State: Bihar

Agriculture Contingency Plan for District: Rohtas

Krishi Vigyan Kendra, Bikramganj, Bihar Agricultural University, Sabour

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Northern Plain, Hot Subhumib (Dry) Eco sub region (9.2)		
	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)	Rohtas, Bojpur, Buxar, Kaimur, Aurangabad, Gaya, Jahanabad, Patna, Nawada, Nalanda, Arwal		
	Geographic coordinates of district headquarters	**Latitude**	**Longitude**	**Altitude**
		24^0 30' – $25^0$20' N	83^0 14' – $84^0$2' E	107.8 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research Sub-station, Bikramganj		
	Mention the KVK located in the district with address	KVK, Bikramganj , Rohtas, Ara Road , Bikramganj, Dist – Rohtas , Bihar , 802212		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Regional Research Sub-station, Bikramganj		

Source: DAO,Rohtas

1.2	**Rainfall**	**Normal RF(mm)** (Avg. of last 10 years)	**Normal Rainy days (number)** (Avg. of last 10 years)	**Normal Onset (specify week and month)**	**Normal Cessation (specify week and month)**
	SW monsoon (June-Sep):	624.9	41	2^{nd} week of June	2^{nd} week of October
	NE Monsoon(Oct-Dec)/ Post Monsoon	48.0	3	-	-
	Winter (Jan- March)	36.8	6	-	-
	Summer (Apr-May)	36.8	3	-	-

	Annual	746.6	53	-	-

Source – Metrology office, IRS, Bikramganj

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)	337.69	231.88	59.81	-	-	9.07	-	10.37	-	28

Source – DAO,Rohtas

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area ('000 ha)**	**Percent (%) of total**
	Old alluvium- Redddish yellow-Rellowish Brown Soils (Loamy)	102	43.9
	Old alluvium-Grey- Greyish yellow- heavy soil (Clay loam)	82	35.3
	New alluvium- Non calcareous- Non Saline – Yellowish Red soils (Sandy loam)	44	18.9

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	231.8	167.1
	Area sown more than once	155.7	
	Gross cropped area	387.6	

Source – DAO,Rohtas

1.6	**Irrigation**	Area (‘000 ha)		
	Net irrigated area	79		
	Gross irrigated area	188.46		
	Rainfed area	152.88		
	Sources of Irrigation	**Number**	**Area (‘000 ha)**	**Percentage of total irrigated area**
	Canals		161.69	85.79
	Tanks			
	Open wells			
	Bore wells		21.70	11.51
	Lift irrigation schemes		0.485	0.03
	Micro-irrigation			
	Other sources (please specify)		4.58	2.43
	Total Irrigated Area		188.46	
	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	-	-	-
	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	Rainfed	Total	Irrigated	Rainfed	Total	Summer	Grand total
	Rice	100.8	94.1	195.0	-	-	-	-	195.0
	Wheat	-	-	-	-	-	140.0	-	140.0
	Maize	-	-	1.0	-	-	-	-	1.0
	Mustard/Toria	-	-		-	-	4.5	-	4.5
	Pigeonpea	-	-	3.0	-	-		-	3.0
	Pulses	-	-	1.6	-	-	29.5	-	31.1
	Oil seed	-	-	0.7	-	-	10.9	-	11.6

Sources – DAO, Rohtas

	Horticulture crops - Fruits	Area ('000 ha)		
		Total	Irrigated	Rainfed
	Mango	5.639		
	Guava	3.204		
	Banana	0.281		
	Lemon	0.355		

	Horticulture crops - Vegetables	**Total**	**Irrigated**	**Rainfed**
	Potato	10.332		
	Onion	1.155		
	Tomato	0.803		
	Cauliflower	1.178		
	Cabbage	0.592		
	Brinjal	0.968		
	Okra	1.397		
	Medicinal and Aromatic crops	**-**	**-**	**-**
	Total are in Bihar	**Approx-5000ha**		
	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)			254.70
	Improved cattle			
	Crossbred cattle			15.343
	Non descriptive Buffaloes (local low yielding)			321.92
	Descript Buffaloes			
	Goat			195.110
	Sheep			28.789
	Other (Camel, Pig, Yak etc.)			12.53
	Commercial dairy farms (Number)			

1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**
	Commercial		315.201
	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.)

