

Agriculture Contingency Plan, District Latur



State: Maharashtra
Agriculture Contingency Plan: Latur 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
		18° 23' 5.65" N	76° 34' 51.50" E	515 m above sea level
Name and address of the concerned ZRS / ZARS / RARA / RRA / RRTTS	National Agricultural Research Project, Marathwada Agriculture University Parbhani Paithan Road , Aurangabad 500431 (Maharashtra)			
Mention the KVK located in the district	Manjara Charitable Trust, Krishi Vigyan Kendra, Latur 413 531.			

1.2	Rainfall	Normal RF (mm)	Normal Rainy days (number)	Normal Onset (Specify week and month)	Normal Cessation (Specify week and month)
	NE monsoon (Oct - Dec) :	85.2	6	-	-
	Winter (Jan - Feb) :	6	-	-	-
	Summer (Mar - May) :	43.6	-	-	-
	Annual	769.7	43	-	-
(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
			715.7	657.5	1.8	21.4	21.3	24.1	20.9	18.9	46.4

(Source: Agriculture Statistical Information Maharashtra State 2005- 2006 (Part – II) (Maharashtra socio-economic database, 2010)

1.4	Major Soils types	Area ('000 ha)	Percent (%) of total geographical area
	1.Deep soils	253.67	35.70
	2.Medium deep soils	105.80	14.89
	3.Shallow soils	351.10	49.41

(Source: NBSS and LUP, Nagpur)

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	529	
	Area sown more than once	159	130
	Gross cropped area	688	

1.6	Irrigation	Area ('000 ha)	Percent (%)	
	Net Irrigated area	319.00		
	Gross irrigated area	394.00		
	Rainfed area	294.00		
	Sources of Irrigation	Number	Area ('000 ha)	(%)
	Canals	-	5.8	-
	Tanks	-	-	-
	Open wells	-	50.0	-
	Bore wells	-	-	-
	Lift irrigation	-	-	-
	Other sources (Farm ponds)	-	-	-
	Total	-	-	-
	No. of tractors	-	-	-
	Pump sets	-	-	-
	Micro-irrigation (2009-10) (Drip 1.7 and sprinkler 6.3 ha)	-	8.0	-
	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	-	-	
	Ground water quality	-	-	Suitable for drinking and irrigation

* 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 2007-08			Summer		
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
	Soybean	-	155.3	155.3	-	-	-	-	-	155.3
	Sorghum	-	141.0	141.0	-	28.7	28.7	-	-	169.7
	Pigeon pea	-	70.9	70.9	-	-	-	-	-	70.9
	Black gram	-	66.9	66.9	-	-	-	-	-	66.9
	Green gram	-	24.9	24.9	-	-	-	-	-	24.9
	Sunflower	-	14.1	14.1	-	-	-	-	-	14.1
	Wheat	-	-	-	27.4	-	27.4	-	-	27.4
	Gram	-	-	-	-	43.1	43.1	-	-	43.1
	Safflower	-	-	-	-	8.5	8.5	-	-	8.5
	Sunflower	-	-	-	11.7	-	11.7	-	-	11.7
	Sugarcane	-	-	-	33.5	-	33.5	-	-	33.5
	Horticulture crops – Fruits	Total area (000 ha) (2009-100)			Irrigated			Rainfed		
	Fig	0.03			-			-		
	Mango	1.02			-			-		
	Sapota	0.04			-			-		
	Pomogrenate	0.11			-			-		
	Total (1990-91 to 2009-10)	23.89			23.89			-		
	Horticulture crops – Vegetables	Total area			Irrigated			Rainfed		
	Tomato	-			-			-		
	Brinjal	-			-			-		
	Chilli	-			-			-		
	Onion	-			-			-		
	Medicinal and Aromatic crops	Total area			Irrigated			Rainfed		
		-			-			-		
	Plantation Crops	Total area			Irrigated			Rainfed		
	Not Applicable	-			-			-		
	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	-	-	-
	Others (Specify)	-	-	-

(Source: JDA's ZREAC report, kharif, 2010)

