State: Bihar

Agriculture Contingency Plan for District: Munger

KrishiVigyan Kendra, Munger

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone :**			
	Agro Ecological Sub Region (ICAR)	Eastern Plain, Hot Subhumid (moist) Eco-sub region (13.1)		
	Agro-Climatic Zone (Planning Commission)	Middle Gangetic Plain Region (IV)		
	Agro Climatic Zone (NARP)	South Bihar Alluvial Plain Zone (BI-3)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Sheikh Pura, Jamui, Jahanabad, Gaya, Bunar, Bhojpur, Bhagalpur, Bhabhua, Begusarai, Banka, Aurangabad, Munger, Nalanda, Nawadah, Patna, Rohtas		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		24^0 22' to $25^0$30' N	85^0 30' to 87^o30' E	50-60 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RRS Munger, PO – Shankarpur, Distt. – Munger		
	Mention the KVK located in the district with address	KVK, Munger, PO – Shankarpur, Distt. – Munger		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Automatic Weather Station has been installed at KVK,Munger& DAO office by IMD, Pune		

1.2	**Rainfall**	**Normal RF(mm)**	**Normal Rainy days (number)**	**Normal Onset (specify week and month)**	**Normal Cessation (specify week and month)**
	SW monsoon (June - September):	952	40	2^{nd} week of June	4^{th} week of September
	NE Monsoon(October - December):	115	8	1^{st} week of October	4^{th} week of October
	Winter (January - February)	31	2	1^{st} week of Jan	4^{th} week of February

	Summer (March - May)	45	-		
	Annual	1143.1	50		

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
	Area ('000 ha)	139.793	66.67	28.524	21.66	3.1	1.802	3.6	2.2	6.2	6.037

Source: DACNET 2006-07

1. 4	Major Soils	Area ('000 ha)	Percent (%) of total Geographical area
	Calcarious sandy soils	**3.509**	**3.36**
	Coarse loamy soils	**24.589**	**23.53**
	Fine loamy soils	**26.004**	**24.88**
	Clayey soils	**50.418**	**48.24**

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	66.67	142
	Area sown more than once	20.69	
	Gross cropped area	87.36	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	26.66		
	Gross irrigated area	40.40		
	Rainfed area	60.70		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		19.936	49.35
	Tanks		0.259	0.64
	Open wells		0.192	0.48
	Bore wells		9.4	23.27

	Lift irrigation schemes		0.2	0.5
	Micro-irrigation			
	Other sources (please specify)		10.413	25.78
	Total Irrigated Area		40.4	
	Pump sets	2010		
	No. of Tractors	930		
	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			Fluoride (>1.5 mg/l), Arsenic (>0.05 mg/l)
	Critical			
	Semi- critical			
	Safe	9	100%	Fluoride (2-6 ppm)
	Wastewater availability and use			
	Ground water quality	Portable		
*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***			**Summer**	
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**		**Grand total**
	Rice	7.350	25.650	33.00	-	-	-	-	33.000
	Wheat	-	-	-	13.873	4.330	18.203	-	18.203
	Maize	-	25.00`	10.500	3.000	-	7.783	-	20.788
	Pigeonpea	-	2.021	2.021	-	-	-	-	2.021
	Rabi Pulses	-	-	-	-	3.515	3.515		3.515
	Oil seed / Mustard	-	-	-	1.413	0	1.413		1.413

	Horticulture crops - Fruits	**Area ('000 ha)**
	Mango	2.4
	Guava	0.285
	Banana	0.1
	Others	03.5
	Horticulture crops - Vegetables	**Total**
	Pea	0.75
	Tomato	0.5
	Potato	0.4
	Cabbage & Cauliflower	0.59
	Brinjal	0.3
	Other	1.5
	Medicinal and Aromatic crops	**Total**
	Japanese Mint	1.0
	Plantation crops	0.2
	Fodder crops	0.2
	Grazing land	0.5
	Sericulture etc	0.1
	Spices Coriander & Chili	0.4

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	32.520	91.22	123.74
	Improved cattle	12.5	30.2	42.7
	Crossbred cattle	13.1	42.0	55.1
	Non descriptive Buffaloes (local low yielding)	1.5	59.7	61.2
	Descript Buffaloes	0.4	5.8	6.2
	Goat	51.1	105.5	156.6
	Sheep	0.2	0.5	0.7
	Others (Camel, Pig, Yak etc.)		-	
	Commercial dairy farms (Number)		0.01	0.01

1.9	**Poultry**	**No. of farms**	**Total No. of birds (‘000)**
	Commercial	108	58.6
	Backyard	5300	53.5

1.10	**Fisheries** (Data source: Chief Planning Officer)source : SREP, MUNGER						
	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**	
		167		812		645	
	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)			2842.0	3.2	6012.4	

1.11 Production and Productivity of major crops (Average of last 5 years: 2004-08)

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)										
	Rice	85.8	2600	-	-	-	-	85.8	2600	-
	Maize	11.25	1800	16.1	2200	-	-	27.35	2200	-
	Pigeon pea	1.2	1200			-	-	1.2	1200	-
	Wheat	-	-	38.3	2105	-	-	38.3	2105	-

	Rabi Pulses	-	-	1.1	324	-	-	1.1	324	-
	Oilseed	-	-	0.3	150	-	-	0.3	150	-
Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango	-	-	-	-	18.2	7500	18.2	7500	-
	Guava	-	-	2.5	9000	-	-	2.5	9000	-
	Banana	-	-	1.85	4100	-	-	1.85	410	-
	Tomato	-	-	11.29	22500	-	-	11.29	22500	-
	Pea	-	-	7.5	10000	-	-	7.5	10000	-
	Potato	-	-	6.72	21000	-	-	6.72	21000	-

1.12	**Sowing window for 5 major field crops**	**Rice**	**Wheat**	**Maize**	**Chickpea& Lentil**	**Mustard**	**Pigeonpea-Please write the sowing window as it is a major crop**
	Kharif- Rainfed	3rd week of June – 4th week of June	-	3rd week of May - 2nd week of June	-	-	Second week of July
	Kharif-Irrigated	3rd week of June – 2nd week of July	-	-	-	-	August
	Rabi- Rainfed	-	1st week of November – 2nd week of November	-	2nd week of October – 2nd week of November	2nd week of October –2nd week of November	
	Rabi-Irrigated	-	2nd week of November – 2nd week of December	3rd week of October– 2nd week of November	-3rd week of October – 1stnd week of December	2nd week of November – 2nd week of December	

