturity or in case of severe drought use as fodder/ green manuring	Plan for rabi crops chickpea / safflower / rabi sorghum / sunflower	
		Cotton	Give protective irrigation with drip Picking	If possible, adopt relay cropping of chickpea, safflower, rabi sorghum	
		Sorghum	Life saving irrigation or harvest at physiological maturity or if no grain setting use as green fodder.	Plan for rabi crops like chickpea and safflower	
		Soybean	Give life saving irrigation or harvest at physiological maturity	Sowing of rabi crops like sorghum, chickpea, safflower immediately after harvest of soybean with minimum tillage	
		Green gram	Harvest at physiological maturity or in case of severe drought use as fodder/ green manuring	Plan for rabi crops chickpea / safflower / rabi sorghum / sunflower	
Pigeon pea	Life saving irrigation	Foliar spray of 2% KNO ₃ , urea and			

				DAP	
		Black gram	Harvest at physiological maturity or in case of severe drought use as fodder/ green manuring	Plan for rabi crops chickpea / safflower / rabi sorghum / sunflower	

2.1.2 Irrigated situation

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/Cropping system	Change in crop / cropping system	Agronomic measures	Remarks on Implementation
Delayed / limited release of water in canals due to low rainfall	Medium deep to deep black soil with assured and high rainfall	Sugarcane Turmeric	No change or prefer Cotton (Irrigated) Wheat	Limited irrigation	Supply of seed through MSSC, MAU, Village seed production programme
	Shallow soil with assured and high rainfall	Sweet orange Ginger Vegetable crops	Maize Cotton	Alternate furrow irrigation Drip irrigation	

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/Cropping system	Change in crop / cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Medium deep to deep black soil with assured and high rainfall	Irrigated Cotton	Rainfed Cotton	Recommended spacing (120 x 45 cm) and 80:40:40 NPK Kg/ha	Supply of seed through MSSC, MAU, Village seed production programme
	Shallow soil with assured and high rainfall	Ginger / Turmeric	Cotton and Maize		

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/Cropping system	Change in crop / cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient / delayed	Medium deep to deep black soil with assured and high rainfall	Irrigated Cotton	Rainfed Cotton	Recommended spacing (120 x 45 cm) and	Release of water at critical growth stages by Irrigation Department

onset of monsoon				80:40:40 NPK Kg/ha	
	Shallow soil with assured and high rainfall	Ginger / Turmeric	Cotton and Maize		

Condition	Major Farming situation	Crop/Cropping system	Suggested Contingency measures		
			Change in crop / cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Medium deep to deep black soil with assured and high rainfall	Irrigated Cotton	Rainfed Cotton	Limited irrigation	Supply of seed through MSSC, NFSM, MAU, Village seed production programme
	Shallow soil with assured and high rainfall	Ginger / Turmeric	Cotton and Maize	Alternate furrow irrigation Drip irrigation	

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity Stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Cotton, Sorghum	<ul style="list-style-type: none"> 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
Sweet orange	-do-	-do-	-do-	-do-

Banana	-do-	-do-	-do-	-do-
Sapota	-do-	-do-	-do-	-do-
Heavy rainfall with high speed winds in a short spam				
Cotton, Sorghum	<ul style="list-style-type: none"> • 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	-	Provide support to prevent lodging and uprooting in young orchards	Apply multinutrient and hormonal spray to promote flowering	Shift produce to safer place
Sweet orange	-do-	-do-	-do-	-do-
Banana	-do-	Provide propping and staking	Propping and staking	-do-
Sapota	-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 MgSO ₄ 25 kg/ha soil application or 1% MgSO ₄ 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 of fruits
Banana	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	-	-
Sweet orange	Protect against Citrus Psylla with foliar spray of malathion 50 EC 10 ml or quinalphos 25 EC 10 ml or cypermethrin 25EC 4 ml per 10 liters	Protect against Citrus Psylla with foliar spray of malathion 50 EC 10 ml or quinalphos 25 EC 10 ml or cypermethrin 25EC 4 ml per 10 liters	-	-