1.8	Livestock	Number ('000)		
	Cattle	368.537		
	Buffaloes total	256.949		
	Commercial dairy farms	-		
	Goat	154.242		
	Sheep	39.704		
	Others (Camel, pig, Yak etc.)	-		
1.9	Poultry	-		
	Commercial	179.983		
	Backyard	227.571		
1.10	Fisheries	Area (000 ha)	Yield (t/ha)	Production (tones)
	Brackish water	NA	NA	NA
	Fresh water	12.974	0.274	3564
	Others	NA	NA	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)
	Soybean	121.4	782	-	-	-	-	121.4	782
	Sorghum	182.6	1295	-	-	-	-	182.6	1295
	Pigeon pea	63.1	890	-	-	-	-	63.1	890
	Black gram	13.8	207	-	-	-	-	13.8	207
	Green gram	4.8	191	-	-	-	-	4.8	191
	Sunflower	7.2	512	-	-	-	-	7.2	512
	Wheat	-	-	35.3	1290	-	-	35.3	1290
	Gram	-	-	15.4	357	-	-	15.4	357

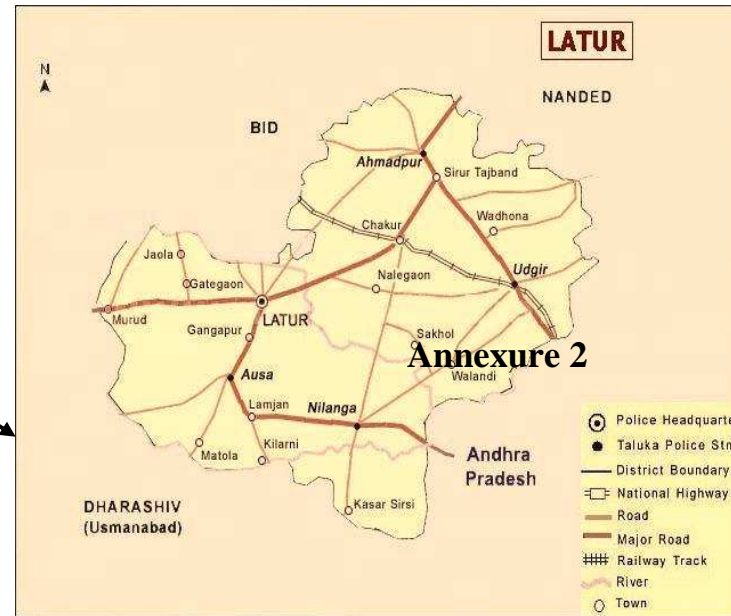
Safflower	-	-	4.9	582	-	-	4.9	582
Sunflower	-	-	6.8	582	-	-	6.8	582
Groundnut	-	-	-	-	-	1350	8.0	1350
Sunflower	-	-	-	-	-	703	1.1	703
Sugarcane	20100	60	2010.0	6000				
Major Horticultural crops								
Mango	-	-	-	-	-	-	-	-
Tamarind	-	-	-	-	-	-	-	-
Pomogrenate	-	-	-	-	-	-	-	-
Sapota	-	-	-	-	-	-	-	-
Sweet Orange	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	-	-

1.12	Sowing window for 5 major crops (start and end of sowing period)	Soybean	Sorghum	Pigeon pea	Black gram	Green gram
	Kharif - Rainfed	June 15 to July 15	June 15 to July 15	June 15 to July 30	June 15 to July 7	June 15 to July 7
	Kharif - Irrigated					
		Wheat	Sorghum	Chickpea	Safflower	Sunflower
	Rabi - Rainfed		October 1 to 15	October 1 to 15	October 1 to 15	October 1 to 15
	Rabi - Irrigated	Nov 1 to 20	15 Oct to 15 Nov	15 Oct to 15 Nov	15 Oct to 15 Nov	15 Oct to 15 Nov