	ii) Inland (Data Source Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
		297		682		385	
	B. Culture						
				Water Spread Area		Yield (t/ha)	Production (‘000 tons)
	i) Brackish water (Data Source : MPEDA/Fisheries Department)			-		-	-
	ii) Fresh water (Data Source : Fisheries Department)			1385.00		3.2/ha	2765

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	457.08	2344					457.0	2344	
	Wheat			315.4	2253			315.4	2253	
	Maize	4.1	4100					4.1	4100	
	Mustard/ Toria			5.4	1220			5.4	1220	
	Greengram	2.0	1000			1.1	1100	3.1	1050	
	Lentil			32.0	2000			32.0	2000	
Major Horticultural crops (Crops to be identified based on total acreage)										

	Mango							52.983		
	Guava							25.992		
	Banana							11.135		
	Lemon							2.385		

Sources – DAO, Rohtas

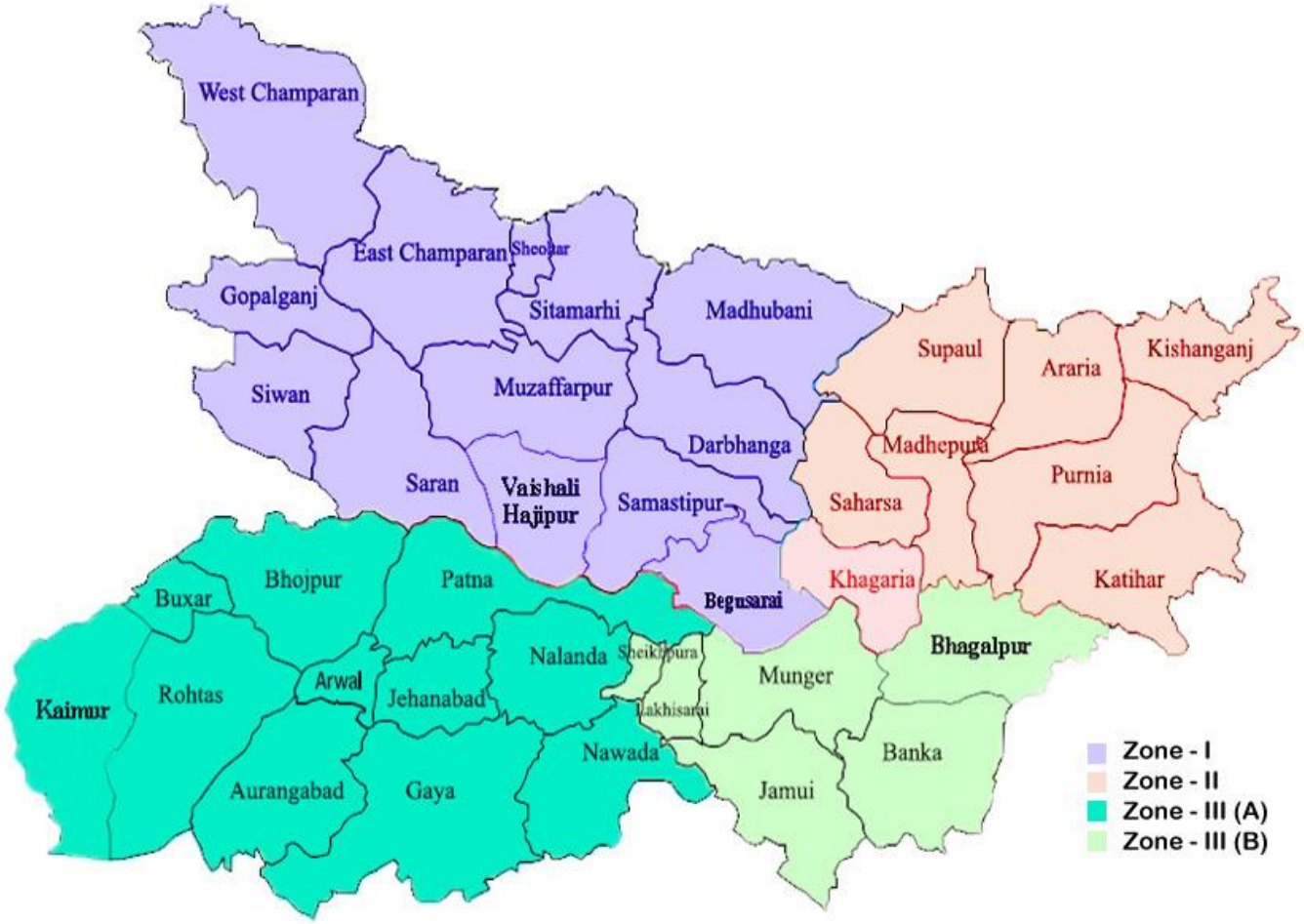
1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	**Paddy**	**Wheat**	**Maize**	**Lentil**	**Potato**
	Kharif- Rainfed		-	-	-	-
	Kharif-Irrigated	3rd week of May – 4th week of June	-	3rd week of May – 4th week of June	-	-
	Rabi- Rainfed	-	1st week of November – 3rd week of November	-	1st week of October – 2nd week of November	-
	Rabi-Irrigated	-	2nd week of November- 2nd week of December	2nd week of October – 3rd week of November	2nd week of October – 2nd week of November	3rd week of October -2nd week of November

