State: Madhya Pradesh

Agriculture Contingency Plan for District: Hoshangabad

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Central Highlands (Malwa And Bundelkhand), Hot Subhumid (Dry) Eco-Sub region (10.1)		
	Agro-Climatic Zone (Planning Commission)	Central Plateau And Hills Region (VIII)		
	Agro Climatic Zone (NARP)	Central Narmada valley (MP-6)		
	List all the districts or part thereof falling under the NARP Zone	Harda, Hoshangabad and Betul		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude(elevation)
		21° 22' to 22° 24' N	**77° 10' to 78° 33' E**	299 (MSL)
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	ADR, ZARS, Powarkheda		
	Mention the KVK located in the district	Programme Coordinator, Krishi Vigyan Kendra, Powarkheda, Distt. - Hoshangabad		
1.2	**Rainfall**	Normal RF(mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	1325.4	2nd week of June	1st Week October
	NE Monsoon(Oct-Dec):	64.2		
	Winter (Jan- Feb)	27.5	-	-
	Summer (March-May)	20.6		-
	Annual	1437.7	-	-

1.3	**Land use pattern of the district** (latest statistics)	**Geographical area**	**Cultivable area***	**Forest area**	**Land under non-agricultural use**	**Permanent pastures**	**Cultivable wasteland**	**Land under Misc. tree crops and groves**	**Barren and uncultivable land**	**Current fallows**	**Other fallows**
	Area ('000 ha)	668.7	315.0	256.1	43.7	26.0	25.3	0.1	2.5	5.4	8.7

* Net sown area + current fallow + old fallow

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area ('000 ha)**	**Percent (%) of total**
	Deep soil	433.2	64.6
	Medium deep soils	26.8	4.0
	Shallow soils	209.8	31.3

(Source : NBSS & LUP, Nagpur)

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	300.9	168
	Area sown more than once	203.5	
	Gross cropped area	504.4	

(Source : Agriculture Statistics 2009, Directorate of Farmer Welfare and Agriculture Development Madhya Pradesh, Bhopal)

1.6	**Irrigation**	**Area ('000 ha)**		
	Net irrigated area	270.3		
	Gross irrigated area	270.3		
	Rainfed area	30.6		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	6	147.1	54.4
	Tanks	9	1.1	0.4
	Open wells	23495	53.5	19.8
	Bore wells	4853	52.3	19.3
	Lift irrigation schemes	NA		

	Micro-irrigation	NA		
	Other sources (reservoir)	1	16.3	6.03
	Total Irrigated Area		270.3	
	Pump sets	NA		
	No. of Tractors	NA		
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils 07	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	-		
	Critical	-		
	Semi- critical	-		
	Safe	07		
	Wastewater availability and use			
	Ground water quality			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

1.7 Area under major field crops & horticulture etc. (2008-09)

(Source : Agriculture Statistics 2009, Directorate of Farmer Welfare and Agriculture Development Madhya Pradesh, Bhopal)

1.7	**Major Field Crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***			**Summer**	**Total**
		Irrigated	***Rainfed***	**Total**	***Irrigated***	***Rainfed***	**Total**		
	Soybean	_		*196.60*				**NA**	*196.60*
	Rice	_		21.20					21.20
	Pigeonpea			9.40					9.40
	Maize			1.70					1.70
	Wheat						201.00		201.00
	Chickpea						63.80		63.80
	Sugarcane						3.50		3.50
	Lentil						1.60		1.60
	Pea						1.40		1.40
	Horticulture crops -	**Total area(ha)**			**Irrigated**		**Rainfed**		

	Fruits			
	Mango	4878		
	Guava	1855		
	Lemon	1934		
	Orange	1502		
	Horticultural crops - Vegetables	**Total area(ha)**	**Irrigated**	**Rainfed**
	Potato	1250		
	Onion	1300		
	Tomato	2009		
	Brinjal	2400		
	Jackfruit	4010		

	Medicinal and Aromatic crops	**Total area(ha)**	**Irrigated**	**Rainfed**
	Lemongrass	55		
	Musli	35		
	Isabgol	45		
	Others Spices Crops Chilli	 548		
	Coriander	430		
	Zinger	113		
	Others Flowers 1.Marygold 2.Rose 3.gilardia	 140 74 82		

	Plantation crops	**Total area**	**Irrigated**	**Rainfed**
		NA		
	Others such as industrial pulpwood crops etc (specify)			
	Fodder crops	**Total area (ha.)**	**Irrigated**	**Rainfed**

	Others (specify)			
	Total fodder crop area			
	Grazing land	26000		
	Sericulture etc	1400		
	Others (Specify)			

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	146.165	196.000	342.165
	Crossbred cattle	1.291	3.646	4.937
	Non descriptive Buffaloes (local low yielding)	15.299	110.686	125.985
	Graded Buffaloes	0.388	2.482	2.87
	Goat	20.202	56.946	77.148
	Sheep	0.057	0.089	0.146
	Others (Pig + Horses)	2.145	22.139	24.284
	Commercial dairy farms (Number)			42
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	3	40320	
	Backyard		19752	