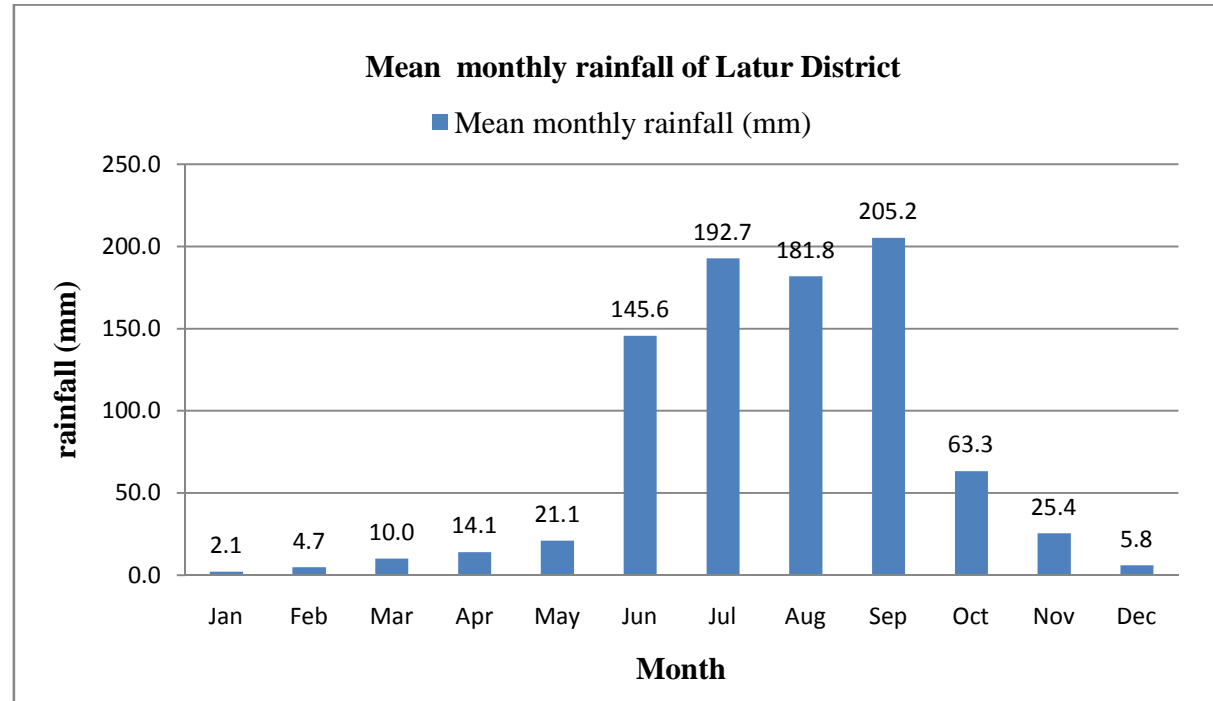
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 years period)	Regular	Occasional	None
	Drought	-	√	-
	Flood	-	-	√
	Cyclone	-	-	√
	Hail storm	-	-	√
	Heat wave	-	-	√
	Cold wave	-	-	√
	Frost	-	-	√
	Sea water inundation	-	-	√
	Pests and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



