State: MADHYA PRADESH

Agriculture Contingency Plan for District: INDORE

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Western Malawa Plateau, Semi-arid medium to deep Vertisols (5.2)		
	Agro-Climatic Zone (Planning Commission)	Central plateau (IX)		
	Agro Climatic Zone (NARP)	Malawa plateau Agro climatic Zone (MP-10)		
	List all the districts or part thereof falling under the NARP Zone	Neemach, Mandsour, Rajgarh, Ujjain,Indore, Dewas, Shajapur, Ratlam,Part of Dhar district (Badanawar and Sardarpu tehsil) and Jhabua district(Petalawad tehsil)		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		22 ^{0}43 ’31.13” N	75 ^{0} 51 56.00” E	602 M
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Zonal Agricultural Research Station, College of Agriculture, Indore Old Sehore road near to Daily college, Madhya Pradesh-452020		
	Mention the KVK located in the district AMFU Station	Kasturba gram (NGO),Indore Madhya Pradesh -452020		

1.2	**Rainfall**	Average (mm)	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	875.6	2nd week of June	3 rd week of September
	NE Monsoon(Oct-Dec):	59.7	-	-
	Winter (Jan- February)	10.2	-	-
	Summer (March -May)	15.4	-	-
	Annual	960.9	-	-

1.3	**Land use pattern of the district**	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 (old fallow)
	Area ('000 ha)	383.2	264.2	52.2	27.2	19.5	13.2	0.1	6.7	2.3	25.2

1.4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area ('000 ha)**	**Percent (%) of total**
	Deep soils	237.2	60.9
	Shallow soils	130	33.4

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	264.2	165.1
	Area sown more than once	173.5	
	Gross cropped area	437.8	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	176.7		
	Gross irrigated area	177.3		
	Rainfed area	254.9		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		17.7	9.9
	Tanks	276	5.1	2.8
	Open wells	10699	18.3	10.3
	Bore wells	41630	118.2	66.6
	Lift irrigation schemes		-	

	Micro-irrigation			
	Other sources (please specify)		18.0	10.1
	Total Irrigated Area		177.3	
	Pump sets			
	No. of Tractors			
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited		104% of ground water exploited	
	Critical			
	Semi- critical			
	Safe			
	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

1.7	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***				
		Irrigated	**Rain fed**	**Total**	**Irrigated**	**Rain fed**	**Total**	**Summer**	**Grand total**
	Soybean	-	219.8	219.8	-	-	-	-	219.8
	Maize	-	0.9	0.9	-	-	-	-	0.9
	Sorghum	-	0.2	0.2	-	-	-	-	0.2
	Wheat	-	-	-	127.2	-	127.2	-	127.2
	Chickpea	-	-	-	23.8	8.4	32.2	-	32.2

	Horticulture crops - Fruits	Area ('000 ha)		
		Total	**Irrigated**	**Rain fed**
	Mango	0.1	0.1	
	Guava	0.1	0.1	
	Lemon	0.06	0.06	
	Others (Papaya, Ber)	0.1	0.1	
	Horticulture crops - Vegetables			
	Potato	15.7	15.7	-
	Onion	1.9	1.9	-
	Cabbage+ cauliflower	1.9	1.9	-
	Tomato	0.7	0.7	-
	Garlic	2.8	2.8	-
	Others(lady's finger,rabi , brinjal,chilies, ginger,turmeric, coriander)	5.1	5.1	
	Medicinal and Aromatic crops			
	Safed Musali	0.02		0.02
	Kalmegh	0.01		0.01
	kinwach	0.005		0.005
	Ashwa gandha	0.005		0.005
	Rosh, lemon	0.02		0.02
	Plantation crops			
	Eg., industrial pulpwood crops etc.			
	Fodder crops			
	Total fodder crop area			
	Grazing land	19.5		
	Sericulture etc			

1.8 Livestock

1.8	Type of animals	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)			164.5
	Crossbred cattle			5.3
	Non descriptive Buffaloes (local low yielding)			125.6
	Graded Buffaloes			38.3
	Goat			92.3
	Sheep			3.0
	Others Horses, Pig, Yak etc.)			9.3
	Commercial dairy farms (Number)			

1.9	Poultry	No. of farms	Total No. of birds ('000)
	Commercial	-	1037.8
	Backyard	-	

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
	21	41	244

	B. Culture			
		Water Spread Area (ha)	**Yield (t/ha)**	**Production (‘000 tons)**
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	-	-	-
	ii) **Fresh water** (Data Source: Fisheries Department)	2267	1.0	2.3

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										
	Soybean	260.4	1185	-	-	-	-	260.4	1185	
	Maize	10.0	1176	-	-	-	-	10.0	1176	
	Sorghum	2.1	1313	-	-	-	-	2.1	1313	
	Wheat	-	-	252.5	2277	-	-	252.5	2277	
	Chickpea	-	-	30.5		-	-	30.5	941	
Major horticultural crops										
	Mango							30.9	30.9	
	Guava							47.8	47.8	
	Lime							16.5	16.5	
	Potato			4712				4712	4712	
	onion			581.7				581.7	581.7	
	garlic			426.1				426.1	426.1	