1.10	**Fisheries** (Data source: Chief Planning Officer)						
	A. Capture						
	i) Marine (Data Source: Fisheries Department)	**No. of fishermen**	**Boats**		**Nets**		**Storage facilities (Ice plants etc.)**
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
		--	--	--	--	--	--
	ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
		111		**15**		**216 (415 harrao)**	
	B. Culture						
		Water Spread Area (ha)		**Yield (t/ha)**		**Production ('000 tons)**	

	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	**nil**	Nil	Nil
	ii) **Fresh water** (Data Source: Fisheries Department)	660	2200kg/ha	830 metric ton
	Others			

1.11 Production and Productivity of major crops

1.11	Name of crop	**Kharif**		**Rabi**		**Summer**		**Total**		**Crop residue as fodder** (‘000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Soybean	189.9	962			NA		189.9	962	
	Rice	21.0	1383					21.0	1383	
	Pigeonpea	9.4	1021					9.4	1021	
	Sorghum	1.3	1211					1.3	1211	
	Maize	2.1	1285					2.1	1285	
	Wheat			569.2	2764			569.2	2764	
	Chickpea			64.8	1256			64.8	1256	
	sugarcane			5.4	3265			5.4	3265	
	lentil			1.1	566			1.1	566	
	pea			0.5	478			0.5	478	
Major Horticultural crops (Crops to be identified based on total acreage)										
Fruits	Mango							34146	7000	
	Guava							38955	21000	
	Orange							59954	31000	
	Lemon							31542	21000	
	Jackfruit							4920	12000	
Vegetable										
	Potato							31875	2550	
	Onion							40300	3100	

	Tomato							101450	50500	
	Brinjal							121048	25050	
	Chilli							41616	17070	

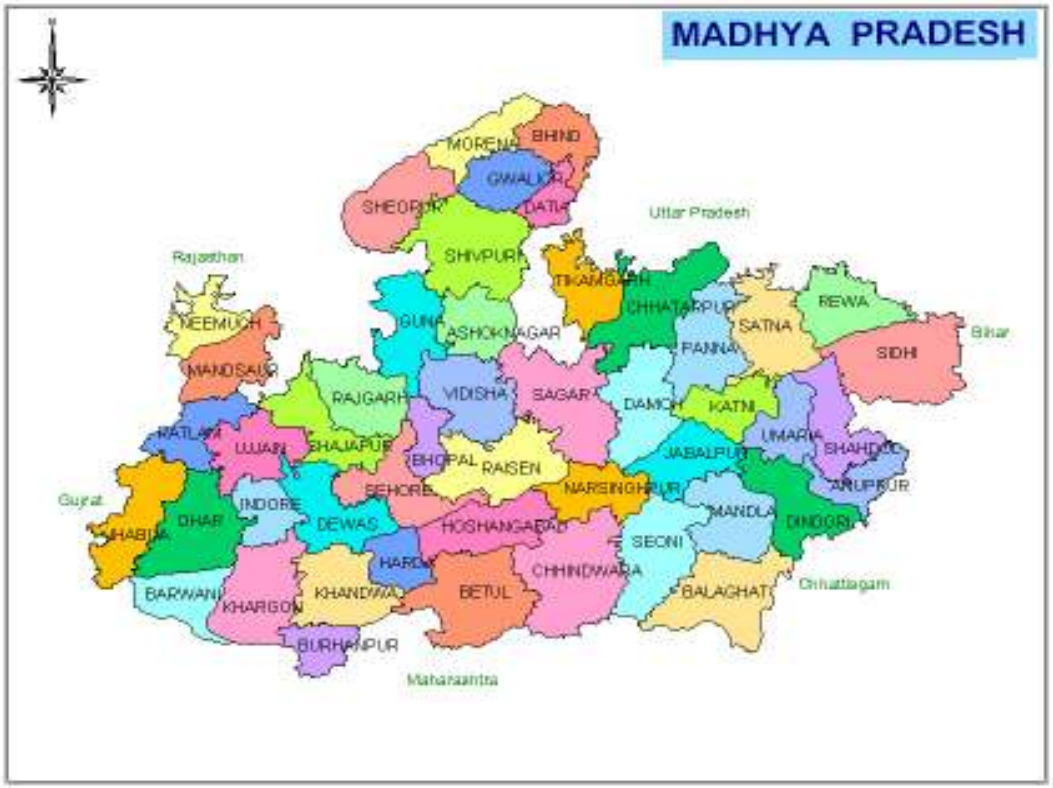
1.12	**Sowing window for 5 major field crops (start and end of normal sowing period)**	**Soybean**	**Rice**	**Maize**	**Pigeonpea**	**Blackgram**	**Greengram**
	Kharif- Rainfed	3rd week of June – 1st week of July	1st week of July – 2nd week of July	3rd week of June – 2nd week of July	3rd week of June – 2nd week of July	1st week of July - 2nd week of August	1st week of July- 2nd week of July
	Kharif-Irrigated	-	2nd week of July – 4th week of July		-	-	-
		Chickpea	**Pea**		**Lentil**	**Wheat**	**Sugarcane**
	Rabi- Rainfed	1st week of October –	-		2nd week of October –	-	-
	Rabi-Irrigated	2nd week of October – 2nd week of	2nd week of September- 2nd week of October		2nd week of October – 2nd week of	2nd week of October –4th week of December	October-March