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging / partial inundation				
Cotton	<ul style="list-style-type: none"> Drain excess water Interculture at optimum soil moisture Apply 25KgN/Ha to cotton after receding of flood waters 	Drain excess water	Drain out excess water	Protect picked cotton from wetting Dry wet cotton and market
Horticulture				
Sweet orange	Re-transplanting	Drainage of stagnated water	Drainage of Stagnatedwater	-
Mango	Transplanting in new areas	Strengthening of field bunds	Strengthening of field bunds	-
Banana	Open deep trenches between plant rows to improve drainage	Spray Dithane M 45 3g/liter or propiconazole 1 ml/liter 2-3 times against Cercospora leaf spot	Spray Dithane M 45 3g/liter or propiconazole 1 ml/liter 2-3 times against Cercospora leaf spot	-

Continuous submergence for more than 2 days				
Cotton	Drain excess water	Drain out excess water Early rabi crop planning in case of crop failure	Rabi crop planning	-
Horticulture				
Sweet orange	-do-	Drain out excess water Making of basin, interculture and fungicide spray to prevent fungal diseases	-	-
Mango	-do-	-do-	-	-
Banana	-do-	-do-	-	-
Sea water inundation		Not applicable		

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				
Horticulture				
Banana	Frequent irrigation Plant wind break trees	Frequent irrigation	Frequent irrigation	
Sweet orange	Frequent irrigation Shade temporary shade net Mulching	Irrigation and pruning of affected branches / twigs	Irrigation and pruning of affected branches / twigs Apply 1% Bordeaux paste to cut ends	Immediate harvesting, grading and marketing
Cold wave				
Sweet orange	Protect with polythene sheet	Smoking, frequent and light irrigation during evening hours, basin mulching, apply supplementary dose of fertilizers	Smoking, frequent and light irrigation during evening hours, basin mulching, apply supplementary dose of fertilizers	-
Banana	-do-	-do-	-do-	
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	<p>Sowing of cereals (Sorghum/Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during North-East monsoon under dry land system for fodder production</p> <p>Collection of soya meal waste and sunflower/safflower/ groundnut seed cake for use as feed supplement during drought</p> <p>Motivating the sugarcane farmers to convert green sugarcane tops in to silage by the end of February</p> <p>Preserving the green maize fodder as silage</p> <p>Development of hortipastoral systems in existing orchards</p> <p>Establishment of fodder bank at village level with available dry fodder (wheat straw, Sorghum/ Bajra stover, groundnut haulms, sugarcane tops)</p> <p>Development of silvopastoral models with Leucaena, Glyricidia, Prosopis as fodder trees and Marvel, Madras Anjan, Stylo, Desmanthus, etc., as under storey grass</p> <p>Encourage fodder production with Sorghum – stylo- Sorghum on rotation basis and also to cultivate short-term fodder crops like sunhemp</p> <p>Promote Azola cultivation at backyard</p> <p>Formation of village Disaster Management Committee</p> <p>Capacity building and preparedness of the stakeholders and official staff for the</p>	<p>Harvest and use biomass of dried up crops (Pearlmillet, Pigeon pea, Sorghum, maize, Wheat, Green gram, Black gram, Soybean, cluster bean) material as fodder</p> <p>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</p> <p>Harvest all the top fodder available (Subabul, Glyricidia, Pipol, Prosopis etc) and feed the LS during drought</p> <p>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</p> <p>Promotion of Horse gram as contingent crop and harvesting it at vegetative stage as fodder</p> <p>All the hay should be enriched with 2% Urea molasses solution or 1% common salt solution and fed to LS.</p> <p>Continuous supplementation of minerals to prevent infertility.</p> <p>Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals</p> <p>Arrangements should be made for mobilization of small ruminants across the districts where no drought exits</p> <p>Unproductive livestock should to be culled during</p>	<p>Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAIN T BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 on their own lands with input subsidy</p> <p>Supply of quality seeds of COFS 29, Stylo and fodder slips of Marvel, Yaswant, Jaywant, Napier, guinea grass well before monsoon</p> <p>Flushing the stock to recoup</p> <p>Replenish the feed and fodder banks</p>