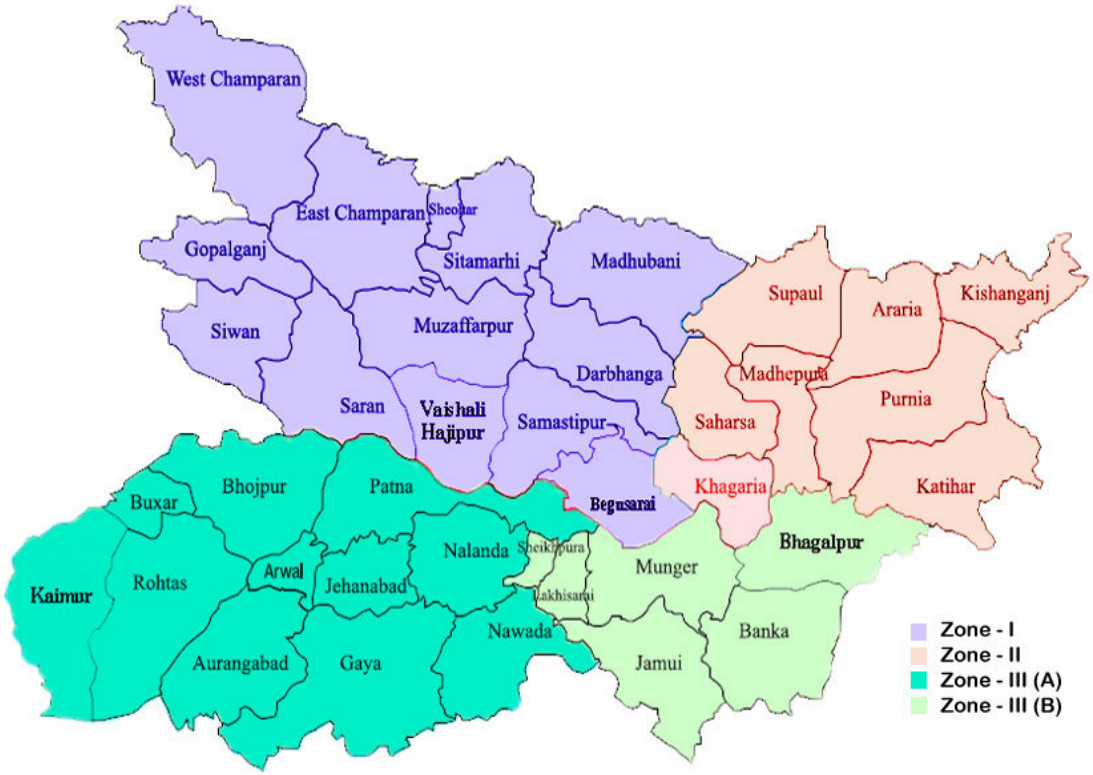
1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought		√	
	Flood		√	
	Cyclone			√
	Hail storm			√
	Heat wave		√	
	Cold wave		√	
	Frost		√	

