State: Bihar

Agriculture Contingency Plan for District: Araria

KRISHI VIGYAN KENDRA, ARARIA

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)	North East Alluvial Plain Zone (BI-2)		
	List all the districts or part thereof falling under the NARP Zone	Begusarai, Saharsa, Supaul, Madhepura, Purnea , Kishanganj, Araria, Katihar		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		26° 8’ 59”	87° 31’ 11”	47 m above MSL
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RRS, Agwanpur		
	Mention the KVK located in the district	KVK Araria		

1.2	**Rainfall**	**Normal RF (mm)**	**Normal Onset**	**Normal Cessation**
	SW monsoon (June-Sep):	1358.2	3rd week of June	3rd week of September
	NE Monsoon(Oct-Dec):	92.1		
	Winter (Jan- March)	209.4		
	Summer (Apr-May)	20.5		
	Annual	1608		

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)	268.5	160.3	0.84	56.69	0.70	1.24	13.19	6.57	19.5	9.49

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area ('000 ha)**	**Percent (%) of total**
	Sandy to sandy loam	190	71
	Clay loam to clay	78	29

* mention colour, depth and texture (heavy, light, sandy, loamy, clayey etc) and give vernacular name, if any, in brackets

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	183.25	156.65
	Area sown more than once	114.56	
	Gross cropped area	217.35	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	108.78		
	Gross irrigated area	108.81		
	Rainfed area	52		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		30.52	28.05
	Tanks		6.75	6.21
	Open wells		3.21	2.95
	Bore wells	11456	49.22	45.24
	Lift irrigation schemes			
	Micro-irrigation			

	Other sources (please specify)		19.10	17.56
	Total Irrigated Area		108.81	
	Pump sets	14456		
	No. of Tractors	1400		
	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			
	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 (2009-10)

1.7	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			**Rabi**				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Rice	45.9	50.02	95.9	-	-	-	-	95.99
	Wheat	-	-	-	51.2	-	51.20	-	51.20
	Maize	5.9	1.2	7.1		-		-	7.15
	Finger millet	-	-	-	-	0.38	0.38	-	0.38
	Greengram	-	-	-	-	-	-	1.21	1.21
	Sun flower	-	0.1	0.1	-	-	-	-	0.15

	Jute	-	34.5	34.5	-	-	-	-	34.59
	Mesta	-	2.7	2.7	-	-	-	-	2.75
	Blackgram	-	0.2	0.2	-	-	-	-	0.20
	Finger millet	-	0.9	0.9	-	-	-	-	0.94

	Horticulture crops - Fruits	**Area ('000 ha)**		
		Total	**Irrigated**	**Rainfed**
	Mango	**2.88**		
	Litchi	**0.33**		
	Guava	**0.21**		
	Banana	**0.11**		
	Other	**0.59**		
	Horticulture crops - Vegetables	**Total**	**Irrigated**	**Rainfed**
	Tomato	1.27		1.27
	Brinjal	0.84	0.21	0.63
	Cauli flower	1.1	0.81	0.29
	Bhindi	0.42	0.42	
	Potato	3.27	1.81	1.46

	Medicinal and Aromatic crops	-	-	-
	Plantation crops	-	-	-
	Fodder crops	-	-	-
	Total fodder crop area	-	-	-
	Grazing land	-	-	-
	Sericulture etc	-	-	-
	Others (specify)	-	-	-

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	215.2	306.4	521.7
	Crossbred cattle	1.3	2.9	4.2
	Non descriptive Buffaloes (local low yielding)	61.08	136.9	727.5
	Graded Buffaloes	0.74	2.5	3.3
	Goat	-	-	657.9
	Sheep	-	-	-
	Others (Camel, Pig, Yak etc.) Pig	-	-	13.9
	Commercial dairy farms (Number)			10 (Private) Govt. Nil
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	10	58282	
	Backyard		653622	
1.10	**Fisheries** (Data source: Chief Planning Officer)			
	A. Capture			

i) Marine (Data Source:	**No. of fishermen**	**Boats**	**Nets**	**Storage facilities**

	Fisheries Department)		Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	**(Ice plants etc.)**
		-	-	-	-	-	-
	ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
		2837		458		383	