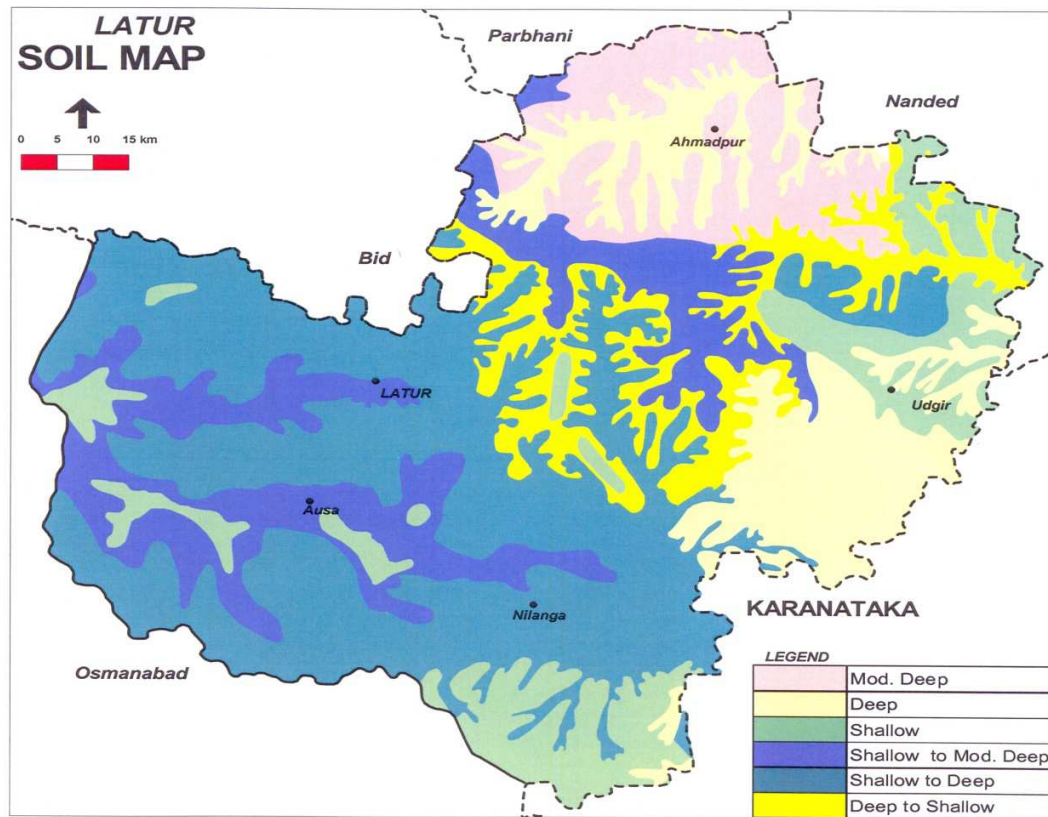
Annexure- II
Mean monthly rainfall of Latur district



(Source: IMD) (1941-90)

Annexure 3

Soil map of Latur 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	Medium deep to deep black soils	Soybean	No Change	No Change	<ul style="list-style-type: none"> Linkage with MAU, MSSC and NSC for seed.
		Sorghum	No Change	No Change	
		Pigeon pea	No Change	No Change	
		Black gram	No Change	No Change	
		Green gram	No Change	No Change	
	Shallow black soils	Soybean	No Change	No Change	<ul style="list-style-type: none"> Linkage with MAIDC for implements.
		Sorghum	No Change	No Change	
		Pigeon pea	No Change	No Change	
		Black gram	No Change	No Change	<ul style="list-style-type: none"> Linkage with MAU, KVK for agro techniques

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	Medium deep to deep black soils	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 Open furrow every after 2 to 4 rows of soybean with Balram plough.	<ul style="list-style-type: none"> Linkage with MAU, MSSC, NSC, NFSM and Village seed production programme for seed.
		Sorghum	Pearlmillet + Pigeonpea 4 : 2 (Shradha, Saburi, Shanti, AIMP-92901) + (BSMR 736, 853, BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani	
		Pigeon pea	No change / Soybean + Pigeonpea 4:2 (JS-335,	Normal package of practices recommended by MAU,	<ul style="list-style-type: none"> Linkage with