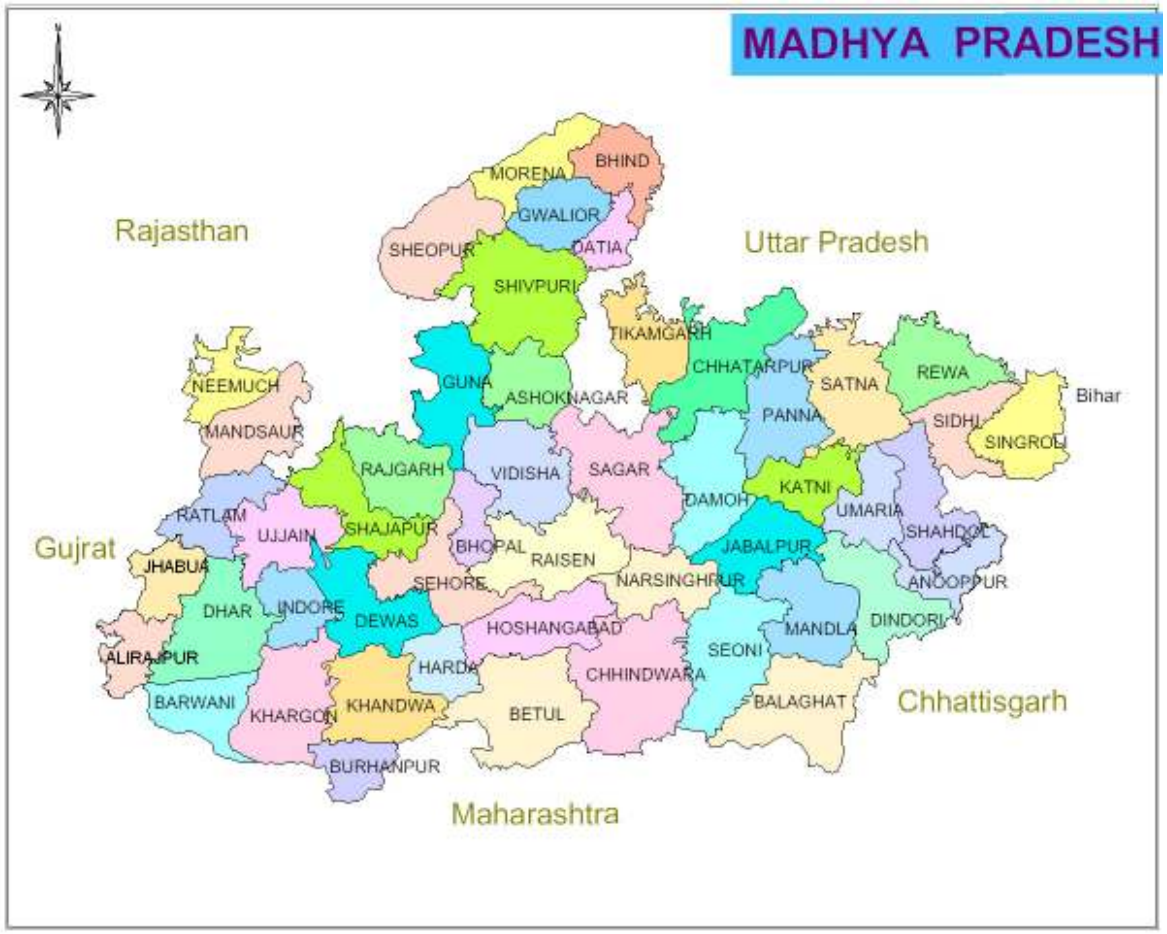
1.12	**Sowing window for 5 major field crops**	**Soybean**	**Maize**	**Sorghum**	**Chickpea**	**wheat**
	Kharif- Rainfed	3rd week of June- -1st week of July	3rd week of June- -1st week of July	3rd week of June- -1st week of July	-	-
	Kharif-Irrigated		1st week of June – 3rd week of June		-	-
	Rabi- Rainfed	-	-	-	3rd week of September - 1st week of October	1st week of October – 2nd week of October
	Rabi-Irrigated	-	-	-	2nd week of October -2nd week of November	1st week of October – 2nd week of October

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) Girdle beetel ,semilooper in soybean and gram pod borer in chick pea	-	√	-