1.13	**What is the major contingency the district is prone to?** (Tick mark)	Regular	Occasional	None
	Drought		√	
	Flood			√
	Cyclone			√
	Hail storm		√	
	Heat wave		√	
	Cold wave		√	
	Frost			√
	Sea water intrusion			√
	Pests and disease outbreak (specify)	√		

	Others (specify)			

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

Annexure I




AGROCLIMATIC ZONES
BUNDELKHAND
CENTRAL NARMADA VALLEY
CHATTISGARH PLAIN BALAGHAT
GRID REGION
JHABUA HILLS
KYMORE PLATEAU SATPURA HILLS
MALWA PLATEAU
NIMAR PLAINS
NOTHERN HILL REGION OF CHATTISGARH
SATPURA PLATEAU
VINDHYA PLATEAU
AGROCLIMATIC ZONES OF MADHYA PRADESH
N
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E
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GWALIOR
SHEOPUR
DATIA
SHIVPURI
TIKAMGARH
CHHATARPUR
REWA
GUNA
ASHOKNAGAR
PANNA
SATNA
SIDHI
NIMACH
MANDSAUR
RAJGARH
VIDISHA
SAGAR
DAMOH
KATNI
UMARIA
SHAHDOL
SHAJAPUR
RATLAM
UJJAIN
BHOPAL
JABALPUR
RAISEN
SEHORE
NARSIMHAPUR
ANUPPUR
INDORE
DEWAS
DINDORI
JHABUA
DHAR
HOSHANGABAD
MANDLA
HARDA
SEONI
CHHINDWARA
WEST NIMAR
EAST NIMAR
BARWANI
BETUL
BALAGHAT
BURHANPUR
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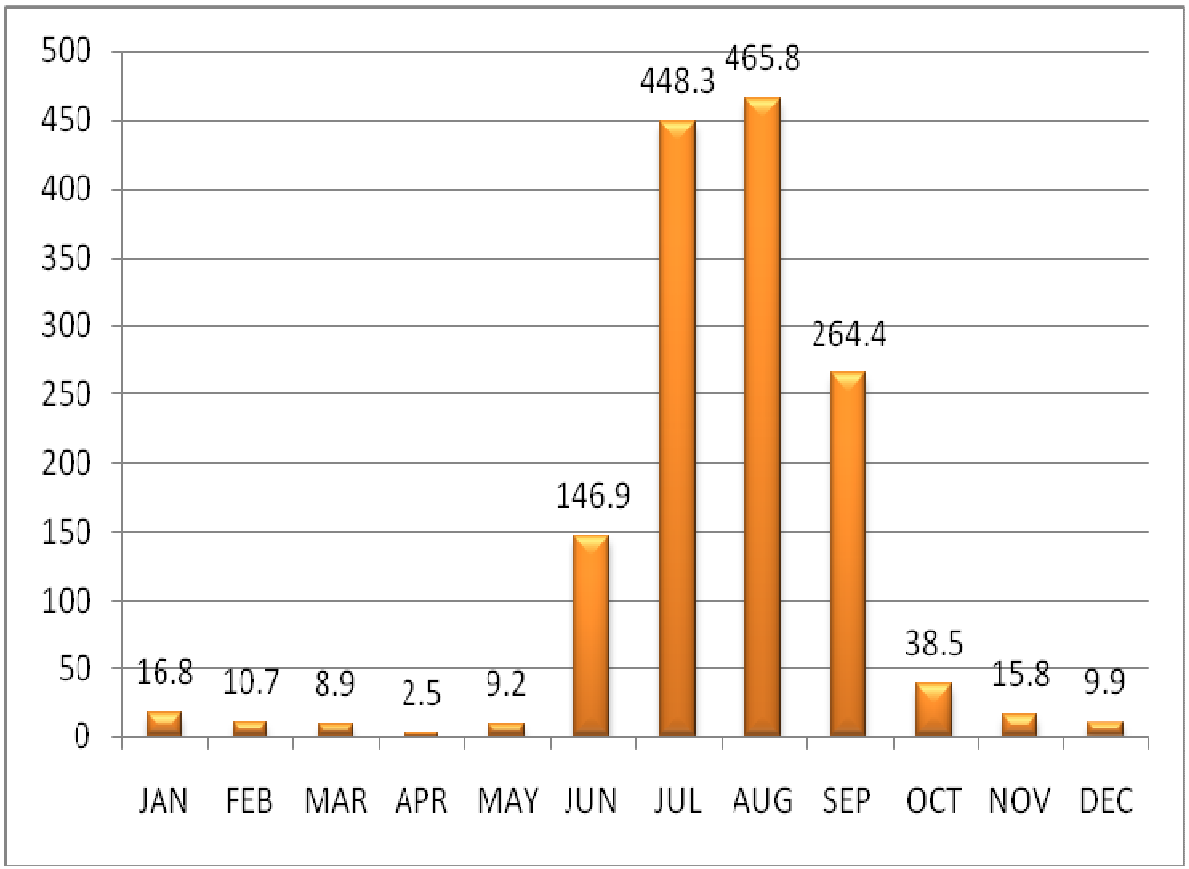
45
90
180
Kilometers