			MAUS-71,81) + (BSMR 736, 853, BDN 708, 711)	Parbhani Open furrow every after 2 to 4 rows of soybean with Balram plough.	MAIDC, ZILLA PARISHAD for implements. • Linkage with MAU, KVK for agro techniques
		Black gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736, 853, BDN 708, 711)	-----do-----	
		Green gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736, 853, BDN 708, 711)	-----do-----	
	Shallow black soils	Soybean	No change / Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81) + (BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani Prefer early maturing varieties. Open furrow every after 2 to 4 rows of soybean with Balram plough.	
		Sorghum	Pearlmillet + Pigeonpea 4 : 2 (Shradha, Saburi, Shanti, AIMP-92901) + (BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani	
		Pigeon pea	No change / Soybean + Pigeonpea 4:2 (JS-335, MAUS-71,81) + (BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani Open furrow every after 2 to 4 rows of soybean with Balram plough.	
		Black gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81) + (BDN 708, 711)	-----do-----	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop/Cropping system	Change in Crop/Cropping system	Agronomic measures	Remarks on Implementation
Delay by 6 week (Specify month) July 4th week	Medium deep to deep black soils	Soybean	No change / Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81) + (BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani Open furrow every after 2 to 4 rows of soybean with Balram plough.	<ul style="list-style-type: none"> Linkage with MAU, MSSC NSC, NFSM and Village seed production programme for seed. Linkage with MAIDC, ZILLA PARISHAD for implements. Linkage with MAU, KVK for agro techniques
		Sorghum	Pearlmillet + Pigeonpea 4 : 2 (Shradha, Saburi, Shanti, AIMP-92901) + (BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani.	
		Pigeon pea	No change / Soybean + Pigeonpea 4:2 (JS-335, MAUS-71,81) + (BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani Open furrow every after 2 to 4 rows of soybean with Balram plough.	
		Black gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736, 853, BDN 708, 711) or Sunflower (Morden, EC-68414, SS-56, LSH-35)	-----do-----	
		Green gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736, 853, BDN 708, 711) or Sunflower (Morden, EC-68414, SS-56, LSH-35)	-----do-----	
	Shallow black soils	Soybean	No change / Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81) + (BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani Prefer early maturing varieties. Open furrow every after 2 to 4 rows of soybean with Balram plough.	
		Sorghum	Pearlmillet + Pigeonpea 4 : 2	Normal package of	

			(Shradha, Saburi, Shanti, AIMP-92901) + (BDN 708, 711)	practices recommended by MAU, Parbhani	
		Pigeon pea	No change / Soybean + Pigeonpea 4:2 (JS-335, MAUS-71,81) + (BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani Open furrow every after 2 to 4 rows of soybean with Balram plough.	
		Black gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81) + (BDN 708, 711) or Sunflower (Morden, EC-68414, SS-56, LSH-35)	-----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 2nd week	Medium deep to deep black soils	Soybean	No change / Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81) + (BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani Open furrow every after 2 to 4 rows of soybean with Balram plough.	<ul style="list-style-type: none"> Linkage with MAU, MSSC NSC, NFSM and Village seed production programme for seed. Linkage with MAIDC, ZILLA PARISHAD for implements. Linkage with MAU, KVK for agro techniques
		Sorghum	Pearlmillet + Pigeonpea 4 : 2 (Shradha, Saburi, Shanti, AIMP-92901) + (BDN 708, 711)	Open furrow every after 2 to 4 rows of soybean with Balram plough.	
		Pigeon pea	No change / Soybean + Pigeonpea 4:2 (JS-335, MAUS-71,81) + (BDN 708, 711)	-----do-----	
		Black gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736, 853, BDN 708, 711) or Sunflower (Morden, EC-68414, SS-56, LSH-35)	-----do-----	
		Green gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736, 853, BDN 708, 711) or Sunflower (Morden, EC-68414, SS-56, LSH-	-----do-----	

			35) or Sesamum (GLT-7, 26)			
	Shallow black soils	Soybean	No change / Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81) + (BDN 708, 711)	Prefer early maturing varieties. Open furrow every after 2 to 4 rows of soybean with Balram plough.		
		Sorghum	Pearlmillet + Pigeonpea 4 : 2 (Shradha, Saburi, Shanti, AIMP-92901) + (BDN 708, 711)	Open furrow every after 2 to 4 rows of soybean with Balram plough.		
		Pigeon pea	No change / Soybean + Pigeonpea 4:2 (JS-335, MAUS-71,81) + (BDN 708, 711)	-----do-----		
		Black gram	Soybean + Pigeonpea 4 : 2 (JS-335, MAUS-71,81) + (BDN 708, 711) or Sunflower (Morden, EC-68414, SS-56, LSH-35) or Niger (NS-6)	-----do-----		

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 leading to poor germination / crop stand etc.	Medium deep to deep black soils	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	Making of conservation furrows for moisture conservation	<ul style="list-style-type: none"> Linkage with MAU, MSSC and NSC for seed.
		Sorghum	Gap filling with pigeonpea	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	<ul style="list-style-type: none"> Linkage with MAIDC for implements. Linkage with DSAO for farm ponds and micro irrigation system
		Black gram	If the plant population is less than 75% of optimum, go for re-sowing of the alternate crops like sunflower / pigeonpea . If possible give protective irrigation with sprinkler.	--do--	