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

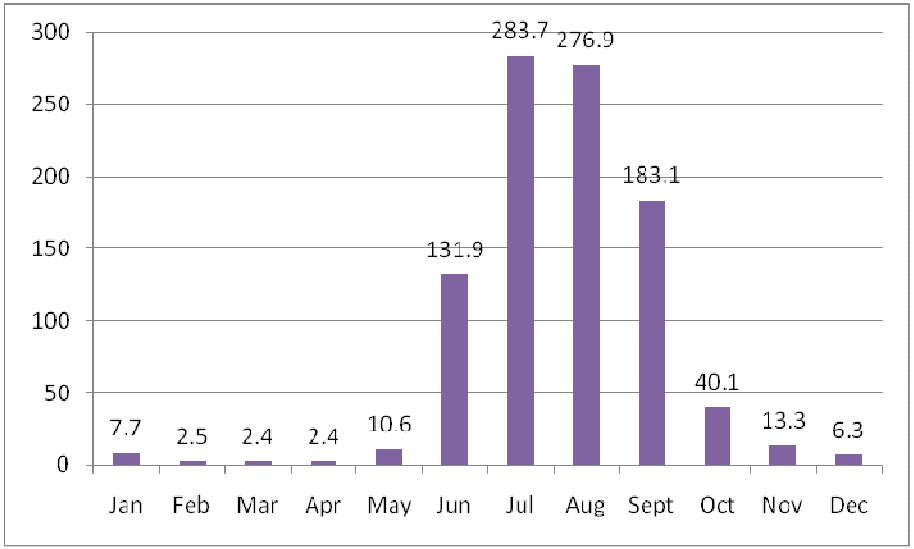
Annexure 1

Location Map of Indore district



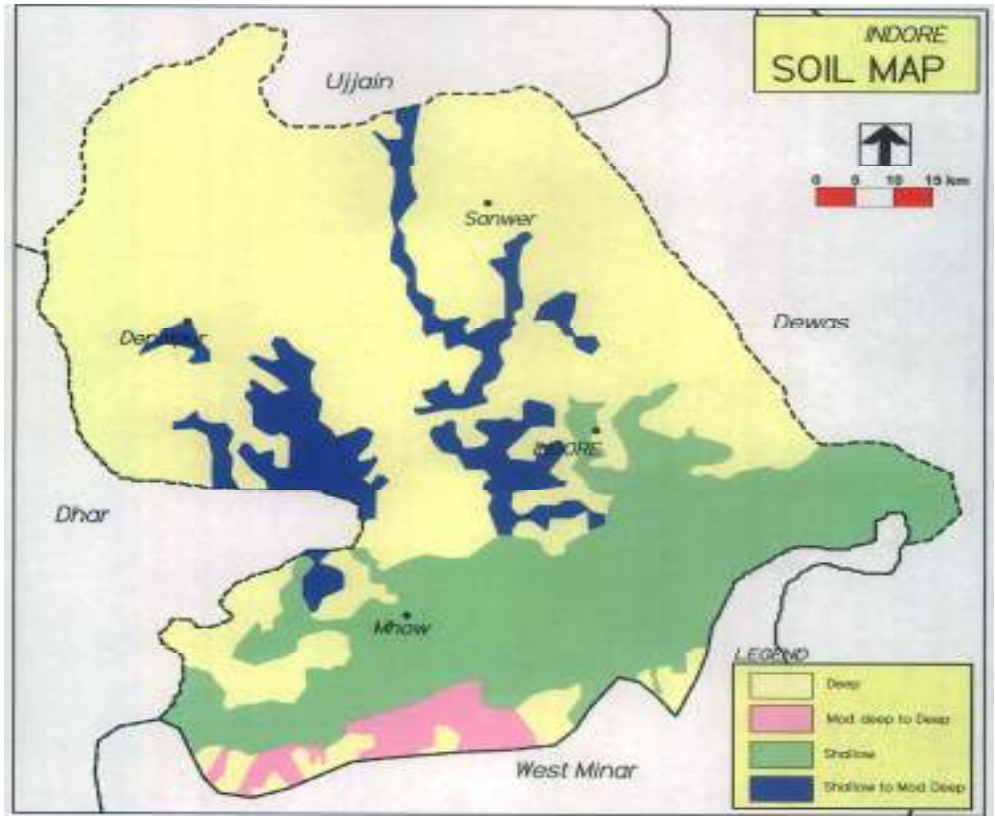
Annexure II

Mean annual Rainfall (mm)



Annexure III

Soil Map of Indore district



Source: NBSS& LUP

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[c] including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks **(4th week of June)**	Deep soils	Soybean	Soybean (early) JS 95-60 Black gram (USA 16) Safflower (JSF 7,JSF73)	Ridge/BBF sowing of kharif crops Seed dressing with Thirum+carbodezim in equal ratio @3g/kg seed Cultivate the field with receiving of pre monsoon showers	Link with department of agriculture, Krashak societies Khettalab/ Balaram talab Yojana of the state for support of good quality seeds Link RKVY for seed drills
		Pigeonpea	Pigeon pea(medium) JA4 + Soybean (early)JS 95-60	Cultivate the field with receiving of pre monsoon showers	
		Pigeonpea + Soybean	Sorghum (JJ938,JJ1041)+ early soybean (JS 95-60)	Cultivate the field with receiving of pre monsoon showers	
		Black gram	Soybean + Black gram	Cultivate the field with receiving of pre monsoon showers	
	Shallow soils	Soybean local (samrat)	Black gram(JU-86)	Cultivate the field with receiving of pre monsoon showers	
		Sorghum+ Black gram(JU86)	Sorghum(JJ938,JJ1041)+ black gram	Cultivate the field with receiving of pre monsoon showers	
		Sorghum (JJ938,JJ1041)	Improved sorghum(JS 938 JS 104)	Cultivate the field with receiving of pre monsoon showers	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system[c] including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks **(2nd week of July)**	Deep soils	Soybean	Sweet corn (sugar-75)	Increase seed rate by 25% and reduce inter row spacing (30cm) Need based irrigation using harvested rain water by sprinkler Cultivate the field as when pre monsoon showers received-	Link with department of agriculture, Krashak societies KhetTalab/Balaram talab Yojana of the state for support of good quality seeds Link RKVY for seed drills
		Pigeonpea	Sunflower(Mordern)		
			Sunflower(Mordern)+ pigeon pea (Asha,No148)		
		Black gram	Brinjal/tomato/sponge guard/ Kharif onion-(Red agrifound)		
	Shallow soils	Soybean local (samrat)	Black gram-(Pusa 16,)		
		Sorghum+ black gram(JU86)	Green gram)+ Sunflower(Modern)		
		Sorghum(JJ-938,JJ-1041)	Sesamum-TKG 55, TKG 8/ Maize fodder		

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system[c] including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks	Deep soils	Pigeonpea	Sunflower(Modern)-late sown wheat (GW 173,DL 788-2)	Increased seed rate by 25% Spacing 30cm	Link with department of