Annexure II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450
400
350
300
250
200
150
100
50
0
16.8
10.7
8.9
2.5
9.2
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448.3
465.8
264.4
38.5
15.8
9.9
JAN
FEB
MAR
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JUN
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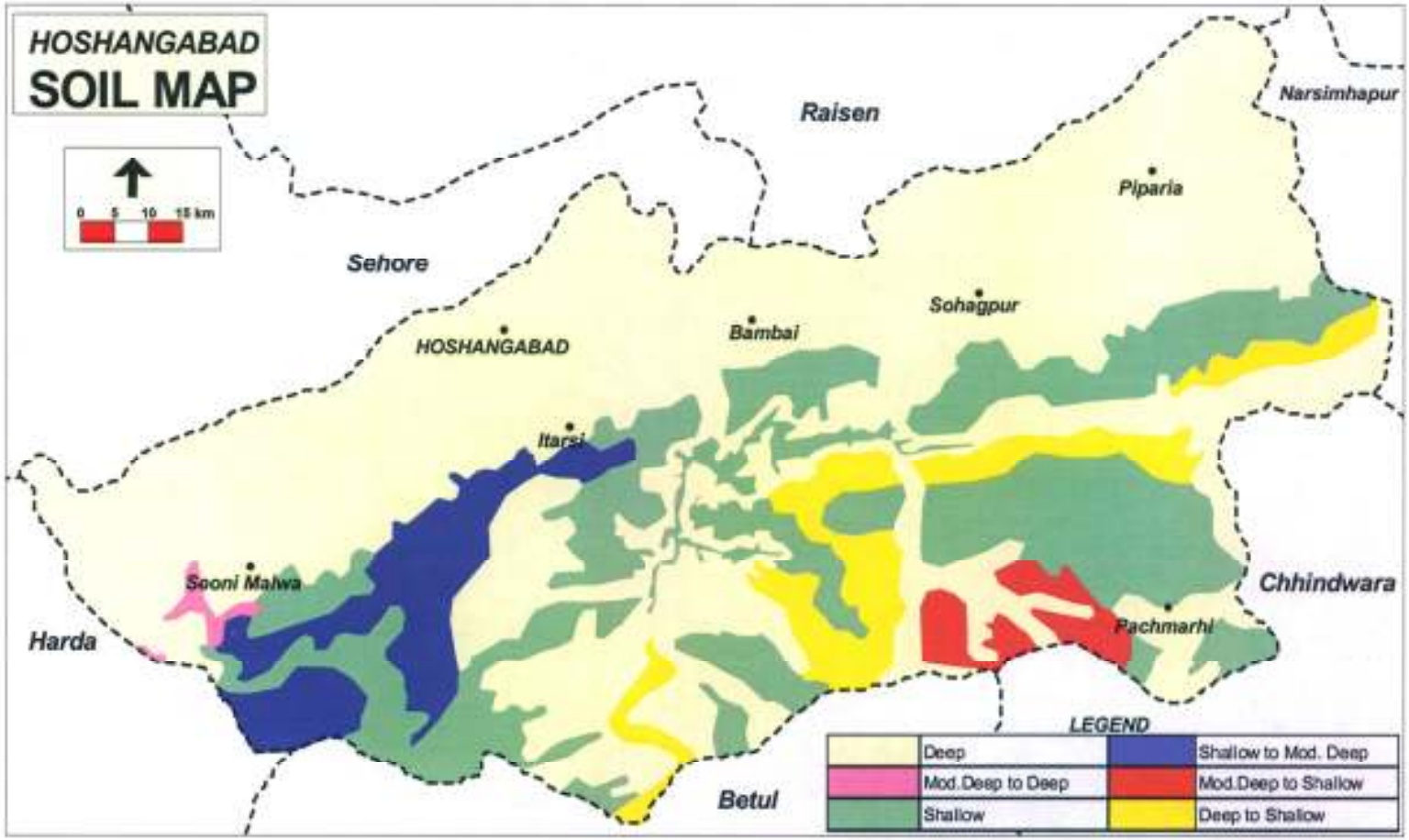
SEP
OCT
NOV
DEC

Annexure III



Source: NBSS & LUP, Nagpur

2.0

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**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks **4th week of June**	Deep Black Soil	Soybean-Chickpea Soybean-Wheat	**No Change**	**Rice:** Transplanting of rice seedling as per SRI technique ; For early maturing varieties, adopt 15x15 cm geometry but seedlings are not more than 18 to 21 days old Blade harrowing (Bakhar) for moisture conservation Seed treatment with mixture of Thiram (1.5g) + Carbendazim (1.5g) /kg seed followed by treated with biofertilizers. Intercultivation	SAU's Beej Nigam, NSC
			Soybean : JS-95-60+JW-273 , JG-130		
		Rice	PS-5,PS-4,PS-3, JR-201		
	Medium deep to shallow black soil	Soybean	No change		
		Pigeonpea-Chickpea			
		Maize-Chickpea			
		Greengram/Blackgram			
		Sesame-Chickpea			