	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

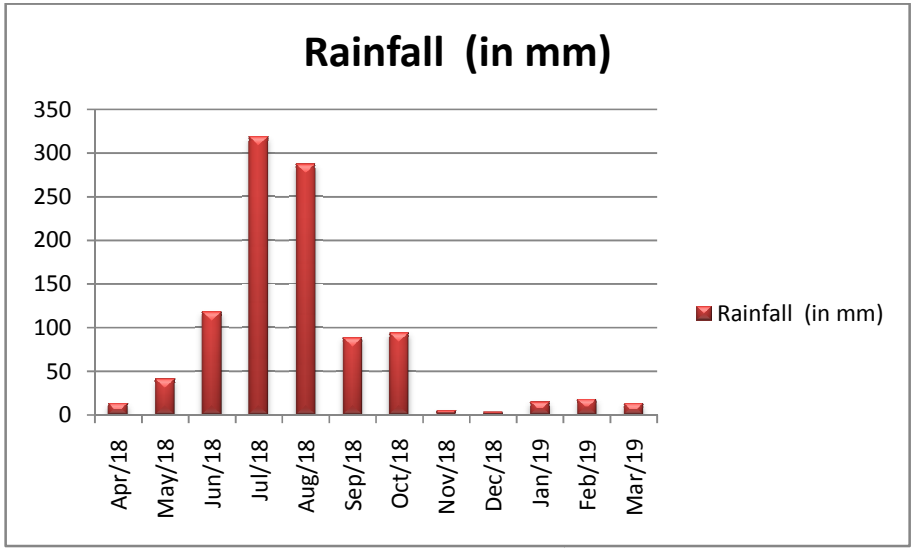
Annexure-I

Agro climatic Zones of Bihar



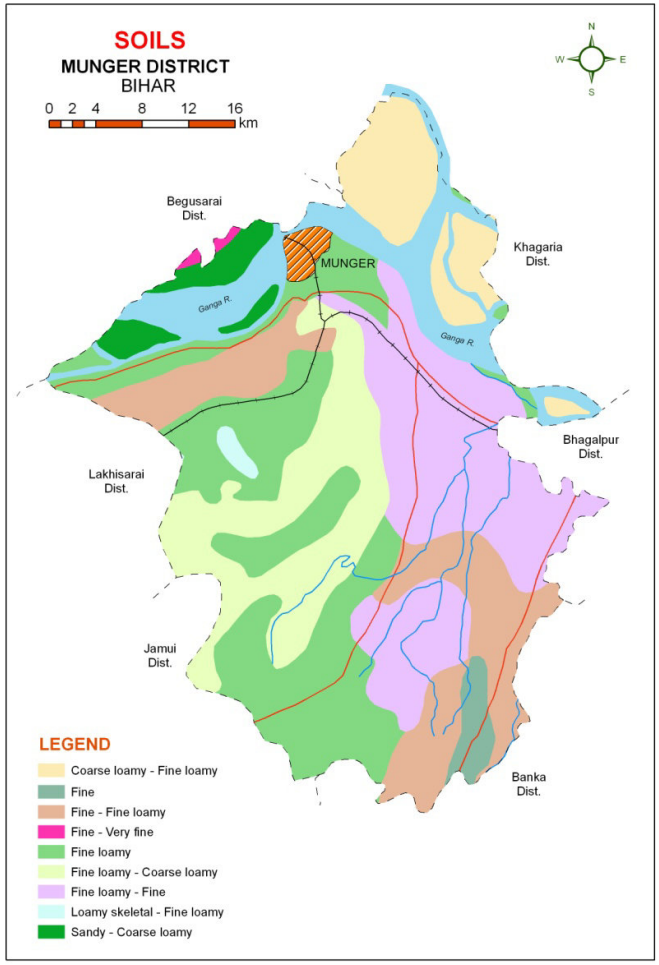
Source: krishi.bih.nic.in

Annexure-II



Month	Rainfall (in *mm)*
Apr-18	13
May-18	41
Jun-18	117.82
Jul-18	318.6
Aug-18	287.1
Sep-18	88.4
Oct-18	93.9
Nov-18	5
Dec-18	3
Jan-19	15
Feb-19	18
Mar-19	13

Annexure-III



Source: NBSS&LUP, Kolkata

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**	Normal rainfall Old Alluvial Plain soils	Rice-Wheat	Prefer Paddy (medium duration) var. R. Mansoori, R. Sweta, Sabour shree, Jay Sree, BPT-5204, R. Bhagwati, P. Basmati, Sabour Ardhjal etc. Followed by timely sown wheat.	• Adopt normal package of practices • Adopt SRI method, • Dapog nursery • Prefer short duration variety of paddy like TurantaPrabhat, Richaria, Sahbhagi, SabourSurabhi, Sabourardhjal. • Raise staggered community nursery preferably with medium duration varieties in mid and lowlands	
		Maize -Wheat	Maize var.Diara composite , Sabour Sankar Makka 1, DHM-17, Saktiman-1,2,3,4, Swan, Devki hybrid etc. followed by timely sown wheat.	Inter culture	
		Pigeonpea	Pigion pea var Malviya-13, P-9, Sarad, Asha, Upash , Narendra arhar-1, IPA-203	Seed treatment with rhizobium; Mulching with weeds	
	Normal Rainfall Sandy Diara soils	Maize-Mustard	Maize var.Diara composite DHM-17, Sabour Sankar Makka 1, Saktiman-1,2,3,4, Swan, Devki etc. followed by timely sown mustard.	Inter culture	
		Maize -Wheat	Maize var. Diara composite DHM-17, Sabour Sankar Makka 1,Saktiman-1,2,3,4, Swan, Devki		

			etc. followed by timely sown wheat.		
		Pointed guard	Fallow – Pointed guard	-	
	Normal Rainfall Lowland Tal Soil	Fallow Lentil	-	-	
		Fallow - Chickpea	-	-	
	Normal rainfall Shallow alluvial Hilly soils	Paddy –wheat	Paddy (medium duration) var. R. Mansoori, R. Sweta, Jay Sree,Sabour ardhjal, Sabour shree, BPT-5204, R. Bhagwati, P. Basmati etc. Followed by timely sown wheat.	• Adopt normal package of practices • Direct seeding of drought tolerant varieties in dry soil in June/ July with pre emergence herbicide application under sufficient soil moisture conditions.	
		Pigeon Pea	Pigionpea var Malviya-13, P-9, Sarad, Asha, Narendra arhar-1, IPA-203 etc.	Seed treatment with rhizobium culture mulching with weeds	

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 **2nd week of July**	Normal rainfall Old Alluvial Plain Soil	Rice-Wheat	Paddy (medium duration) var. R. Mansoori, R. Sweta, Jay Sree, Sabour ardhjal, Sabour surbhit, BPT-5204, R. Bhagwati, P. Basmati etc. Followed by timely sown wheat.	• Use mat nursery/ dapog nursery , mat nursery (dapog method) can be raised for quick availability of young seedlings for transplanting of medium duration varieties by first fortnight of August in mid and low lands • Raise staggered	

				community nursery preferably with short duration varieties in mid and lowlands • Transplant with 30-35 days old seedling may be used with 3-4 seedling per hill with close spacing.	
		Maize -Wheat	Maize var. Sabour Sankar Makka 1, Swan, Devki etc. followed by timely sown wheat.	Interculture in maize Life saving irrigation	
		Pigeonpea	Pigion pea var Malviya-13, P-9, Sarad, Asha etc.	Seed treatment with rhizobium; Mulching	
	Normal Rainfall Sandy Diara soils	Maize-Mustard	Maize var. Sabour Sankar Makka 1, Swan,Diara composite, DHM-17,Devki etc. followed by timely sown mustard.	Interculture in maize Life saving irrigation	
		Maize -Wheat	Maize var. Sabour Sankar Makka 1,Swan,Diara composite ,DHM-17,Devki etc. followed by timely sown wheat.	Provide light irrigation & inter culture in maize	
		Pointed guard	Fallow – Pointed guard	-	
	Normal Rainfall Lowland Tal soils	Fallow Lentil	-	-	
		Fallow - Chickpea	-	-	
	Normal rainfall Shallow alluvial Hilly soils	Paddy –wheat	Paddy (medium duration) var. R. Mansoori, R. Sweta, Jay Sree, BPT-5204, R. Bhagwati, P. Basmati, Sahbhagi, sabour surbhit, etc. Followed by timely sown wheat.	SRI method, Dapog nursery	
		Pigeon Pea	Pigeon pea var Malviya-13, P-9, Sarad, Narendra arhar-1, IPA-203 etc.	Seed treatment with rhizobium; Mulching	