	drought/floods/cyclones	severe drought Create transportation and marketing facilities for the culled and unproductive animals (10000-20000 animals) Subsidized loans (5-10 crores) should be provided 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 <u>Drinking water troughs should be provided in shandies /community grazing areas</u>	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

<p>Cyclone/ Floods</p>	<p>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.</p> <p>Protect the stored dry roughage feed (wheat straw/sorghum stover etc..) from wetting and inundation of stagnated water</p> <p>Procure and stock vaccines for important endemic diseases</p> <p>Make available emergency medicines, anti-diarrheal drugs and electrolytes for transport to the needy areas</p> <p>Keep stock of bleaching powder and lime</p> <p>Don't allow the animals for grazing in case of early forewarning (EFW)</p> <p>Incase of EFW of severe cyclone/floods, shift the animals to safer places</p> <p>Surveillance and disease monitoring network to be established at Animal Husbandry Department in each district</p> <p>Arrange transportation facilities for animals to shift from low lying areas to safer places and also for animal health workers for rescue operations</p>	<p>Arrange relief camps to save productive and high valued animals</p> <p>Shift productive and high valued animals from affected areas to relief camps</p> <p>Carryout deworming to all the animals entering into relief camps</p> <p>Proper hygiene and sanitation of the relief camps, animal sheds and surroundings</p> <p>Avoid feeding soaked and mould infected feeds / fodders to livestock</p> <p>Treatment of the sick, injured and affected animals through arrangement of mobile emergency veterinary hospitals / rescue animal health workers.</p> <p>Spray fly repellants like neem oil, Butax etc., in animal sheds and relief camps</p> <p>Identification and quarantine of sick animals</p> <p>Perform ring vaccination (8 km radius) in case of any disease outbreak</p> <p>Sprinkle lime in relief camps and animal sheds</p> <p>Proper disposal of dung from relief camps and animal sheds</p>	<p>Restrict movement of animals in case of epidemic</p> <p>Repair of animal shed</p> <p>Cleaning and disinfection of the shed</p> <p>Bleach (0.1%) drinking water / water sources</p> <p>Deworm all the animals through mass camps</p> <p>Vaccinate against possible disease out breaks like HS, BQ, FMD and PPR</p> <p>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</p> <p>Bleach / chlorinate (0.1%) drinking water or water resources</p> <p>Collect drowned crop material, dry it and store for future use</p> <p>Sowing of short duration fodder crops in unsown and water logged areas when crops are damaged and no chance to replant</p> <p>Application of urea (20-25kg/ha) in the inundated areas and CPR's to enhance the bio mass production.</p>
<p>Heat & Cold wave</p>	<p>Arrangement for protection from heat wave</p> <p>i) Plantation around the shed</p> <p>ii) Arrangement of H₂O sprinklers /</p>	<p>Heat wave: Allow the animals early in the morning or late in the evening for grazing</p> <p>Feed green fodder/silage / concentrates during day</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing</p>

	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)	time and roughages / hay during night time Put on the foggers / sprinklers during day time In severe cases, vitamin 'C' and electrolytes should be added in H ₂ O 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	(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	Use stored feed as supplement Don't allow for scavenging	Routine practices are followed Deworming and vaccination against RD

	place Storing of grain like maize, 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 (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 lime 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, bajra, jowar, broken wheat/ rice etc Culling of weak birds	Use stored feed as supplement Don't allow for scavenging Protect from thunder storms	Routine practices are followed
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