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 4 weeks	Deep Black	Soybean	Donot prefer soybean, Prefer alternate crops like	1. Donot prefer the soybean, alternatively take up the sowing of Greengram, Blackgram ,Sesame	SAU's Beej Nigam, NSC

2nd week of July	Soils		Sesame: TKG-22 Greengram: Ganga-8/ Sunflower: Mordan/ **Blackgram :** T-9 & LBG-2	2. Blade harrowing (Bakhar) for moisture conservation in existing rainfed crops. 3. Timely weeding and use uprooted weeds as mulching for moisture conservation	
		Rice	Direct sowing of rice can be taken up to 2nd week of July or prefer alternative rainfed crops like blackgram and greengram Blackgram **:** T-9 & LBG-2 Greengram: Ganga-8		
	Medium deep to Shallow black soils	Soybean	Don't sow soybean Prefer alternate crops like Sesame: TKG-22 Greengram: Ganga-8/ Sunflower: Mordan/ Blackgram : T-9 & LBG-2		
		Pigeonpea	Pigeonpea: JKM-7, Pusa-33/ Sunflower: BSH-1		
		Maize Greengram- Blackgram Sesame	Sesame: TKG-22 Greengram: Ganga-8/ Sunflower: Mordan/ Blackgram : T-9 & LBG-2		

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks **4th week of July**	Deep Black Soil	Soybean	Donot sow soybean Prefer alternate crops like Sesame/ Blackgram/ Greengram	1. Don't sow the soybean and prefer t sow alternate crop like Greengram, Blackgram,, sesame 2. Timely weeding is done.	Linkage with SAU, NSC, Beej Nigam and farmers societies for seed availability.
		Rice	**Rice -** JR-201, JR-503, vandna, porrnima, Ananda, Narendr 97, Govinda Dry sowing		

			or alternate crops like Sesame/ Blackgram/ Greengram **Sesame -** TKG -306, TKG -20, TKG -27, TKG-35, JGS-8, JT-7, JT-21, JT-22, JT-55, PKTS-11, PKTS-12,JT-1, N-32. **Blackgram –** LBG-20, PDU-1, JU-2, PU-30,35, TAU-93-2, JU-3,JU-86,T-9, JBG-623, BG-684,TAU-1 **Greengram-** Pusa vishal, K851, JM721, Jawahar 99 -37, Hum-1, Hum-2, Tarme-1 L.G.450, T.M.98-50, JM-98-90, PDM 11, 54 and 139		
	Medium deep to Shallow black soils	Pigeonpea	**Pigeonpea :**Pragti ,Jagrati, Asha , Number-148, JKM-7, JA-4, ICPL-85063 (Laxmi) , JKM-189		
		Maize	Donot sow, prefer alternate crops like Sesame/ Blackgram/ Greengram/ Niger		
		Blackgram	**Blackgram –** LBG-20, PDU-1, JU-2, PU-30,35, TAU-93-2, JU-3,JU-86,T-9, JBG-623, BG-684,TAU-1		
		Sesame	TKG-22		
		Greengram	TM-9937, Ganga-8		

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**

Delay by 8 weeks **2nd week of August**	Deep to Medium deep black Soils	Soybean	Donot sow soybean Prefer to sow alternate crops like Sesame/ Blackgram/ Greengram/ Niger	Blade harrowing (Bakhar) for moisture conservation Timely weeding and Use uprooted weeds as mulch for moisture conservation Preparation of field for *Rabi* crops.	Linkage with SAU, NSC, Beej Nigam and farmers societies for seed availability.
		Rice	Prefer to sow alternate crops like Sesame/ Niger **Sesame -** TKG -306, TKG -20, TKG -27, TKG-35, JGS-8, JT-7, JT-21, JT-22, JT-55, PKTS-11, PKTS-12,JT-1, N-32. **Niger:** JNC-6, JNC-9		
		Maize	Don't sow, prefer alternate crops like Sesame/ Niger		
	Light sandy soil (Light Soil)	Pigeonpea	**Niger:** JNC-6, JNC-9		
		Maize	Don't sow, prefer alternate crops like Sesame/ Niger **Niger:** JNC-6, JNC-9		
		Blackgram			
		Sesame			
		Greengram			

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.	Deep black soils	Soybean-Wheat/Chickpea	Gap filling If population is less than <75% prefer resowing Thinning out the extra seedlings per hill;	Mulching Intercultivation Weed management	Linkage with SAU, NSC, Beej Nigam and farmers societies for seed availability.
		Rice	Gap filling If population is less than <75% prefer resowing with one pre		

			sowing irrigation if possible Thinning out the extra seedlings per hill;		
	Medium deep to deep black soils	Soybean-Wheat/Chickpea	Incase of severe dryspells, poor germination less than <75% plant population resowing with alternate crops *Sesame, Greengram, Blackgram, *Niger. Thinning out the extra seedlings per hill;		
		Pigeonpea	Pigeonpea Thinning out the extra seedlings per hill;		
		Black gram/ Greengram	No change Thinning out the extra seedlings per hill;		

- Sesame and Niger can be sown in semi *rabi* or *rabi* season.