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 weeks **4th week of July**	Normal rainfall Old Alluvial Plain Soil	Rice-Wheat	Paddy (short duration) var. Prabhat, Turant, IR-36, Saket-4, P-2-21, Richaria etc. followed by timely sown wheat.	Adopt SRI method, Dapog nursery, Change cropping system, sow short duration vegetable/ millets	
		Maize -Wheat	Maize var. Tulbuliya, kanchan, sabour Sankar makka1 , Diara composite DHM-17, Swan, Devki etc. followed by timely sown wheat.	Provide light irrigation &intercultural in maize application of potash.	
		Pigeonpea	Pigion pea var Malviya-13, P-9, Sarad, Asha, IPA-203 etc.	Seed treatment with rhizobium, mulching with weeds	
	Normal Rainfall Sandy Diara soils	Maize-Mustard	Maize var. Tulbuliya, kanchan, sabour Sankar makka1, Swan, Devki etc. followed by timely sown mustard.	Provide light irrigation &interculture in maize;	
		Maize -Wheat	Maize var. Tulbuliya, kanchan, sabour Sankar makka1, Swan, Devki etc. followed by timely sown wheat.		
		Pointed guard	Fallow – Pointed guard	-	
	Normal Rainfall Lowland Tal soils	Fallow Lentil	-	-	
		Fallow - Chickpea	-	-	
	Normal rainfall Shallow alluvial Hilly soils	Paddy –wheat	Paddy (short duration) var. Prabhat, Turant, IR-36, Saket-4, P-2-21, Richaria etc. followed by timely sown wheat.	Adopt SRI method, dapog nursery	

		Pigeonpea	Pigeon pea var Malviya-13, P-9, Sarad, Asha etc.	Seed treatment with rhizobium, mulching with weeds	

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 8 weeks **2nd week of August**	Normal rainfall Old Alluvial Plain Soils	Rice-Wheat	Paddy (short duration) var. Prabhat, Turant, Richaria etc. followed by timely sown wheat.	Adopt SRI method, dapognursery, SWI method, zero tillage sowing of wheat.	
		Maize -Wheat	Urad/Kulthi/Tori followed by timely sown wheat.	Seed treatment, disease resistant variety & management of insect pest.	
		Pigeonpea- mono cropping	Pigion pea var Malviya-13, IPA-203 etc.	-	
	Normal Rainfall Sandy Diara soils	Maize-Mustard	Blackgram/Kulthi/Tori followed by timely/late sown wheat.	-	
		Maize -Wheat	Maize var. Tulbuliya, kanchan, sabour Sankar makka1, Diara composite ,DHM-17,Swan, Devki etc. followed by timely sown wheat.	Intercultural in maize	
	Normal Rainfall Lowland Tal soils	Fallow Lentil	-	-	
		Fallow - Chickpea	-	-	
	Normal rainfall Shallow alluvial Hilly soils	Paddy –wheat	Paddy (short duration) var.R. mansoori, swarna sub-1,Prabhat, Turant, Richaria etc. followed by timely sown wheat.		
		Pigeon Pea	Pigion pea var Malviya-13, P-9, Sarad, Asha etc.	-	

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.	Normal rainfall Old Alluvial Plain Soil	Paddy-Wheat	Life saving irrigation, Gap filling with seedlings of Dapog nursery	Application of potash must at final land preparation, inter culturing, mulching through weeds, conservation tillage,	
		Maize-wheat	Life saving irrigation, Gap filling	Application of potash must at final land preparation, inter culturing, mulching through weeds, conservation tillage,	
		Redgram- monocropping	Pre-sowing irrigation, higher seed rate, variety- Sarad,Pusa-9, Asha, IPA-203	Application of potash must at final land preparation, inter culturing, mulching through weeds, conservation tillage,	
	Normal Rainfall Sandy Diara	Maize-Mustard	Urad/Kulthi/Tori followed by timely/late sown wheat.	Seed treatment, disease resistant variety & management of insect pest.	
		Maize -Wheat	Maize var. Tulbuliya, kanchan, sabour Sankar makka1, Swan, Devki etc. followed by timely sown wheat.	Light irrigation & inter culturing in maize	
	Normal Rainfall Lowland Tal Soil	Fallow Lentil	-	-	
		Fallow - Chickpea	-	-	
	Normal rainfall Shallow alluvial Hilly soils	Paddy-Wheat	Life saving irrigation, Gap filling through Dapog nursery	Interculture Mulching through weeds, Conservation tillage,	
		Redgram (Pigeon pea)	Pre-sowing irrigation, higher seed rate	Application of basal fertilizer at final land preparation Interculture Mulching through weeds, conservation tillage	

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	Normal rainfall Old Alluvial Plain Soil	Paddy-Wheat	Life saving irrigation, Gap filling through Dapog nursery	Interculture Mulchingthrough weeds, conservation tillage	-
		Maize-wheat	Life saving irrigation, Gap filling	Interculture mulching through weeds, conservation tillage	
		Red gram	Pre-sowing irrigation, higher seed rate, variety- Sarad,Pusa-9, Asha, IPA-203	Interculture Raise bed planting	
	Normal Rainfall Sandy Diara	Maize-Mustard	Maize var. Tulbuliya, kanchan, sabour Sankar makka1, Swan, Devki etc. followed by timely sown wheat.	Provide light irrigation & inter culture	
		Maize -Wheat	Maize var. Tulbuliya, kanchan, sabour Sankar makka1, Swan, Devki etc. followed by timely sown wheat.		
	Normal Rainfall Lowland Tal Soil	Fallow Lentil	-	-	
		Fallow - Chickpea	-	-	
	Normal rainfall Shallow alluvial Hilly soils	Paddy-Wheat	Life saving irrigation, Gap filling through Dapog nursery	Interculture mulching through weeds, conservation tillage	
		Redgram (Pigeon pea) monocropping	Pre-sowing irrigation, higher seed rate variety- Sarad,Pusa-9, Asha, IPA-203	Interculture Raise bed planting; Conservation tillage	