(4th week of July)					agriculture, Krashak societies Khet Talab/ Balaram talab Yojana of the state for support of good quality seeds Link RKVY for seed
		Soybean	Sweet corn (Sugar 75)-Potato	Ridge/BBF sowing of Kharif crops Seed dressing with Thiram + carbendazim in equal ratio @3g/kg seed Increase seed rate by 25% and reduce inter row spacing (30cm). Need based irrigation using harvested rain water by sprinkler.	
		Pigeonpea + Soybean	Hy. Maize-wheat	Seed dressing with Thiram + carbendazim in equal ratio @3g/kg seed Increase seed rate by 25% and reduce inter row spacing (30cm).	
		Black gram	Kharif onion	Seed dressing with Thiram + carbendazim in equal ratio @3g/kg seed	
	Shallow soils	Soybean local (Samrat)	Maize (Jawahar makka8,12, AmarHM10,Nk21)/sweet corn for cobs	-	
		Sorghum(JJ938,JJ1041)+ black gram(JU86))	Maize for fodder(African tall)	-	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system[c] including variety**	**Agronomic measures**	**Remarks on Implementation**
	Deep soils	Soybean	Horse gram (AK-42,Arjakulthi-	Seed dressing with	Link with

Delay by 8 weeks **(2nd week of August)**			1)	Thiram + carbendazim in equal ratio @3g/kg seed Increase seed rate by 25% and reduce inter row spacing (30cm). Need based irrigation using harvested rain water by sprinkler Increasing the seed rate by 20%	department of agriculture, Krashak societies Khet Talab/ Balaram talab Yojana of the state for support of good quality seeds Link RKVY for seed
		Pigeonpea	Sunflower (Morden)	Need based irrigation using harvested rain water by sprinkler Increasing the seed rate by 20%	
		Pigeonpea + Soybean	Sunflower (Morden)	Seed dressing with Thiram + carbendazim in equal ratio @3g/kg seed	
		Black gram	Maize for fodder(Agrican Tall) Fallow-chick pea	Seed dressing with Thiram + carbendazim in equal ratio @3g/kg seed	
	Shallow soils	Soybean local (samrat)	Niger (Chandrasur)/	Seed dressing with Thiram + carbendazim in equal ratio @3g/kg seed	
		Sorghum+ Blackgram	Maize/sweet corn for cobs/ Maize for fodder (African Tall)	Increasing the seed rate by 20%	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Crop management**	**Soil nutrient and 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 soils	Soybean	Gap filling with improved seed if the plant population is around60% Spray of 2% solution of MOP during the dry spell	Frequent intercultural operations using doura Green leaf mulch subabul/glyricidia,	Link with department of agriculture, Krashak societies KhetTalab/Balaram talab Yojana of the state for support of good quality seeds Link RKVY for seed
		Pigeonpea	-do-	-do-	
		Pigeonpea + Soybean	-do-	-do-	
		Black gram	-do-	-do-	
	Shallow soils	Soybean local (samrat)	Spray of 2% solution of MOP during the dryspell Spraying of PMA @3 ppm solution during the dryspell Girdle beetle control by spraying of Quinalphos@2 ml /l water	Frequent intercultural operations Green leaf mulch	

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop / Cropping system**	**Crop management**	**Soil nutrient and moisture conservation measures**	**Remarks on Implementation**
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period **At vegetative stage**	Deep soils	Soybean	• Weed management through intercultural operation between rows using *doura.* • Gap filling with improved variety if the population <60% • Spray PMA 3ppm solution • Spray Quinalphos@2 ml /l water to control Girdle beetle	• Organic mulch/green leaf mulch • Spray 2% Murate of potash during dry spell • Supplemental irrigation with farm pond water	

		Pigeonpea	• Weed management through intercultural operation between rows using *doura.* • Gap filling with improved variety if the population <60%		
		Pigeonpea + Soybean	• Weed management through intercultural operation between rows using *doura.* • Gap filling with improved variety if the population <60%		
		Black gram	• Weed management through intercultural operation between rows using *doura.* • Gap filling with improved variety if the population <60%		
	Shallow soils	Soybean local(samrat)	• Weed management through intercultural operation between rows using *doura.* • Gap filling with improved variety if the population <60% • Spray PMA 3ppm solution • Spray Quinalphos@2 ml /l water to control Girdle beetle	-	

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop / Cropping system**	**Crop management**	**Soil nutrient and moisture conservation measures**	**Remarks on Implementation**
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period	Deep soils	Soybean	20% defoliation in soybean Spraying of PMA (3ppm) Insecticidal spray for control of green semi looper	Organic mulch/green leaf mulch like subabul, glyricidia Spray 2% Murate of potash during dry spell Supplemental irrigation with farm pond water	

At flowering/ fruiting stage	Shallow soils	Sorghum	Spray Quinalphos @2ml/lit for control of late shoot borer in sorghum		
		Sorghum+ black gram	Spraying of PMA @3ppm solution		
		Soybean local(samrat)	Quinalphos @ 2ml/lit spray for control of green semilooper in soybean		

Condition			**Suggested Contingency measures**		
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation**	**Normal Crop / Cropping system**	**Crop management**	**Rabi Crop Planning**	**Remarks on Implementation**
	Deep soils	Soybean	• Supplemental irrigation • Harvest at physiological maturity	Plan for rabi chickpea if the damage is very severe. Seed priming for rabi chickpea	
		Pigeonpea	Supplemental irrigation	-	
		Pigeonpea + Soybean	-do-	-	
		Black gram	Supplemental irrigation	Plan for rabi chickpea	
	Shallow soils	Sorghum	If the damage is severe harvest for fodder/ ratoon crop		
		Sorghum+ black gram	-do-		
		Soybean local (samrat)	-do-		