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	Deep Black Soil	Soybean-Wheat/Chickpea	Interculture operation for moisture conservation;	If possible give one protective irrigation.	-

	(Heavy soil)	Rice	Thinning out the extra seedlings per hill;		
	Medium Deep to Deep Black soils	Soybean			
		Maize			
		Sorghum			
		Greengram/ Blackgram			
		Pigeonpea			

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	Deep Black Soil (Heavy soil)	Soybean-Wheat/Chickpea	Foliar application of 2% Urea;	Mulching Interculture; Life saving supplemental irrigation	-
	Medium Deep to Deep Black soils	Soybean-Wheat/Chickpea			

Condition			**Suggested Contingency measures**		
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
	Deep Black Soil	Soybean-Wheat/Chickpea	Harvest soybean at physiological maturity. Plan for land preparation and sowing of rabi crops like toria, mustard, ,linseed, pea, linseed, lentil, Chickpea.	Provide life saving irrigation to kharif crop.	Soures of seed SAU, NSC & SSC For Agronomic measures the orgoing scheme like RKVY NREGS ets
	Medium deep to deep black soils	Soybean-Wheat/Chickpea			

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/limited release of water in canals due to low rainfall	Deep black soils	Soybean-Wheat/ Chickpea	Prefer alternate crops like semi rabi sesame in place of soybean In case of severe shortage of water in canals, plan for sowing of soybean with short duration varieties (JS-335, JS-9560) Prefer early maturing cultivars	Mulching, Go for delayed sowing with short duration varieties Mechanical weed control Irrigate at critical stages	Soures of seed SAU, NSC & SSC For Agronomic measures the orgoing scheme like RKVY NREGS ets.
	Medium black soils	Soybean- wheat/Chickpea			
	Shallow black soils	Soybean- wheat/Chickpea			

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation[j]**
Non release of water in canals under delayed onset of monsoon in catchment	Deep Black Soil	Soybean-Wheat+ Chickpea Pigeonpea/ Blackgram/ Greengram	Fallow-Chickpea/ Linseed/ Lentil In case of soybean one pre sowing irrigation and if necessary one irrigation at critical stage at pod development to be given	Interculture operation. Provide the irrigation (farmpond). **Sorghum:** Prefer dual purpose varieties/ hybrids **Blackgram/ Greengram:** Adopt *in-situ* moisture conservation practices at 30DAS	Trainning programme to farmersby ATMA, FTC.
	Medium Black soil	Soybean-Wheat+ Chickpea			
	Shallow black soils	Soybean- wheat/Chickpea			

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Deep Black Soil	Soybean-Wheat+ Chickpea	Fallow-Chickpea/ Linseed/ Lentil In case of soybean, adopt sowing on ridges and give one pre sowing irrigation and if necessary one irrigation at critical stage i.e., pod development to be given	Interculture operation. Mulching. Provide the irrigation by sprinkler method	Trainning programsme to farmersby ATMA, FTC.
	Medium Black soil	Soybean-Wheat+ Chickpea			
	Shallow black soils	Soybean- wheat/Chickpea			

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall	Deep Black Soil	Soybean-Wheat+ Chickpea	Fallow-Chickpea/ Linseed / Lentil Chickpea should be sown with residual moisture after harvest of soybean or give pre sowing irrigation to chickpea Prefer short duration low water requirement varieties of wheat. Protective irrigation at CRI stage in wheat.	Interculture operation. Mulching. Adopt furrow irrigation and use of micro-irrigation system	Trainning programme to farmersby ATMA,FTC
	Medium Black soil	Soybean-Wheat+ Chickpea			
	Shallow black soils	Soybean- wheat/Chickpea			
Any other condition (specify)	Restricted use of irrigation, water irrigation of crops only at critical stages and use of micro-irrigation like drip sprinkler.				