	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)	2578	-	3.92MT
	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)										
	Rice	122.93	1280.62	-	-	-	-	122.93	1280.62	
	Wheat	-		-	-	-	-	66.68	1302.41	
	Maize	27.56	3854.23	-	-	-	-	27.56	3854.23	
	Finger millet	-		-	-	-	-	0.99	2608.06	
	Greengram	-		-	-	-	-	2.21	1826.32	

	Sun flower	0.24	1624.36	-	-	-	-	0.24	1624.36	
	Jute	-	-	-	-	-	-	91.12	2634.25	
	Mesta	-	-	-	-	-	-	6.14	2234.15	
	Blackgram	-	-	-	-	-	-	0.34	1686.62	
		-	-	-	-	-	-			
Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango	-	-	-	-	-	-	16.37	5684.5	
	Litchi	-	-	-	-	-	-	1.76	5328.6	
	Guava	-	-	-	-	-	-	1.53	7264.21	
	Banana	-	-	-	-	-	-	4.68	42583.8	
	Tomato	-	-	-	-	-	-	24.15	19012.2	
	Brinjal	-	-	-	-	-	-	18.92	22526.2	
	Cauli flower	-	-	-	-	-	-	2.47	2245.5	
	Bhindi	-	-	-	-	-	-	7.64	12125.3	
	Potato	-	-	-	-	-	-	34.59	23688.5	

1.12	**Sowing window for 5 major field crops**	**Rice**	**Wheat**	**Maize**	**Potato**	**Greengram**	**Jute**
	Kharif- Rainfed 1. Upland 2. Midland	 1-2nd week of July 2nd-3rd week of June		-	-	**Summer –** 2nd week of March- 2nd week of April	-

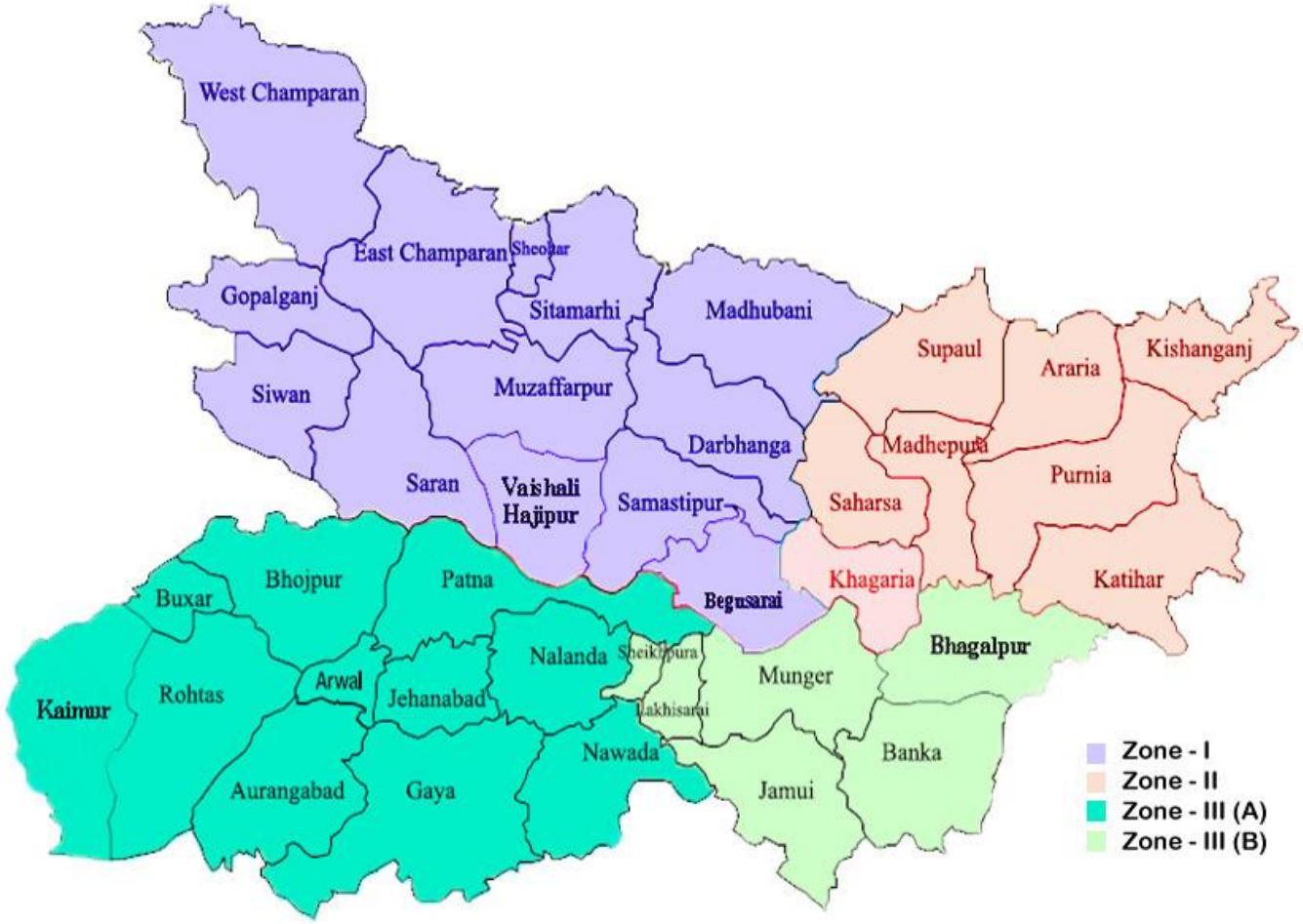
	3. Low land	3rd week of May – 2nd week of June					
	Kharif-Irrigated 1. Upland 2. Midland 3. Low land	 1-2nd week of July 2nd-3rd week of June 3rd week of May – 2nd week of June		May - June	-		March -May
	Rabi- Rainfed	-		-	-		-
	Rabi-Irrigated 1Timely Sown 2.Late Sown	-	2nd week of November – 2nd week of December 2nd week of December-4th week of December	2nd week of October - 3rd week of November	1st week of November- 4th week of November		-
*Jute is harvested between May to July(90-100 days crop)							