2.1.2 Drought - Irrigated situation

Condition			**Suggested Contingency measures**		
Delayed release of water in canals due to low rainfall	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
	Deep soils	Chickpea	Chickpea (JG-130)	• Dry sowing followed by	Link with NSC and SAUs for supply of

				irrigation • Application of vermicompost @3-4 t/ha • Irrigation at critical growth stages • Mulching in between crop rows (organic mulch)	seed and watersheds and NREGs for support of farm pond technology
		Wheat	Wheat (HW 2004, Harshita)	• Balanced fertilization (basal application) • Application of vermicompost @3-4 t/ha • Irrigation at critical growth stages • Mulching in between crop rows (organic mulch)	
	Shallow soils	Chickpea	Chickpea (JG130)		
		Wheat	Wheat (HW 2004, Harshita)		
		Soybean (JS335,JS-71-05)-chickpea	Black gram-chickpea (JG130)	-Ridge/BBF sowing of Kharif crops -Select short duration varieties for sowing -Seed dressing with Thiram+carbandezim in equal ratio @3g/kg seed -Increase seed rate by 10% and reduce inter row spacing (30cm) -Water harvesting and use collected water for life saving irrigation -Cultivate the field on receiving pre monsoon	

				showers -Need based irrigation by sprinklers	

Condition			Suggested Contingency measures		
Limited release of water in canals due to low rainfall	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
	Deep soils	Chickpea	Chickpea (JG -130)	-Dry sowing followed by irrigation -Balanced fertilization -Application of vermi compost @3-4 t/ha. Irrigation at critical crop growth stages with sprinklers if feasible	Link seed farms ,department of agriculture, Krashak societies KhetTalab/Balaram talab Yojana of the state for support of good quality seeds Link RKVY for seed drills
		Wheat	Wheat(HW 2004, Harshita)	-do-	
	Shallow soils	Chickpea Wheat (Lok-1)	Chickpea JG 412 Wheat :HW 2004, Harshita Black gram-chickpea(JG 130)	Dry sowing followed by irrigation -Balanced fertilization -Application of vermi compost @3-4 t/ha Irrigation at critical crop growth stages through micro irrigation systems -Mulching in crop rows	
		Soybean(early)-chickpea Soybean-Wheat	Soybean-chickpea/ Chickpea/Safflower Soybean: JS335,JS-71-05- chickpea: JG218 Safflower: JSF 7, JSF73	-Ridge/BBF sowing of Kharif crops -Select short duration varieties for sowing -Seed dressing with Thiram+carbandezim in equal ratio @3g/kg seed -Increase seed rate by 10% and reduce inter	

				row spacing (30cm) -Water harvesting and use collected water as life saving irrigation -Cultivate the field on receiving pre monsoon showers -Need based irrigation by sprinkler	

Condition			**Suggested Contingency measures**		
Non release of water in canals under delayed onset of monsoon in catchment	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system[c] including variety**	**Agronomic measures**	**Remarks on Implementation**
	Deep soils	Chick pea	Safflower (JSF 1, JSF73,JSF 97)	Seed priming in water for 12-15 hrs Mulching in-between crop rows	Link seed farms ,department of agriculture, Krashak societies KhetTalab/Balaram talab Yojana of the state for support of good quality seeds Link RKVY for seed s
	Shallow soils	Chick pea	Safflower (JSF 1, JSF73,JSF 97)	-do-	

Condition			**Suggested Contingency measures**		
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system[c] including variety**	**Agronomic measures**	**Remarks on Implementation**

Condition			Suggested Contingency measures		
	Deep soils	Soybean-chickpea/wheat Maize-chickpea Sorghum- chickpea	Soybean-chickpea/safflower/toria	Mulching in between crop rows Supplemental irrigation by sprinkler	Link seed farms ,department of agriculture, Krashak societies KhetTalab/Balaram talab Yojana of the state for support of good quality seeds Link RKVY for seed drills
	Shallow soils	Soybean	Early soybean (JS 95-60) Black gram (JU 69)	-Mulching in kharif and rabi crops Supplemental irrigation by sprinkler	

Condition			Suggested Contingency measures		
Insufficient groundwater recharge due to low rainfall	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system[c] including variety**	**Agronomic measures**	**Remarks on Implementation**
	Deep soils	Soybean	Early soybean-chickpea small seeded /safflower	-Irrigation at critical crop growth stages through micro irrigation systems -Mulching in between crop rows	Create awareness on technology by Trainings through ATMA,FTC
		Black gram-chick pea			
	Shallow soils	Soybean Black gram-chick pea/ Maize fodder	Black gram (JU- 69) Maize/sorghum+black gram	Mulching in kharif and rabi crops -Supplemental irrigation by sprinkler	