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	Normal rainfall Old Alluvial Plain Soil	Paddy-Wheat	Life saving irrigation, Gap filling through Dapog nursery	Interculture Conservation tillage	
		Maize-wheat	Life saving irrigation, Gap filling	Interculture , conservation tillage,	
		Redgram monocropping	Pre-sowing irrigation		
	Normal Rainfall Sandy Diara soils	Maize-Mustard	Maize var sabour Sankar makka1, Swan, Devki etc. followed by timely sown wheat.	Provide light irrigation &Interculture	
		Maize -Wheat	Maize var. sabour Sankar makka1, Swan, Devki etc. followed by timely sown wheat.		
	Normal Rainfall Lowland Tal Soil	Fallow Lentil	-	-	
		Fallow - Chickpea	-	-	
	Normal rainfall Shallow alluvial Hilly soils	Paddy-Wheat	Life saving irrigation, Gap filling through Dapog nursery	Interculture Conservation tillage, raise bed planting	
		Red gram (Pigeon pea) monocropping	Pre-sowing irrigation		

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**
	Normal rainfall Old Alluvial Plain Soil	Paddy-Wheat	Life saving irrigation, Foliar application of 2% potash	Preparation of land for timely wheat cultivation.	-
		Maize-wheat	Life saving irrigation	Inter culturing, mulching through weeds, conservation tillage,	
		Redgram	Life saving irrigation	Application of potash must at final land preparation, inter culturing, mulching through weeds, conservation tillage,	

	Normal Rainfall Sandy Diara	Maize-Mustard	Life saving irrigation	Procurement of mustard seed for early sowing.	
		Maize -Wheat		Procurement of wheat seed for timely sowing.	
	Normal Rainfall Lowland Tal Soil	Fallow Lentil	-	Sowing of lentil from 20th October.	
		Fallow - Chickpea	-	Sowing of lentil from 20th October.	
	Normal rainfall Shallow alluvial Hilly soils	Paddy-Wheat	Provide light irrigation	Moisture conservation and pre-sowing irrigation for wheat.	
		Redgram (Pigeon pea)	Inter cultivation, Conservation tillage, raise bed planting	-	

2.1.2 Drought - Irrigated situation

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed release of water in canals due to low rainfall	Normal rainfall Old Alluvial Plain Soil	Rice-Wheat	Paddy (medium duration) var. R. Mansoori, R. Sweta, Jay Sree, BPT-5204, R. Bhagwati, P. Basmati,Sabour ardhjal, sabour shree etc. Followed by timely sown wheat.	Adopt SRI method, dapog nursery	
		Maize -Wheat	Maize var. DHM117 and sabour sankar makka-1, Swan, Devki etc. followed by timely sown wheat.	Provide light irrigation & inter culture	
		Pigeonpea	Pigion pea var Malviya-13, P-9, Sarad, Asha, IPA-203 etc.	Seed treatment with rhizobium, mulching with weeds, application of potash etc.	
	Normal Rainfall Sandy Diara soils	Maize-Mustard	Maize var. sabour sankar makka-1, Swan, Devki etc. followed by timely sown mustard.	Provide light irrigation & inter culture	
		Maize -Wheat	Maize var. sabour sankar makka-1, Swan, Devki etc. followed by		

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
			timely sown wheat.		
		Pointed guard	Fallow – Pointed guard	-	
	Normal Rainfall Lowland Tal Soil	Fallow Lentil	-	-	
		Fallow - Chickpea	-	-	
	Normal rainfall Shallow alluvial Hilly soils	Paddy –wheat	Paddy (medium duration) var. R. Mansoori, R. Sweta, Jay Sree, BPT-5204, R. Bhagwati, P. Basmati etc. Followed by timely sown wheat.	-	
		Pigeon Pea	Pigion pea var Malviya-13, P-9, Sarad, Asha ,IPA-203etc.	-	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Limited release of water in canals due to low rainfall	Normal rainfall Old Alluvial Plain Soil	Rice-Wheat	Paddy (short duration) var. Prabhat, Turant, IR-36, Saket-4, P-2-21, Richaria etc. followed by timely sown wheat.	SRI method, dapog nursery	
		Maize -Wheat	Maize var. sabour sankar makka-1,Swan, Devki etc. followed by timely sown wheat.	Provide light irrigation & inter culture;	
		Pigeonpea	Pigion pea var Malviya-13, P-9, Sarad, Asha, IPA-203 etc.	Seed treatment with rhizobium, mulching with weeds, application of potash etc.	
	Normal Rainfall Sandy Diara	Maize-Mustard	Maize var. sabour sankar makka-1, Swan, Devki etc. followed by	Provide light irrigation & inter culture;	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
			timely sown mustard.		
		Maize -Wheat	Maize var. sabour sankar makka-1, Swan, Devki etc. followed by timely sown wheat.		
		Pointed guard	Fallow – Pointed guard	-	
	Normal Rainfall Lowland Tal Soil	Fallow Lentil	-	-	
		Fallow - Chickpea			
	Normal rainfall Shallow alluvial Hilly soils	Paddy –wheat	Paddy (short duration) var. Prabhat, Turant, IR-36, Saket-4, P-2-21, Richaria etc. followed by timely sown wheat.	Adopt SRI method, dapog nursery, SWI method, zero tillage sowing of wheat.	
		Pigeon Pea	Pigion pea var Malviya-13, P-9, Sarad, Asha,IPA-203 etc.	Seed treatment with rhizobium; Mulching	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water in canals under delayed onset of monsoon in catchment	Normal rainfall Old Alluvial Plain Soil	Paddy-Wheat	1) Paddy (Short Duration)-Late sown wheat 2) Vegetable –Wheat	Dapog Nursery, SRI, Machine transplanting, Zero tillage sown paddy and wheat to make up the time, Direct seeding of short duration paddy/ Cultivation of Cowpea, Rajma	
		Maize-wheat	Sesame –maize Sesame-wheat	Life saving irrigation, Application of potash, Inter culture, Mulching, Application of Organic manure and vermicompost initially	
		Red Gram	September Red gram		
	Normal rainfall Shallow alluvial Hilly	Paddy-wheat-green gram	Paddy (Short Duration)-Wheat	Adopt Mat type Nursery, SRI, Machine transplanting, Zero tillage	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	soils	Paddy-Wheat	Paddy (Short Duration)-Late sown wheat	sown paddy and wheat to make up the time, Direct seeding of short duration paddy varieties	
	Normal Rainfall Sandy Diara	Maize-wheat	Sesame –maize Sesame-wheat	Inter culture, Mulching, Application of Organic manure and vermicompost initially Life saving irrigation	
		Redgram	September Redgram		
	Normal Rainfall Lowland Tal Soil	Paddy-wheat-green gram	Paddy (Short Duration)-Wheat	Adopt Mat type Nursery, SRI, Machine transplanting, Zero tillage sown paddy and wheat to make up the time, Direct seeding with short duration paddy	