1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought		√	
	Flood	√ (August)		
	Cyclone		√ (April)	
	Hail storm			√
	Heat wave		√ (May - June)	
	Cold wave		√ (December - January)	
	Frost		√ January-February)	
	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

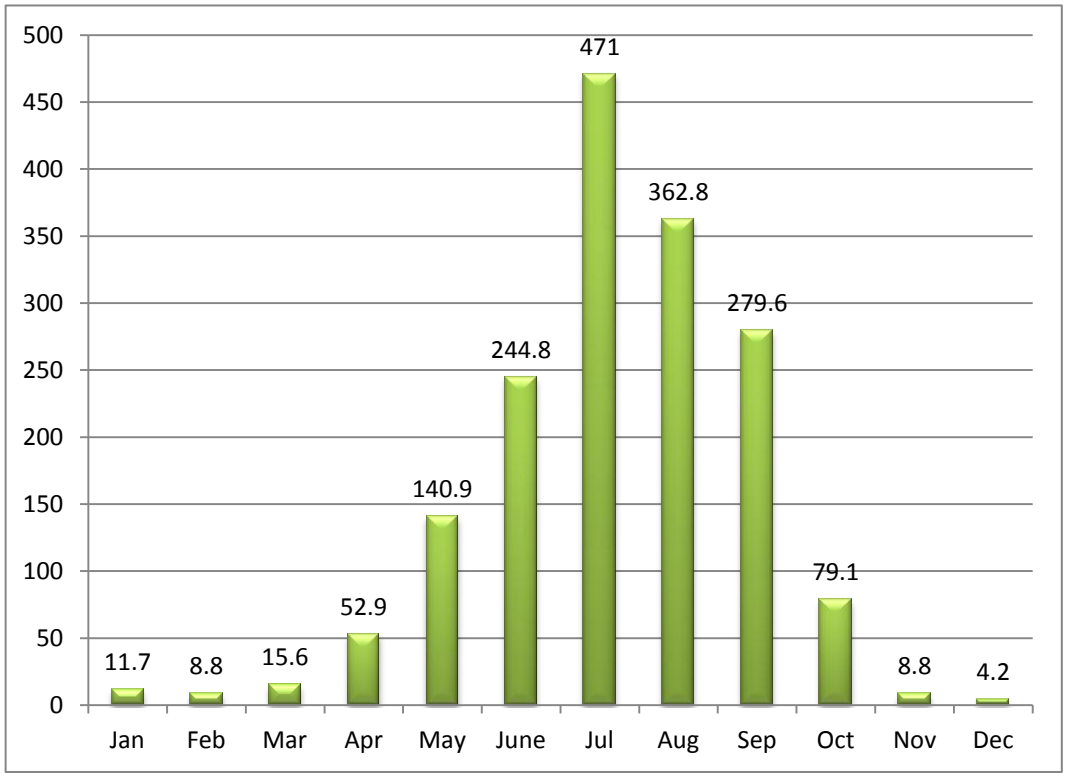
Agro climatic Zones of Bihar



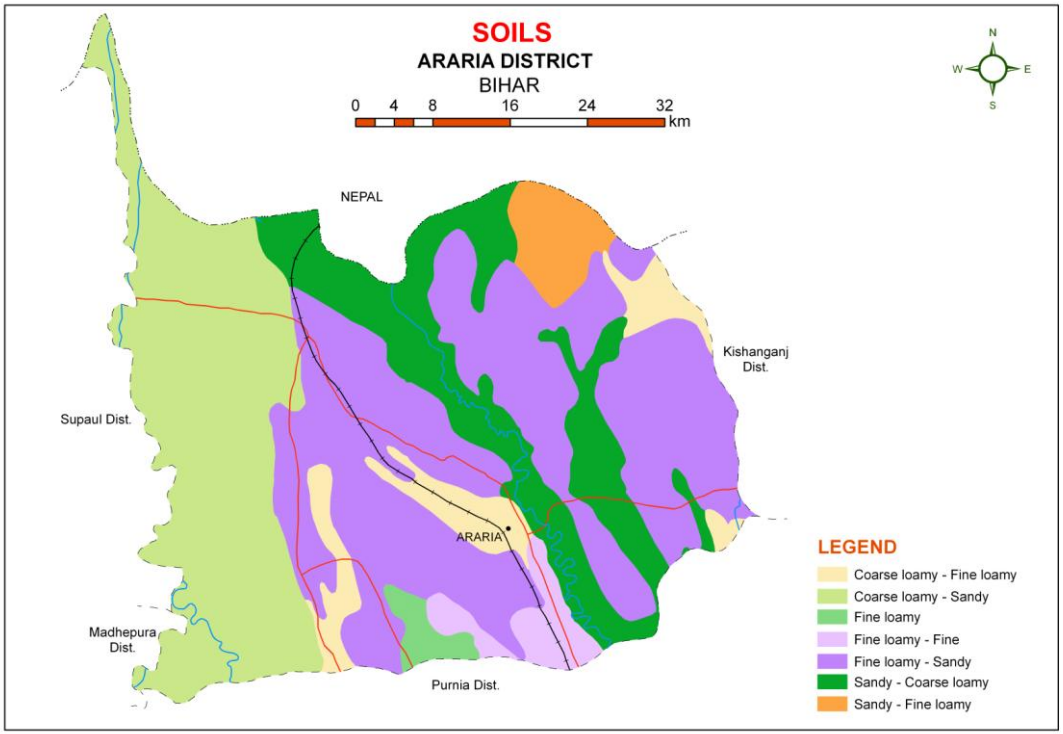
Source: krishi.bih.nic.in

Annexure II

Mean annual rainfall (mm)



Annexure III



Source : NBSS& LUP, Regional Centre, 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 **July 1st week**	Upland	Rice-Wheat-Greengram	Rice-Wheat-Greengram	No change	-
		Maize-Wheat-Greengram	Maize-Wheat-Greengram		
	Medium land	Rice-Wheat-Greengram	Rice-Wheat-Greengram		
		Jute-Rice	Jute-Rice		
	Low land	Jute-Rice	Jute-Rice		

*Jute is harvested between May to July (90-100 days crop)