2.2 Unusual rains (untimely, unseasonal etc) (for both rain fed 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**

Soybean	Draining of excess water Intercltivate to loosen the soil and to improve aeration Topdressing with N10-20kg/ha at optimum moisture	Drain excess water Intercltivate to loosen the soil and to improve aeration Foliar spray with 2% urea/DAP to regain lost vigour	Drain excess water Harvesting on a clear sunny day Shift the produce to safer place	Maintain optimum moisture content in grain by drying before bagging and marketing
Maize	Draining of excess water Intercltivate to loosen the soil and to improve aeration Apply 25 kg additional N/ha after draining of excess water	Draining of excess water Intercltivate to loosen the soil and to improve aeration Apply 25 kg additional N/ha after draining of excess water	Draining of excess water Harvest green cobs from dislodged plants for immediate marketing	Harvest green cobs from dislodged plants for immediate marketing Dry the grain before storage
Sorghum	Draining of excess water Apply 25 kg additional N/ha after draining of excess water	Draining of excess water Intercultivation with hoe Apply 25 kg additional N/ha after draining of excess water	Draining of excess water Harvest green cobs from dislodged plants for immediate marketing	Spread the bundles drenched in the rain on the field bunds/ drying floors to quicken drying Thresh bundles after they are dried properly Dry the grain before bagging and storing
Wheat	Drain excess water Top dressing of nitrogenous fertilizers 20-30 kg/ha at optimum soil moisture to gain vigour	Drain excess water Top dressing of nitrogenous fertilizers 20-30 kg/ha at optimum soil moisture to gain vigour Adopt need based plant protection measures	Drain excess water Adopt need based plant protection measures Harvest on a clear sunny day	Maintain optimum moisture of grain by drying
Chickpea	Drain excess water Foliar spray with 2% urea after cessation of rains	Drain excess water Foliar spray with 2% urea after cessation of rains	Drain excess water Timely harvest of produce on a clear sunny day	Shifting to safer place and drying through produce before bagging and storage
Horticulture				
Fruits	Spray mancozeb@3g/lit to check damping off	Immediate drain of water *Application N-fertilizers (after	Earthling and application of fungicides	

		drainage)	Harvest on clear weather day	
Vegetables	Spray mancozeb@3g/lit to check damping off	Drain water immediately Application N-fertilizers (after drainage)	Earthling and application of fungicides Stop harvesting till weather clear	
Heavy rainfall with high speed winds in a short span				
Soybean	• Drain excess water • Top dressing with N 10-20 kg/ha at optimum soil moisture	Drain excess water Intercultivation at optimum soil moisture to loosen the soil and improve aeration Foliar spray 2% urea DAP to regain lost vigour	Stop harvesting till weather clear Drain excess water Shift the produce to safer place	Well dry the produce up to 10- 12 %moisture before storage
Maize	Drain the excess water Apply 25 kg additional N/ha after draining of excess water	Drain the excess water Apply 25 kg additional N/ha after draining of excess water	Drain the excess water Harvest green cobs from dislodged plants for immediate marketing	Harvest green cobs from dislodged plants for immediate marketing Dry the grain to optimum moisture content before storage
Sorghum	Draining the excess water Apply 25 kg additional N/ha after draining of excess water	Drain the excess water Inter cultivation with hoe Apply 25 kg additional N/ha after draining of excess water	Drain the excess water Harvest green cobs from dislodged plants for immediate marketing	Spread the bundles drenched in the rain on the field bunds/ drying floors to quicken drying Thresh bundles after they are dried properly Dry the grain to proper moisture content before bagging and storing
Wheat	Drain the excess water Top dressing of nitrogenous fertilizers 20-30 kg/ha at optimum soil moisture to gain vigour	Drain the excess water Top dressing of nitrogenous fertilizers 20-30 kg/ha at optimum soil moisture to gain vigour	Drain the excess water Adopt need based plant protection measures	Maintain optimum moisture of grain by drying

		Adopt need based plant protection measures	Harvest on a clear sunny day	
Chickpea	Drain the excess water Foilar spray with 2% urea after cessation of rains	Drain the excess water Foilar spray with 2% urea after cessation of rains	Drain the excess water Timely harvest of produce on a clear sunny day	Shifting to safer place and drying thr produce before bagging and storage
Horticulture				
Fruits	Proper drainage and removal of excess water from root zone	Proper drainage and removal of excess water from root zone	Proper drainage and removal of excess water from root zone	
Vegetables	Proper drainage and removal of excess water from root zone	Proper drainage and removal of excess water from root zone	Proper drainage and removal of excess water from root zone	
Outbreak of pests and diseases due to unseasonable rains				
Soybean	Early planting to minimize the incidence of gridle beetle and green semilooper Foliar spray with 5% NSKE or dimethoate 30EC 1 ml/l to protect against semi looper	Monitor moth activity of spodoptera through pheromone traps (10 traps/ha) Apply Quinalphos 25EC 2ml/l or Emameetin benzoate 5 SG 4 g/10 lit to control spodoptera		-
Maize		Foliar application of Mancozeb .25-.4% at 8-10 days interval to control turcicum leaf blight	Trichoderma mixed with FYM 10 gm/kg at 10 days prior to its use in the field can be applied to control stalk rot which is likely during post flowering	Proper storage of seed cotton to prevent wetting and incidence of molds
Sorghum	Early sowing of sorgum to control Shootfly. Use of carbofuran granules 3G 8-10kg/ha to control stem borer	Use of carbofuran granules to control midge	Use of systematic insecticide as dusting with carbrabryl powder(25kg/ha) to control Ear head bug	Quick drying to prevent molds
Wheat	Spray 0.2% mancozeb 76% WP against wheat rust.	Spray 0.2% mancozeb 76% WP against wheat rust.	Spray 0.2% mancozeb 76% WP against wheat rust.	