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**

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**
Rice	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up gap filling either with available nursery or by splitting the tillers from the surviving hills Take up suitable plant protection Measures in anticipation of pest & disease out breaks	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up suitable plant protection Measures in anticipation of pest & disease out breaks	Drain the excess water as early as possible Take up suitable plant protection measures in anticipation of pest & disease out breaks	Drain out water and spread sheaves loosely in field or field bunds where there is no water stagnation Spray common salt at 5% on panicles to prevent germination and spoilage of straw from moulds Thresh after drying the sheaves properly Ensure proper grain moisture before storing
Maize, Soybean, Sesame. Blackgram, Greengram, Pigeonpea	Provide drainage care should be taken that rain water does not stagnate in the field. Interculture operation to loosen the soil to improve aeration in soil.	Change care should be taken that rain water does not stagnate in the field. Interculture operation to loosen the soil to improve aeration in soil.	Care should be taken that rain water does not stagnate in the field. Harvesting of crop in clear weather.	Produce should be placed under shade. or protect the produce by tarpaulin kept in T floor.
Wheat	Care should be taken that rain water does not stagnate in the field and not allow to top dressing of nitrogenous fertilizers.	Care should be taken that rain water does not stagnate in the field and not allow to top dressing of nitrogenous fertilizers. Interculture operation	Proper drainage should be provided and adopt all plant protection measures. Harvesting of crop in clear weather.	- Produce should be placed under shade. or protect the produce by tarpaulin kept in T floor
Chickpea	Care should be taken that rain water does not stagnate in the field and not allow to top dressing of nitrogenous	Care should be taken that rain water does not stagnate in the field. Interculture operation	Proper drainage should be provided and adopt all plant protection measures. Harvesting of crop in clear	Produce should be placed under shade. or protect the produce by tarpaulin kept in T floor

Condition	Suggested Contingency measures				
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	fertilizers.		weather.		
Horticulture					
Tomato	Staking of plant be done	Staking of plant be done			
Heavy rainfall with high speed winds in a short span[2]					
Rice	• Gap filling • Removal of excess water	• Strengthening of Drainage system • Sowing of subsequently crop, if totally damaged i.e. Toria	• Strengthening of Drainage system • Subsequent crop if totally damaged • Harvest at physiological maturity		Storage at safer place
Pigeonpea	• September sowing of Pigeonpea if, previous pigeonpea crop is completely damaged • Gap filling, if needed • Removal of excess water	• Strengthening of Drainage system • Sowing of alternative rabi maize or other crops like chilly\ tomato\ brinjal if totally damaged	• Strengthening of Drainage system • Subsequent if totally damaged • Harvest at physiological maturity		Storage at safer place
Horticulture					
Mango	• Strengthening of Drainage system • Replanting of crop if substantially damaged	• Strengthening of Drainage system • Drenching with copper fungicides	• Strengthening of Drainage system • Harvesting at proper time		Immediate sale of fruits and safe transportation
Outbreak of pests and diseases due to unseasonal rains					
Rice	Spraying of Monocrotophos 36 EC 14 ml or Cypermethrin 10 EC 6 ml per 10 liter of water against stem borer	Spraying of Monocrotophos 36 EC 14 ml or Cypermethrin 10 EC 6 ml per 10 liter of water against stem borer	Removal and destruction of infected panicles due to Loose smut		-
Soybean	Carry out critical survey of fields for insect and disease attack in crops	Carry out critical survey of fields for insect and disease attack in crops	Carry out critical survey of fields for insect and disease attack in crops		Proper storage with seed treatment with neemoil (5ml/kg grain /seed)
Wheat	Spray 0.2 % mancozeb 76% WP against wheat rust.	Spray 0.2 % mancozeb 76% WP against wheat rust.	Carry out critical survey of fields for disease attack in crops		

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Chickpea	Spray t triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. · "T" shaped pegs placed in late sown chickpea field for biological control of pod borer and for chemical control spraying of Quinalphos 25 EC or Chlorpyriphos 20 EC C or Methyl Parathion 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Fenvalerate 0.4% or Quinalphos 1.5 WP 20-25 per hectare with duster.	Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. · "T" shaped pegs placed in late sown chickpea field for biological control of pod borer and for chemical control spraying of Quinalphos 25 EC or Chlorpyriphos 20 EC C or Methyl Parathion 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Fenvalerate or Quinalphos 1.5 WP 20-25 per hectare with duster.	Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. Carry out critical survey of fields for insect and disease attack in crops	-
Sesame	Pest monitoring &spray of insecticide as per need				
Horticulture					
Vegetables	Pest monitoring &spray of insecticide as per need pest monitoring &spray of insecticide as per need				

2.3 Floods.-NA.

Condition	Suggested contingency measure[o]			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Transient water logging/ partial inundation[1]	**Not applicable**			
Continuous submergence for more than 2 days[2]				

Soybean	After draining the submerge water ,washing off vegetative cover will remove the mud collected on vegetative surfaces.
Pigeonpea	
Rice	
Greengram	
Sesame	
Horticulture	
Vegetables	After draining the submerge water ,washing off vegetative cover will remove the mud collected on vegetative surfaces.
Sea water intrusion[3]	Not applicable

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

Extreme event type	**Suggested contingency measure**[r]			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave	**NA**			
Rice	Light and repeated irrigation at the appearance of hair line cracks in soil surface, Correct iron deficiency with 0.5% iron sulphate spray.	Repeated irrigation at the appearance of hair line cracks in soil surface, pounding of water for 15 days after transplanting to check Fe deficiency and for crop establishment.	Repeated irrigation at the appearance of hairline cracks in soil surface	Harvest crop at physiological maturity
Wheat ,Chickpea Lentil,Pigeonpea Linseed,Musturd	Protect the crop with the help of light irrigation, wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation
Horticulture	Not applicable			
Vegetables				
Cold wave				
Wheat ,Chickpea Lentil,Pigeonpea Linseed,Musturd	Light irrigation Smoke generation at night time to rise temperature	Light irrigation Smoke generation at night time to rise temperature	Light irrigation Smoke generation at night time to rise temperature	Harvest at physiological maturity
Horticulture	NA			