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

Sources – DAO, Rohtas

Annexure I

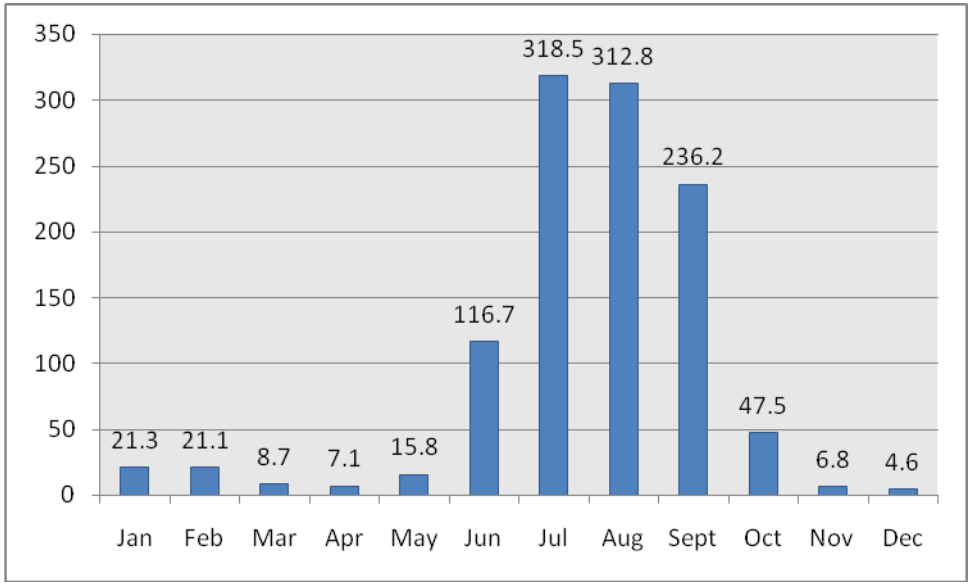
Agro climatic Zones of Bihar



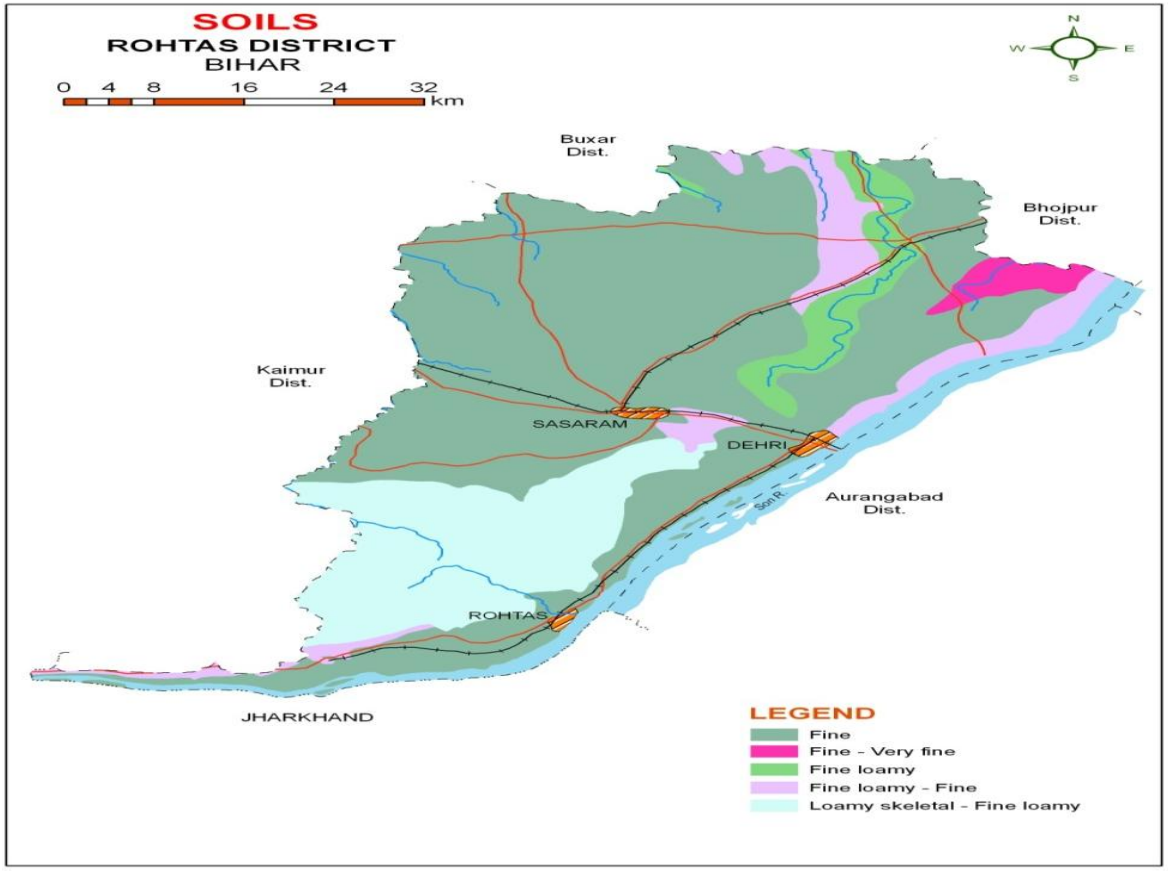
Source: krishi.bih.nic.in

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[e]**
Delay by 2 weeks 4th wk of June	Rainfed/ tube- well irrigation (Raifall: 900-1050 mm) Non calcareous, Non saline, yellowish red sandy loam soils	Paddy- Lentil Paddy – Chickpea Pigeonpea -fallow	Paddy- Lentil Paddy – Chickpea Pigeonpea – fallow Paddy- R. Bhagwati, Saroj, MTU 1010, Sahbhagi, Saket Pigeonpea – Bahar, Pusa-9, Narendra Arhar-I Chickpea- KPG 59, KWR- 108, Pusa- 372, RAU- 52 Lentil- PL-406, Malika, Arun, HUL-57	• 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. • Raise staggered community nursery preferably with medium duration varieties in mid and lowlands • Application of fertilizers especially phosphorous and potash to be ensured under late transplanted conditions