Chickpea	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. Chemical control spraying of Quinolphos 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 Felvunerate 0.4% or Endosulphan 4% 15-20 kg or Quinolphos 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 Chemical control spraying of Quinolphos 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 Felvunerate 0.4% or Endosulphan 4% 15-20 kg or Quinolphos 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	

2.3 Floods: Not occur in the district

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

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				
Wheat	Light irrigation. Provision of Wind breaks (3m interval)	Light irrigation	Light irrigation	Harvest at physiological maturity

Chickpea	Light irrigation	-do-	-do-	-do-
Horticulture				
Fruits	Protect the seedlings by providing the shed Arrangement of wind breaks	-Bordeaux paste to exposed bark branches of the tree to protect from Sun scorching Mulching around the base of trunk of the tree	Bordeaux paste to exposed bark . branches of the tree to protect from Sun scorching Mulching around the base of trunk of the tree	Harvesting of crop as early as possible and marketed or keep in cold store Store the produce in shed or safe place.
Vegetables	Protect the seedlings by providing the shed Arrangement of wind breaks	Light irrigation at night hours	Application of N-fertilizers	Harvest and marketed as early as possible
Cold wave				
Chick pea	Light irrigation Smoking during night	Light irrigation Smoking during night	Light irrigation Smoking during night	Harvest at physiological maturity
Wheat	Light irrigation Smoking during night	Light irrigation Smoking during night	Light irrigation Smoking during night	-do-
Horticulture				
Fruits	Light irrigation Smoking during night	Light irrigation Smoking during night	Light irrigation Smoking during night	Harvesting of crop as early as possible and marketed or keep in cold store -Store the produce in shed or safe place.
Vegetables	Light irrigation Smoking during night	Light irrigation Smoking during night	Light irrigation Smoking during night	Harvest and marketed as early as possible
Frost				
Wheat	Light irrigation Smoking during night	Light irrigation Smoking during night	Light irrigation Smoking during night	Harvest at physiological maturity
Chick pea	Light irrigation Smoking during night	Light irrigation Smoking during night	Light irrigation Smoking during night	-do-
Horticulture				
Fruits	Light irrigation	Light irrigation	Light irrigation	Harvesting of crop as early as

	Smoking during night	Smoking during night	Smoking during night	possible and marketed or keep in cold store Store the produce in shed or safe place.
Vegetables	Light irrigation Smoking during night	Light irrigation Smoking during night		Harvest and marketed as early as possible
Hailstorm				
Wheat	Re-sowing in case of severe damage	Light and frequent irrigation	Apply 10% additional nitrogen Light and frequent irrigation	Keep the produce in protected area preferably under the roof
Chick pea	Re-sowing in case of severe damage	Light and frequent irrigation	Apply 10% additional nitrogen Light and frequent irrigation	Keep the produce in protected area preferably under the roof
Horticulture				
Fruits	Provide the shed	-	Prune damaged branches and twigs Apply Bordeaux paste 1% to avoid fungal infections	Keep the produce in protected area preferably under the roof
Vegetables	Provide the shed RE-sowing in case of severe damage	Light and frequent irrigation	Apply 10% additional nitrogen Light and frequent irrigation	Keep the produce in protected area preferably under the roof
Cyclone : Not occur in the district				

2.5.1 Contingent strategies for Livestock, Poultry & Fisheries

2.5.2 Livestock

Drought	**Suggested contingency measures**		
	Before the event	**During the event**	**After the event**
Feed and fodder availability	• Adoption of fodder bank ,	• Use of reserve fodder	• Feeding green feed/ fodder and

	• Use of surplus fodder for silage , • Urea treatment :4kg Urea 75 litter of water 100 kg fodder. • Insurance	• Use of stored silage • Balance ration • Use of chaffed fodder • Transportation of fodder from ad joining districts if excess there • Use unconventional feeds as a source of roughage, • use urea treated roughage, • use urea molasses block as a source of nitrogen and energy. • Use low quality processed with mild acid and alkali treatment.	conventional feed. • Regularly Sprinkling of water on live stock body. • Use of wet *bhusa*. • Availing the insurance. • Separation of unproductive livestock. .

Drinking water	• Provision of hygienic supply of water . • Storage of water in the tank for drinking • Excavations of bore wells .	• Judicious use of stored water . • Use of potassium permanganate 1ppm , • Heat treatment of Water before use.	• Ensure the cleanlinell of drinking water • Water treated with quick lime
Health and disease management	• Deworming , • Regular vaccination of HS , BQ and FMD • Provision of mineral mixture	• Treatment of sick animal through camp. • Isolation of sick animals .	• Culling of sick animal • Vaccination & deworming

Floods			
Feed and fodder availability	Adoption of fodder bank Hay and silage making Insurance. Repair of animal shed Shifting of animals from the flood area	-Use unconventional feeds -Use of reserve fodder -Balance ration -Use of chaffed fodder -use roughages processed with mild acid and alkali -Transportation excess fodder from ad joining district	-Regularly Sprinkling of water on live stock body . -Feeding green feed/ fodder and conventional feed -use of wet bhusa. -Availing the insurance. ----Separation of unproductive livestock.
Drinking water	Ensure availability of clean hygienic water Water be treated with quick lime	Clean water Water after boiling / alum treatment	Ensure the cleanliness of drinking water
Health and disease management	• Regular vaccination of HS , BQ and FMD • provision of mineral mixture , • preparation of water proof shed • provision of dry fodder , • Deworming	• Treatment of sick animal through camp. • Isolation of sick animals. • Treatment of sick animals in houses	-Culling of sick animal -Use antidote in poisoning case
Cyclone	**(Not occur in the district)** NA		NA
Feed and fodder availability	-		
Drinking water	-		
Health and disease management	-		
Cold wave			
Shelter/environment management	• House of animal should be N-S direction • Plan of proper housing ,	• Availability of full sun rays in animal shed, keep animal body warm	• Adopt curative measures to obtain the milk production level • Keep environment uniformly to