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	Normal rainfall Old Alluvial Plain Soil	Paddy-Wheat	1) Paddy (Short Duration)-Late sown wheat 2) Vegetable –Wheat	Adopt Mat type Nursery, SRI, Machine transplanting, Zero tillage sown paddy and wheat to make up the time, Direct seeding of short duration paddy/ Cultivation of Lobia, Rajma, cowpea, horsegram	
		Maize-wheat	Sesame –maize Sesame-wheat	Life saving irrigation, Application of potash, Inter culturing operation, Mulching, Application of Organic manure and vermicompost initially	
		Redgram	September Red gram		
	Normal rainfall Shallow alluvial Hilly soils	Paddy-wheat-green gram	Paddy (Short Duration)-Wheat	Direct seeding of short duration paddy Adopt Mat type Nursery, SRI, Machine transplanting, Zero	
		Paddy-Wheat	Paddy (Short Duration)-Late sown wheat		

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
				tillage sown paddy and wheat to make up the time,	
	Normal Rainfall Sandy Diara	Maize-wheat	Sesame –maize Sesame-wheat	Life saving irrigation, Inter culturing operation, Mulching, Application of Organic manure and vermicompost initially	
		Redgram	September Red gram		
	Normal Rainfall Lowland Tal Soil	Paddy-wheat-green gram	Paddy (Short Duration)-Wheat	Adopt Mat type Nursery, SRI, Machine transplanting, Zero tillage sown paddy and wheat to make up the time, Direct seeding of short duration paddy	

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		Paddy-Wheat	Paddy (Short Duration)-Late sown wheat	Dapog Nursery, SRI, Machine transplanting, Zero tillage sown paddy and wheat to make up the time, Direct seeding of short duration paddy	
		Maize-wheat	Sesame –maize Sesame-wheat	Life saving irrigation; Inter culture; Mulching, Application of Organic manure and vermicompost initially	
		Redgram	September Red gram		
		Paddy-wheat-green gram	Paddy (Short Duration)-Wheat	Dapog Nursery, SRI, Machine transplanting, Zero tillage sown paddy and wheat to make up the time, Direct seeding of short duration paddy	

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**
Paddy	Drainage, retransplanting through Dapog nursery, paddy transplanter, drum seeder, firb planter	Drainage, management of pest & diseases.	Drainage, application of hormones/nutrients sprays and pesticides to control pest/diseases. Quick harvesting	Shifting of produce to safer place for drying.
Maize	Re-sowing	Drainage, application of potash	Drainage, quick harvesting	Shifting of produce to safer place for drying.
Redgram	Plan for September sowing	Drainage, alternative crops if totally damaged	Quick harvest	Shifting of produce to safer place for drying.
Horticulture				
Bhindi	Drainage, resowing	Drainage, alternative crops if totally damaged	Harvest the vegetable at physiological maturity	Quick harvesting & selling
Other Vegetables (Chili,Tomato, Lauki)	Drainage, re transplanting	Drainage, alternative crops if totally damaged	Harvest the vegetable at physiological maturity	Quick harvesting & selling
Heavy Rainfall with High wind speed in a short span				
Paddy	Drainage, re transplanting	Drainage, alternative crops if totally damaged	Drainage, alternative crops if totally damaged	Quick harvesting & threshing
Maize	Resowing, & intercropping with Blackgram	Drainage, alternative crops if totally damaged	Drainage, alternative crops if totally damaged	Quick harvesting & threshing
Red gram	-	Drainage, alternative crops if totally damaged	Drainage, alternative crops if totally damaged	Quick harvesting & threshing
Horticulture				

Bhindi	Resowing	Drainage, alternative crops if totally damaged	Harvest the vegetable at physiological maturity	Quick harvesting & selling
Other Vegetables (Chili,Tomato, Lauki)Brinjal	Re transplanting (if needed)	Drainage, alternative crops if totally damaged	Harvest the vegetable at physiological maturity	Quick harvesting & selling
Out break of pests and diseases due to un seasonal rains				
Paddy	For Plant Hopper, Leaf Hopper management spray Imidaclorpid 0.01% Seedling treatment with granular insecticide – Cartap hydrochloride or phorate 10G or carbofuran 3G. Maintain shallow water in nursery beds Providing good drainage.	For Rice gundhi Bug, dusting 2 1kg ai./ha Use copper fungicides against Bacterial leaf blight. Split application of N fertilizer (3-4 times)	Harvest at physiological maturity	Rice weevil infestation can be managed by proper drying and safe storage
Maize	Stem borer can be managed by applying carbofuran 3G @ 25 kg/ha Drainage, and yellowing mainly due to nitrogen deficiency apply N split doses Application of granular insecticides viz. Thimet 10g, or Carbofuran 3g. in whorl of maize	Climbing cutworm can be managed by spraying Imidaclorpid 0.01% Foliar blight control through Mancozeb @ 2.5g/l or Zineb/ Mancozeb @ 2.5-4 g/lit of water (2-4 applications at 8-10 days interval)	Cob harvesting from standing crop Harvest at physiological maturity	Ensure 10-12% moisture in grains before storage to prevent further infestation of store grain pest Storage in safe places like farmer warehouse/tent covering of produce Proper dying
Red gram	-	**Pod fly** – Intercropping with maize (2:1) or Two spray of Dimethoate 35 EC @ 2 litre/ ha **Wilt** – Seed treatment with carbenadazim @ 2g/ kg seed	**Pod borer** – Pheromone trap 10-15 per ha **Sterlity Mosaic** – Spray of Metasystox @ 0.1% on first appearance of the symptom. Eradication of infected plant **Alternaria leaf spot** –	**Pod borer**–Store dried seed with mustard oil (1.0 %) for six month