		Green gram	If the plant population is less than 75% of optimum, go for re-sowing of the alternate crops like sunflower / pigeonpea . If possible give protective irrigation with sprinkler.	--do--	through RKVY <ul style="list-style-type: none"> Linkage with MAU, KVK for agro techniques
Shallow black soils	Soybean	Gap filling within the rows with same or short duration cultivar to maintain at least 75% plant population	Interculture with hoe		
	Sorghum	Gap filling with pigeonpea	--do--		
	Pigeon pea	Gap filling within the rows with same or short duration cultivar to maintain at least 75% plant population	--do--		
	Black gram	If the plant population is less than 75% of optimum, go for re-sowing of the alternate crops like sunflower / pigeonpea . If possible give protective irrigation with sprinkler.	--do--		

Condition	Major Farming situation	Normal Crop/Cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture Conservation measures	Remarks on Implementation
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)					
At vegetative stage	Medium deep to deep and black soils	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 or DAP	<ul style="list-style-type: none"> Linkage with MAIDC for implements. Linkage with
		Sorghum	Avoid top dressing of fertilizers till sufficient soil moisture is available.	Opening of alternate furrows with Balaram plough.	

			Intra row thinning. Protective irrigation if possible.	Interculture for weeding	DSAO for farm ponds and micro irrigation system through RKVY • Linkage with MAU, KVK for agro techniques	
		Pigeon pea	Protective irrigation if possible	-do-		
		Black gram	Inter culture for weeding Protective irrigation if possible	Spraying of 2% urea or DAP		
		Green gram	Inter culture for weeding Protective irrigation if possible	Spraying of 2% urea or DAP		
	Shallow black soils	Soybean	Give protective irrigation wherever possible	Opening of alternate furrows with Balaram plough. Spraying of 2% urea or DAP		
		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 for weeding		
		Pigeon pea	Protective irrigation if possible	-do-		
		Black gram	Inter culture for weeding Protective irrigation if possible	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	Soybean	Give protective irrigation wherever possible	Opening of alternate furrows with Balaram plough. Spraying of 2% urea or DAP	<ul style="list-style-type: none"> Linkage with MAIDC for implements. Linkage with DSAO for farm
		Sorghum	Give protective irrigation. If feasible spray antitranspirant 6% kaolin	-	
		Pigeon pea	Protective irrigation if possible	Foliar spray of 2% KNO ₃ , urea	

				and DAP	ponds and micro irrigation system through RKVY <ul style="list-style-type: none"> Linkage with MAU, KVK for agro techniques
		Black gram	Protective irrigation if possible	-	
		Green gram	Protective irrigation if possible	-	
	Shallow black soils	Soybean	Give protective irrigation wherever possible	Opening of alternate furrows with Balaram plough. Spraying of 2% urea or DAP	
		Sorghum	Give protective irrigation. If feasible spray antitranspirant 6% kaolin	-	
		Pigeon pea	Protective irrigation if possible	Foliar spray of 2% KNO ₃ , urea and DAP	
		Black gram	Protective irrigation if possible	-	

Condition			Suggested Contingency measures		
Terminal drought	Major Farming situation	Crop/Cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
	Medium deep to deep black soils	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	<ul style="list-style-type: none"> Linkage with MAU, MSSC and NSC for seed. Linkage with MAIDC / DSAO for harvesting implements (thresher, harvester). Linkage with DSAO for farm ponds and micro irrigation system through RKVY Linkage with
		Sorghum	Life saving irrigation or harvest at physiological maturity	Plan for rabi crops like chickpea and safflower	
		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	
		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	
	Shallow black soils	Soybean	Give protection irrigation	Plan for rabi crops chickpea / safflower / sorghum	
		Sorghum	Give protection irrigation In case of severe stress harvest as green fodder	Plan for rabi crops chickpea / safflower	
		Pigeon pea	Give protection irrigation	Foliar spray of 2% KNO ₃ , urea	