	• Collection of waste gunny bags for shelter	• Use of gunny bags to cover the windows during night hours	recover animal
Health and disease management	• Ensure storage of antibiotics, B-complex, liver tonic, anti-inflammatory drugs, anti-stress drugs, vaccines etc for the event • Storage for balanced ration	• Treatment of sick animals • Balanced ration • Use of warm water • Inhalation of *Eucalyptus* water	Vaccination & deworming Culling of sick animals
Heat wave			
Shelter/environment management	• Provision of proper shade • Provision of trees • Reflector paints over roof , two times bathing of animals.	• Provision of cold water • Keep environment uniformly to recover animal	• Vaccination & deworming
Health and disease management	• -Ensure storage of antibiotics, B-complex, liver tonic, anti-inflammatory drugs, anti-stress drugs, vaccines etc for the event • -Use suitable drugs depending on condition.	Vaccination & deworming	

2.5.2 Poultry

	Suggested contingency measures			**Convergence/linkages with ongoing programs, if any**
	Before the event	**During the event**	**After the event**	
Drought	• Insurance of birds	Keep watch on mortality and adopt measures	Materialized the benefit of insurance	
Shortage of feed ingredients	-Storage of food ingredients	Mineral mixture feeding, use unconventional feed in feeding of poultry ration, use animal protein source like fish meal, silk worm pupa, blood meal by products of slaughter house etc, ration should	Feeding high quality balance fee	

		be made from locally available feed ingredients.		
Drinking water	-Storage of Sanitized drinking water	Judicious use of stored water	Fresh drinking water	
Health and disease management	• Deworming • Vaccination • Deticking of shed • Provision of rapid growing strain	• Use of high weight gain breeding stock • Treatment of sick birds	• Vaccination and deworming • Culling of sick birds	
Floods				
Shortage of feed ingredients	• -Storage of poultry feed --Storage of mineral mixture	• Use of stored feed • Offer dry feed • Avoid dampness in feed to minimize the chances of aflotoxins	• Open the curtain for proper aeration and drying of litter. • Optimum feeding to maintain egg production and proper weight	
Drinking water	Storage of clean drinking water			
Health and disease management	• Provision of Vaccination • Deworming	• Proper Vaccination and deworming, • Use anti fungal and liver tonic during feeding and drinking	• Culling of sick birds • Vaccination and deworming	
Cyclone: Not occur in the district				
Shortage of feed ingredients	-	-	-	
Drinking water	-	-	-	
Health and disease management	-	-	-	
Heat wave and cold				

wave				
Shelter/environment management	-Repair of sheds -Use of sprinklers for maintenance of temperature -Storage of local available food grains/feed ingredients	-Down the curtain of windows -lighting in the shed in cold condition -maintain the temperature of shed	Feeding high quality balance feed	Culling of sick birds
Health and disease management	Deworming Vaccination	Vaccination and deworming, use anti stress drugs and liver tonic during feeding and drinking.	Vaccination and deworming	
		Deworming Deticking		

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine	-	-	-
Inland			
(i) Shallow water depth due to insufficient rains/inflow	• All the fish should be marketed • Shifting of small sized fishes to i small storage water bodies such as Plastic or cemented structures	• Harvesting of fish • Shifting of small sized fishes to in small storage water bodies such as Plastic or cemented structures • Provision of net-shed over the tank • Dry ponds should be treated with lime	• - Safe disposal of first event of runoff for storage of only clean water • Waste ware should be protected by net for stay of fishes in the tank. • After onset of monsoon and ponds fill with water seedling the fish seed

(ii Impact of heat and salt load build up in ponds / change in water quality	Apply the lime to neutralize the concentrated water	Apply the lime to neutralize the concentrated water	• - Safe disposal of first event of runoff for storage of only clean water • Waste ware should be protected by net for stay of fishes in the tank. • After onset of monsoon and ponds fill with water seedling the fish seed
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow			
(ii) Impact of salt load build up in ponds / change in water quality			
2) Floods			
A. Capture			
Marine			
Inland			
(i) Average compensation paid due to loss of human life			
(ii) No. of boats / nets/damaged			
(iii) No.of houses damaged			
(iv) Loss of stock			
(v) Changes in water quality			
(vi) Health and diseases			
B. Aquaculture			
(i) Inundation with flood water	Keeps net in west wear of ponds	Protect the fish to flow with runoff water	
(ii) Water contamination and changes in water quality	Lime treatment should be done.	Lime treatment and $KMnO_4$ treatment 2 ppm	No seedling of new fish seed
(iii) Health and diseases	-do-	-do-	-do-
(iv) Loss of stock and inputs (feed,	Manufactured feed should be given	Manufactured feed should be	Natural feed should be available in ponds

chemicals etc)	in ponds	given in ponds	
(v) Infrastructure damage (pumps, aerators, huts etc)	Dust and debris should be clean in west wear.	Continuous Dust and debris cleans in west wear.	-
3. Cyclone / Tsunami : No any possibilities of event in the district			
A. Capture	-	-	-
Marine	-	-	-
(i) Average compensation paid due to loss of fishermen lives	-	-	-
(ii) Avg. no. of boats / nets/damaged	-	-	-
(iii) Avg. no. of houses damaged	-	-	-
Inland	-	-	-
B. Aquaculture	-	-	-
(i) Overflow / flooding of ponds	-	-	-
(ii) Changes in water quality (fresh water / brackish water ratio)	-	-	-
(iii) Health and diseases	-	-	-
(iv) Loss of stock and inputs (feed, chemicals etc)	-	-	-
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	-	-	-
4. Heat wave and cold wave			
A. Capture			
Marine	-	-	-
Inland	Net-shed	-	-
B. Aquaculture			

(i) Changes in pond environment (water quality)	Showering of water by pump for proper O_2 in water	Showering of water by pump for proper O_2 in water	-
(ii) Health and Disease management	$KMnO_4$ treatment 2 ppm	$KMnO_4$ treatment 2 ppm	-