			Spray of Iprodion @ 0.2%.	
Horticulture				
Okra	**Jassids** - Foliar spray of Dimethote&@ 2 litre/ha Mites – Spray Kelthane @ 1.5 ml/litre	**Shoot & Fruit borer** – Foliar spray of Dimethote @ 2 litre/ha YVMV - Spray of Metasystox @ 0.1%	**Shoot & Fruit borer**– Foliar spray of Dimethote&@ 2 litre/ha **YVMV** - Spray of Metasystox @ 0.1%	-
Tomato	**Shoot & Fruit borer** – Foliar spray of Dimethote&@ 2 litre/ha **Damping off** – Seed treatment with Metalaxyl @ 3g/kg seed	**Shoot & Fruit borer** – Foliar spray of Dimethote&@ 2 litre/ha Phomosis blight – two spray of Bavistin @ 1g/litre water.	-	-
Chili	**Termite**- Apply carbofuran 3G @ 1kg ai./ha in the soil at the time of planting and assure Irrigation Damping off – Seed treatment with Metalaxyl @ 3g/kg seed	**Borer** – Foliar spray of Dimethote&@ 2 litre/ha **Anthracnose:-** Apply Carbendazim/ Thiophanate methyl (1g/lit) to control of Anthracnose. Blossom infection can be controlled effectively by spraying of Bavistin (0.1%) at 15 days interval.	**White fly & Aphid** - Foliar spray of Metasystox @ 1 litre/ha **Anthracnose:-** Apply Carbendazim/ Thiophanate methyl (1g/lit) to control of Anthracnose. Blossom infection can be controlled effectively by spraying of Bavistin (0.1%) at 15 days interval.	Store the mature fruits after proper drying in sealed containers
Bottle gourd	**Red Pumpkin beetle** – Foliar spray of Dimethote&@ 2 litre/ha **Mildew -** spray of Bavistin (0.1%) at 15 days interval	**Fruit fly –** Spray malathion @ 1 litre/ ha or use 10-12 pheromone trap in one ha crop. **Anthracnose:-** Apply Carbendazim/ Thiophanate methyl (1g/lit) to control of Anthracnose. Blossom infection can be controlled effectively by spraying of Bavistin (0.1%) at 15 days interval.	**Fruit fly –** Spray malathion @ 1 litre/ ha or use 10-12 pheromone trap in one ha crop. **Anthracnose:-** Apply Carbendazim/ Thiophanate methyl (1g/lit) to control of Anthracnose. Blossom infection can be controlled effectively by spraying of Bavistin (0.1%)	-

			at 15 days interval.	

2.3 Floods

Condition	**Suggested contingency measure[o]**			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Paddy	Drainage	Drainage, alternative crops if totally damaged	Harvest at physiological maturity	Quick harvesting & threshing
Maize	Re sowing			
Redgram	Plan for September sowing			
Horticulture				
Bhindi, Chili,Tomato, Lauki	Drainage, retransplanting Spray Ridomil M-Z, 2gm/lt to check damping off	Apply 25 kg Urea /Acre	Harvest the vegetable at physiological maturity	Quick harvesting & selling
Continuous Submergence for more than 2 days				
Paddy, Maize, Red gram	Drainage, Resowing/ retranslating	Drainage, alternative crops if totally damaged	Drainage, alternative crops if totally damaged	Quick Harvesting & threshing
Horticulture				

Bhindi, Brinjal, Chili, Tomato, lauki	Drainage, retranslating Spray Ridomil M-Z, 2gm/lt to check damping off	Drainage, alternative crops if totally damaged	Drainage, alternative crops if totally damaged	Quick harvesting & selling
Old orchard	1. After flood sprayChlorpyriphos/ Dimethoate @ 1-1.5ml/lt on trees 2. Drench the tree with carbenazim @ 1 gm/lt 3. Prune the diseased and dried branches and apply Blitox-50 @ 3gm/ lt 4. Apply Bordeaux Paste up to 5'ht			
Sea Water Inundation	**Not applicable**			

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

Condition	**Suggested Contingency Measures**			
Extreme Event Type	**Seeding Nursery Stage**	**Vegetative Stage**	**Reproductive Stage**	**At harvest**
Heat wave				
Horticulture	Save nursery by sprinkling / life saving irrigation in evening	life saving irrigation	life saving irrigation	-
Bhindi, Brinjal, Chili, Tomato, Lauki	-	-	Provide life saving irrigation	
Cold Wave				
Wheat , Chickpea, Redgram	Irrigation, interculture, mulching with uprooted weeds			

, Lentil				
Horticulture				
Bhindi, Chili, Tomato, Lauki	Irrigation, interculture, mulching with uprooted weeds			
Frost				
Wheat, Chickpea, Redgram, Lentil	Irrigation, interculturing, mulching by weeds			
Horticulture				
Bhindi	Treat the seeds in 0.2% soln of Dithane M-45	Irrigation, interculturing, mulching by weeds		
Brinjal, Chilli		Irrigation interculturing, mulching by weeds		
Tomato, Potato&Lauki	Treat the seeds in 0.2% soln of Dithane M-45	Earthing up to 15cm ht. Irrigation interculturing, mulching by weeds	Spray Dithane M-45/ Mancozeb @ 2.5 gm/lt of water in 3rd week of December at 10 days interval 3 times	Harvest in dry weather
Hail storm	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 & fodder availability	Silage making of leguminous and Non leguminous fodder	Feeding of unconventional livestock feed such as Karanj cake, leaves of trees , Urea treated straw	Feeding of leaves of subabuletc, Urea-molasses feeding