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 **(July 3rd week)**	Upland	Rice-Wheat-Greengram	Rice-Wheat-Greengram	• Direct seeding of rice with medium duration drought tolerant varieties with pre emergence herbicide application under sufficient soil moisture conditions followed up with a post-emergence weedicide application 20-25 days later for effective weed management. • Normal package of practices.	
		Maize-Wheat-Greengram	Rice-Wheat-Greengram Rice- Prefer Medium to short duration varieties like Saroj (100-110d), Birsa Dhan-201 (100-115d)		

				• Interculture for timely weed control in direct seeded rice	
	Medium land	Rice-Wheat-Greengram	Rice-Wheat-Greengram Direct sowing / 20d old dapog seedlings with medium to short duration varieties – BR34, Rajendra Dhan-201(130-135d), Rajendra Bhagwati,		
		Jute-Rice	Jute-Rice	Direct sowing / 20d old dapog seedlings with medium to short duration varieties – BR34, Rajendra Dhan-201(130-135d), Rajendra Bhagwati	
	Low land	Jute-Rice	Jute-Rice	Rice- Direct/ dapog seedlings with long duration varieties.	

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 (August 1st week)	Upland	Rice-Wheat-Greengram	Pulse-Wheat-pulse	In Kharif Finger millet, Blackgram & Kulthi can be grown	
	Medium land	Rice-Wheat-Greengram	Pulse-Wheat-Pulse	In Kharif Finger millet, Blackgram & Kulthi can be grown	
		Jute & Rice	Pulse-Wheat-pulse	• Normal package of practices. • Interculture for timely weed control in direct	

				seeded rice	
	Low land	Jute – Rice	Finger millet/ Blackgram / Kulthi - Wheat-pulse	• Normal package of practices. • Interculture for timely weed control in direct seeded rice	

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 (August 3rd week)	Upland	Rice-Wheat-Greengram	Finger millet/ Blackgram /Kulthi -Wheat- Green gram(Local)	In Kharif Finger millet, Blackgram & Kulthi can be grown	
	Medium land	Rice-Wheat-Greengram	Finger millet/ Blackgram / Kulthi -Wheat-Green gram(Local)	• Normal package of practices. • Interculture for timely weed control in direct seeded rice	
		Jute & Rice	Finger millet, Blackgram & Kulthi-Wheat- Green gram(Local)	• Normal package of practices. Interculture for timely weed control in direct seeded rice	
	Low land	Jute – Rice	Finger millet/ Blackgram / Kulthi -Wheat- Green gram(Local)	• Normal package of practices. • Interculture for timely weed control in direct seeded rice	

Condition			**Suggested Contingency measures**

Early season drought **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Upland	Rice-Wheat-Greengram	Gap filling , If crop is damaged totally, short duration Rice can be transplanted	Top dressing of N on rainfall, application of potash at final land preparation	
		Maize-Wheat-Greengram	Gap filling	Inter culture Mulching Life saving irrigation	
	Medium land	Rice-Wheat-Greengram	Gap filling by seedling. If crop is damaged totally, short duration Rice can be transplanted	Inter culture Mulching Life saving irrigation	
		Jute-Rice	Gap filling by seedling. If crop is damaged totally, short duration Rice can be transplanted	Inter culture Mulching Life saving irrigation	
	Low land	Jute-Rice	Gap filling by seedling. If crop is damaged totally, Long duration Rice can be transplanted	Inter culture Mulching Life saving irrigation	

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 measues**	**Remarks on Implementation**
At vegetative stage	Upland	Rice-Wheat-Greengram	Reduce the no. of plants, on rainfall gap filling by the khurhan method. If crop is totally damaged kulthi, black gram can be grown	Top dressing of N on rainfall, application of potash at final land preparation	
		Miaze-Wheat-Greengram		Inter culture Life saving irrigation	
	Medium land	Rice-Wheat-Greengram	Reduce the no. of plants, on rainfall gap filling by the khurhan method. If crop is totally damaged kulthi, black gram can be grown	Inter culture Life saving irrigation	
		Jute-Rice	Reduce the no. of plants, on rainfall gap filling by the khurhan method. If crop is totally damaged kulthi, black gram can be grown	Inter culture Life saving irrigation	
	Low land	Jute-Rice	Reduce the no. of plants, on rainfall gap filling by the kharuhan method. If crop is totally damaged kulthi, black gram can be grown	Inter culture Life saving irrigation	