				and DAP	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	

2.1.2 Irrigated situation

Condition	Major Farming situation	Crop/Cropping system	Suggested Contingency measures		
			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	Major Farming situation	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 soil with assured and high rainfall	Irrigated Cotton	Rainfed Cotton	Recommended spacing (120 x 45 cm) and 80:40:40 NPK Kg/ha	Release of water at critical growth stages by Irrigation Department
	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
Lack of inflows into tanks due to insufficient / delayed onset of monsoon	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	Release of water at critical growth stages by Irrigation Department
	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
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
Grape	-do-	-do-	-do-	-do-
Heavy rainfall with high speed winds in a short span				
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
Grape	-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 streptomycin 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 Dithane 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
Grape	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	-	-

2.3 Floods: Not applicable

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging / partial inundation				
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	<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 drought/floods/cyclones</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. Go downs 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 severe drought</p> <p>Create transportation and marketing facilities for the culled and unproductive animals (10000-20000 animals)</p> <p>Subsidized loans (5-10 crores) should be provided to the livestock keepers</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>
Drinking water	Make available wholesome clean drinking water throughout the year for livestock	Provide wholesome clean drinking water throughout the day	Watershed management practices should be promoted to conserve the rainwater.

	<p>Adopt various water conservation methods at village level to improve the ground water level for adequate water supply.</p> <p>Identification of water resources</p> <p>Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals)</p> <p>Construction of drinking water tanks in herding places/village junctions/relief camp locations</p> <p><u>Drinking water troughs should be provided in shandies /community grazing areas</u></p>	<p>Restrict wallowing of animals in water bodies/resources</p> <p>Add alum in stagnated water bodies</p>	<p>Bleach (0.1%) drinking water / water sources</p> <p>Desilting of ponds</p> <p>Sensitize the farming community about importance of clean drinking water for livestock</p>
Health and disease management	<p>Procure and stock emergency medicines and vaccines for important endemic diseases of the area</p> <p>All the stock must be immunized for endemic diseases of the area before the onset of monsoon</p> <p>Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</p> <p>Adequate refreshment training on disaster management to be given to animal husbandry department staff</p> <p>Procure and stock multivitamins & area specific mineral mixture</p>	<p>Conduct mass animal health camps in every village</p> <p>Keep close watch on health of different livestock species</p> <p>Identification and quarantine of sick animals</p> <p>Performing ring vaccination (8 km radius) in case of any outbreak</p> <p>Tick control measures should be implemented to prevent tick borne diseases in productive animals</p> <p>Keep the animal houses clean and spray disinfectants</p> <p>Safe and hygienic disposal of dead animal carcasses</p>	<p>Keep close surveillance on disease outbreak.</p> <p>Undertake the vaccination depending on need</p> <p>Restricting movement of livestock in case of any epidemic</p> <p>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>

<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. 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</p> <p>Don't allow the animals for grazing in case of early forewarning (EFW) In case 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</p>	<p>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.</p> <p>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</p>	<p>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 outbreaks 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.</p>
<p>Heat & Cold wave</p>	<p>Arrangement for protection from heat wave</p> <ol style="list-style-type: none"> i) Plantation around the shed ii) Arrangement of H₂O 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 <p>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</p>	<p>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 / sprinklers during day time In severe cases, vitamin 'C' and electrolytes should be added in H₂O during day time</p> <p>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</p>	<p>Feed the animals as per routine schedule Allow the animals for grazing (normal timings)</p>

	during night time)		
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
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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)	Prevent water logging around the sheds Provide proper drainage facility to clear stagnated water Assure supply of electricity by generator or	Sanitation of poultry house Treatment of affected birds Disposal of dead birds by burning / burying with lime powder in pit

	in drinking water to prevent any disease outbreak	solar energy or biogas Sprinkle lime powder to prevent ammonia accumulation due to dampness Sanitation of poultry house	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	Routine practices are followed

		Sprinkle lime powder (5-10g per square feet) to prevent ammonia accumulation due to dampness	
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^a based on forewarning wherever available

2.5.3 Fisheries: Not applicable