Drinking water	Recharge the ponds with fresh water	Provides animal water from well, Tube well , Hand pump, etc	provide water from hand pump, tube well etc.
Health & disease management	Give vaccine for tick borne diseases like thalaria	Check the population of tick, fleas, mosquito by keeping the environment clean & disinfected by chemicals, fumigation in barn.	Take care about he disease spread by tick, mites, fleas etc.
Floods			
Feed & fodder availability	Hay making of grasses & fodders.	Feeding the animals with tree leaves like subabul, Banana etc. and Urea molasses	Dry the greens then feed it, Do not feed animals mouldy fodders.
Drinking water	Hand pump and tube well should be on higher places	Drink the animals always fresh water, running water, not stagnant water	Drink the animals running water, water from hand pump, tube well
Health & disease management	Give vaccine for H.S., B.Q, Anthrax etc	De worm animals regularly special care for Fasciolosis (Liver fluke)	Do not graze the animals where snail population is more, control the snail population.
Cyclone			
Feed & fodder availability	Silage & hay making	feed animals silage or hay, urea molasses	Do not feed animals moist mouldy fodder, feed animals dry fodder
Drinking water	Pump, hand pump at higher places	Always drink animals fresh water	Drink animals fresh or running water
Health & disease management	Provide animals proper housing.	Keep the animals in good quality house that shouldn't be damaged due to cyclone, in case of causality provide first aid immediately.	Provide proper treatment to injured animals, deep burial of dead animals and disinfect the environment with good quality disinfectants like bleaching powder etc.
Heat waves and cold waves			
Shade/ environment management	Construct animal house well ventilated and spacious with shady trees around.	In case of heat wave provide the animals shade with kachcha roof, well ventilated. In cold wave protect the animals with clothing of jute etc. Proper bedding, protection from cold wind with jute carton etc provide warmth with fire	Provide well ventilated house with shady trees.
Health & disease management	In case of heat wave Anthelmintic &Antiprotozoal drug must be provided, keep fleas & mosquito free environment.	In case of heat wave- Provide animals cool places & keep them cool by bathing twice, Protect from heat stroke by keeping them on cool places and do not allow them to graze during day time, feed animals light diet during cool time i.e. early morning & evening, regular feeding of digestive tonics	After heat wave :- Provide animals anti-stress drug keep environment clean, provide adequate nutrition & fresh water, feeding digestive tonics, after cold wave keep animals in sun light, Let them graze, Provide them quality concentrate.

[s] based on forewarning wherever available

2.5.2 Poultry

	Suggested contingent measures		
	Before the event	**During the Event**	**After the events**
Drought			
Shortage of feed ingredients	Maize is replaced by broken rice, Kodo, Sawan, Mustard cake replaced groundnut cake.	Small millets and molasses can replace cereals, mustard cake, saya bean meal cake can replace ground nut cake	Cotton seed cake, sun flower seed meal replace groundnut cake, Small millets can replace cereals.
Drinking water	Harvest water in water tanks with sanitation measures & use after proper disinfection of water	Give water 4 times in a day in earthed utensils, Water should be clean with beaching powder. Periodically provide electoral powder etc in water	Give fresh water in adlibdom.
Health & Disease Management	Vaccinate the stock with Fowlpox, Fowl cholera, Marex disease etc	Give sulpha drugs to check cholera, Amproliium, salts etc to cheek coccidiosis	Give Anti-stress drugs for cope up the condition, provide adequate feed & water
Flood			
Shortage of feed ingredients	Stock the cereals (Maize, Rice, Wheat bran etc) on higher places and Maize is replace by sorghum	Feed shorghum in place of maize, replace G/N cake by mustard or cotton seed cake, Fish meal can be replaced by Live residue meal.	Small millets can replace maize. Sunflower meal can replace g/n cake
Drinking water	Fresh water of hand pump or tube well of higher palace should be used	Disinfected fresh water should be given to birds, bleaching powdered water can be used	Fresh water with proper disinfection with chlorine tablet/bleaching powder etc must be used.
Health & diseases management	Use dewormer regularly & vaccinate the birds with proper vaccine	Give dewormer periodically, vaccine of fowl cholera, Ranikhet disease must be given. Anti coccidial drug in preventive doses also be given.	Anti-stress and Multi vitamin and minerals must be given.
Cyclone			
Shortage of feed ingredients	Stock the cereals (Maize, Rice, Wheat bran etc) on higher places and Maize is replace by sorghum	Feed shorghum in place of maize,replace G/N cake by mustard or cotton seed cake, Fish meal can be replaced by Live residue meal.	Small millets can replace maize. Sunflower meal can replace g/n cake
Drinking water	Fresh water of hand pump or tube well of higher palace should be used	Disinfected fresh water should be given to birds, bleaching powdered water can be used	Fresh water with proper disinfection with chlorine tablet/bleaching powder etc must be used.
Health & diseases management	Provide poultry proper housing.	Keep the birds in good quality house that shouldn't be damaged due to cyclone.	Provide proper treatment to injured birds, deep burial of dead birds and disinfect the environment with good quality disinfectants like bleaching powder etc.

Heat waves and cold waves			
Shade/ environment management	Construct poultry house well ventilated with shady trees around.	In case of heat wave the poultry house with straws on roof, well ventilated, windows with carton of jute soaked in water, if possible cool the house with cooler. In cold wave protect the poultry with carton of jute etc., provide warmth with electrical bulb or gas burner etc.	Provide well ventilated house with shady trees.
Health & disease management	In case of heat wave Anthelmintic & Antiprotozoal drug must be provided, keep fleas & mosquito free environment.	In case of heat wave- provide poultry cool places, Protect from heat stroke by keeping them in well ventilated places, feed birds moisten diet during cool time i.e. early morning & evening, regular feeding of digestive tonics and electoral powder	After heat wave :- Provide birds anti-stress drug keep environment clean, provide adequate nutrition & fresh water, feeding digestive tonics, after cold wave keep poultry with maximum light in house.

[a] based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture :Not applicable

	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			
(ii)Changes in water quality			
(iii)Any other			
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			
(iii)Any other			
2) Floods			
A.Capture			
Marine			
Inland			
(i)No. of boats / nets/damaged			
(ii)No.of houses damaged			
(iii)Loss of stock			
(iv)Changes in water quality			
(v) Health and diseases			
B.Aquaculture			
(i)Inundation with flood water			
(ii)Water contamination and changes in water quality			
(iii)Health and diseases			
(iv)Loss of stock and inputs (feed, chemicals etc)			
(v)Infrastructure damage (pumps, aerators, hutsetc)			
(vi) Any other			
3. Cyclone / Tsunami			
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/hutsetc)			
(vi) Any other			
4.Heat wave and cold wave			
A.Capture			
Marine			
Inland			
B.Aquaculture			
(i)Changes in pond environment (water quality)			
(ii) Health and Disease management			
(iii)Any other			

[a] based on forewarning wherever available