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	Upland	Rice-Wheat-Greengram	If the crop damage is high then Toria, early potato can be grown	Inter culture Life saving irrigation Foliar spray- 2% potash.	
		Miaze-Wheat-Greengram	Leaf clipping in maize.	I Foliar spray- 2% potash.nter culture Life saving irrigation	
	Medium land	Rice-Wheat-Greengram	If the crop damage is high then Toria, early potato can be grown	Inter culture Life saving irrigation	
		Jute-Rice	-	Inter culture Life saving irrigation	
	Low land	Jute-Rice	-	Inter culture Life saving 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**
	Upland	Rice-Wheat-Greengram	Life saving irrigation	Toria, Rai, lentil can be grown in place of wheat	
		Miaze-Wheat-Greengram	Life saving irrigation	Toria, Rai, lentil can be grown in place of wheat	
	Medium land	Rice-Wheat-Greengram	Life saving irrigation	Toria, Rai, lentil can be grown in place of wheat	
		Jute-Rice	-	Toria, Rai, lentil can be	

				grown	
	Low land	Jute-Rice	-	Toria, Rai, lentil can be grown	

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	Upland	Rice-Wheat-Greengram	Prefer short duration variety of Rice	Dapog nursery, SRI technique, Direct seeding of short duration Rice	
	Mid land	Rice-Wheat-Greengram	Short duration variety of Rice		
		Jute-Rice	Short duration variety of Rice		
	Low land	Jute-Rice	Short duration variety of Rice		

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	Upland	Rice-Wheat-Greengram	Maize-Wheat-Greengram	Inter culture, life saving irrigation	
			Blackgram / Kulthi-Wheat-Greengram		
	Medium land	Jute-Rice	Jute-Blackgram / Kulthi		
		Rice-Wheat-Greengram	Maize-Wheat-Greengram		
			Blackgram / Kulthi-Wheat-Greengram		
	Low land	Jute-Rice	Jute-Blackgram / Kulthi		

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	Upland	Rice-Wheat-Greengram	Maize-Wheat-Greengram	Inter culturing, life saving irrigation	
			Blackgram / Kulthi-Wheat-Greengram		
	Medium land	Jute-Rice	Jute-Blackgram / Kulthi		
		Rice-Wheat-Greengram	Maize-Wheat-Greengram		
			Blackgram / Kulthi-Wheat-Greengram		
	Low land	Jute-Rice	Jute-Blackgram / Kulthi		

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	Upland	Rice-Wheat-Greengram	Maize-Wheat-Greengram	Inter culturing, life saving irrigation	
			Blackgram / Kulthi-Wheat-Greengram	Inter culturing, life saving irrigation	
	Medium land	Jute-Rice	Jute-Blackgram / Kulthi	Inter culturing, life saving irrigation	
		Rice-Wheat-Greengram	Maize-Wheat-Greengram	Inter culturing, life saving irrigation	
			Blackgram / Kulthi-Wheat-Greengram	Inter culturing, life saving irrigation	
	Low land	Jute-Rice	Jute-Blackgram / Kulthi	Inter culturing, life saving irrigation	

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		Rice-Wheat-Greengram	Blackgram / Kulthi-Wheat-Greengram	Sprinkler irrigation	
		Jute-Rice	Blackgram / Kulthi-Wheat-Greengram	Sprinkler irrigation	

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	Drainage, transplanting through seedlings from dapog nursery	Drainage, alternative crop if totally damaged	Drainage	Store the grain at higher place
Maize	Drainage, resowing if damaged totally	Drainage, alternative crop if damaged totally	Drainage	Store the grain at higher place
Horticulture				
Brinjal	Drainage, retranslating	Drainage, alternative crop if damaged totally	Harvest the crop	Store the grain at higher place
Tomato	Drainage, retranslating	Drainage, alternative crop if damaged totally	Harvest the crop	Store the grain at higher place
Heavy rainfall with high speed winds in a short span[2]				
Rice	Drainage, transplanting through Dopag nursery	Drainage, alternative crop if totally damaged	Drainage	Store the grain at higher place
Maize	Drainage, resowing if damaged totally	Drainage, alternative crop if damaged totally	Drainage	Store the grain at higher place
Horticulture				
Brinjal	Drainage, retranslating	Drainage, alternative crop if damaged totally	Harvest the crop	Store the grain at higher place
Tomato	Drainage, retranslating	Drainage, alternative crop if damaged totally	Harvest the crop	Store the grain at higher place
Outbreak of pests and diseases due to unseasonal rains				