Frost				
Wheat Chickpea Linseed Pigeonpea Musturd	Give light irrigation, Smoke generation at night time to rise temperature wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; Smoke generation at night time to rise temperature wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation, Smoke generation at night time to rise temperature wind breaks are necessary where cold and heat wave in regular	Harvest at physiological maturity
Horticulture				
Vegetables	Light irrigation Smoke generation at night time to rise temperature	Light irrigation Smoke generation at night time to rise temperature	Light irrigation Smoke generation at night time to rise temperatures	
Hailstorm				
Wheat, Chickpea, Lentil, Pigeonpea Linseed, Mustard	-	Light and frequent irrigation	• Apply 10% additional nitrogen • Light and frequent irrigation	Timely harvesting and shifting of produce to safer place in case of early forewarning
Cyclone	Not applicable			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	As the district is occasionally prone to drought the following practices may be implemented to prevent fodder shortage problem Sowing of cereals (fodder varieties of Sorghum/ Bajra) and leguminous crops (Lucerne,	Harvest and use biomass of dried up crops (Rice, wheat, Maize, Soybean, Black gram, Green gram, chick pea etc.,) material as fodder Harvest all the top fodder available (Subabul,	Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize with input subsidy Supply of quality stem cuttings of

	Berseem, Horse Chickpea, Cowpea) during North-East monsoon under dry land system for fodder production. Collection of soybean and chick pea stover for use as feed supplement during drought Preserving the green maize fodder as silage Encourage fodder production with Bajra – stylo-Bajra on rotation basis and also to cultivate short-term fodder crops like sunhemp	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 as supplement for high productive animals during drought Promotion of Horse gram as contingent crop and harvesting it at vegetative stage as fodder Continuous supplementation of minerals and vitamin to prevent infertility. Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals	Hybrid napier (CO1), paragrass, guinea grass etc., well before monsoon Encourage growing fodder crops like Berseem in winter and Juar in summer season Flushing the stock to recoup Replenish the feed and fodder banks
Drinking water	Adopt various water conservation methods at village level to improve the ground water level for adequate water supply. Identification of water resources De-silting of ponds 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	Adequate supply of drinking water. Restrict wallowing of animals in water bodies/resources; Add alum in stagnated water bodies	Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources Provide clean drinking water

	Community drinking water trough can be arranged in sandies /community grazing areas		
Health and diseases 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 Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures Procure and stock multivitamins & area specific mineral mixture	Carryout deworming to all animals entering into relief camps Identification and quarantine of sick animals Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of any outbreak Restricting movement of livestock in case of any epidemic Tick control measures be undertaken to prevent tick borne diseases in animals Rescue of sick and injured animals and their treatment Organize with community, daily lifting of dung from relief camps	Keep close surveillance on disease outbreak. Undertake the vaccination depending on need Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer
Floods	**NA**		
Cyclone	NA		
Heat wave and cold wave			
Heat wave	i) Plantation around the shed ii) 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 animal to minimize heat stress	Allow the animals early in the morning or late in the evening for grazing during heat waves Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves Put on the foggers / sprinklers /fans during heat weaves in case of high yielders (Jersey/HF crosses) In severe cases, vitamin 'C' and electrolytes should be added in H_2O during heat waves.	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)

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)	Allow for grazing between 10AM to 3PM during cold waves Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves Apply / sprinkle lime powder in the animal shed during cold waves 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	During the event	After the event
Drought			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Supplementation to all survived birds
Drinking water		Use water sanitizers or offer cool hygienic drinking water	
Health and disease management	Culling of sick birds. De-worming and vaccination against RD and IBD	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water)	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
Floods	**NA**		
Cyclone	NA		
Heat wave and cold			

wave			
Shelter/environment management	**Heat wave:** Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day	Routine practices are followed
	Cold wave: Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity	Close all openings with polythene sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening	Routine practices are followed
Health and disease management	De-worming and vaccination against RD and fowl pox	Supplementation of 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

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Shallow water in ponds due to insufficient rains/inflow	1. Restricted release of water from reservoir. 2. Supplementary water harvest structures like pond and tanks have to be developed. 3. Renovation and maintenance of existing water harvest structures	1. Restrict lifting of water for irrigation purpose of crops 2. Catch the stock, market the produce to reduce the density of population in ponds.	1. Excavate the ponds to increase the depth. 2. Try to release water into the pond if it rains in off-season
Impact of heat & salt load build up in ponds / change in water quality	1. Prepare to release water into the habitat	1. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat.	1. Monitoring the water quality and health of aquatic organisms
Floods	**NA**		

Cyclone	**NA**		
Heat wave and cold wave			
Management of pond environment	Good water quality to be maintained, Water depth to be maintained	Recirculation of water and pruning	Water treatment with lime
Health and diseases management	Prophylactic measures to be taken	Maintain good quality water in ponds	Treatment of pond water with lime and medicines