Rice	❖ For Plant Hopper, Leaf Hopper management spray Imidacloprid 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. Carbofuran 3g. in whorl of maize	Climbing cutworm can be managed by spraying Imidacloprid 0.01% ❖ Foliar blight control through Mancozeb @ 2.5g/l or Zineb/ Maneb @ 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
Horticulture				
Brinjal,	Shoot & Fruit borer – Foliar spray of Dimethoate &@ 2 litre/ha Damping off – Seed treatment with Metalaxyl @ 3g/kg seed	Shoot & Fruit borer – Foliar spray of Dimethoate &@ 2 litre/ha Little leaf – Eradication of infected plant	-	-
Tomato	Shoot & Fruit borer – Foliar spray of Dimethoate &@ 2 litre/ha Damping off – Seed treatment with Metalaxyl @ 3g/kg seed	Shoot & Fruit borer – Foliar spray of Dimethoate &@ 2 litre/ha Phomosis blight – two spray of Bavistin @ 1g/litre water.	-	-

2.3 Floods

Condition	**Suggested contingency measure**			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Rice	Drainage, resowing if damage is higher	Drainage, alternate crop if damaged totally	Drainage	Harvest & store at higher place
Maize	Resowing	Drainage, alternate crop if damaged totally	Drainage	Harvest & store at higher place
Horticulture				
Brinjal	Drainage, retransplant	Drainage, alternate crop if damaged totally	Drainage	Harvest & store at higher place
Tomato	Drainage, retransplant	Drainage, alternate crop if damaged totally	Drainage	Harvest & store at higher place
Continuous submergence for more than 2 days[2]				
Rice	Drainage, resowing if damage is high	Drainage, alternative crop if damage totally	Drainage	Harvest & store at higher place
Maize	Resowing	Drainage, alternative crop if damage totally	Drainage	Harvest & store at higher place
Horticulture				
Brinjal	Drainage, retransplant	Drainage, alternate crop if damaged totally	Drainage	Harvest & store at higher place
Tomato	Drainage, retransplant	Drainage, alternate crop if damaged totally	Drainage	Harvest & store at higher place
Sea water intrusion	Not applicable			

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave				-
Rice	Provide Irrigation	Irrigation	Irrigation	-
Maize		Irrigation	Irrigation	-
Horticulture				-
Brinjal	Irigation	Irrigation	Irrigation	-
Tomato	Irrigation	Irrigation	Irrigation	-
Cold wave	-			-
Wheat	-	Irrigation, Mulching, Inter culture	Irrigation	-
Maize	-	Irrigation, Mulching, Inter culture	Irrigation	-
Horticulture	-			-
Brinjal	-	Irrigation, Mulching, Inter culture	Irrigation	-
Tomato	-	Irrigation, Mulching, Inter culture	Irrigation	-
Potato	-	Irrigation, Mulching, Inter culture	Irrigation & mulching	-
Frost	-			-
Wheat	-	Irrigation		-
Maize	-	Irrigation		-
Horticulture	-			-
Brinjal	-	Irrigation & mulching	Irrigation & mulching	-
Tomato	-	Irrigation & mulching	Irrigation & mulching	-
Potato	-			-
Hailstorm	Not applicable			
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 & 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 subabul etc, 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	Always drink animals fresh water	Drink animals fresh or running water

	places		
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.

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	Small millets and molasses can replace cereals, mustard cake, saya bean meal cake can replace ground	Cotton seed cake, sun flower seed meal replace groundnut cake, Small millets can

	groundnut cake.	nut cake	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 sorghum 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 carbofuran 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	Disinfected fresh water should be given to birds,	Fresh water with proper disinfection with

	or tube well of higher palace should be used	bleaching powdered water can be used	carbofuran 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.