in severely affected districts. • Interculture for timely weed control in direct seeded rice • Groundwater to be used	Seeds from KVK, IRS & BRU, Bikramganj , RAU, Pusa, NSC, BRBN etc.
	Medium land Rainfed/ Canal irrigation (Raifall: 900-1050 mm) Old alluvium, reddish yellow, yellowish brown, loamy soils	Paddy-Wheat Paddy- Lentil Paddy – Chickpea	Paddy – Wheat Paddy – Lentil Rice- Chickpea Mid duration Paddy up to 125-130 days Paddy- R. Bhagwati, Saroj, MTU -1010, Saket Wheat- HUW-234, HD2643, PBW 373 Chickpea- KPG 59, KWR- 108, Pusa- 372, RAU- 52 Lentil- PL-406, Malika, Arun, HUL-57		

	Low land rainfed/ canal irrigation (Raifall: 900-1050 mm) Old alluvium, reddish yellow, yellowish brown, heavy loamy soils	Paddy-Wheat Paddy- Lentil Paddy – Chickpea	Paddy – Wheat Paddy – Lentil Paddy - Chickpea Mid duration Paddy up to 125-130 days Paddy- R. Bhagwati, Saroj, MTU 1010, Saket Wheat- HUW-234, HD2643, PBW 373 Chickpea- KPG 59, KWR- 108, Pusa- 372, RAU- 52 Lentil- PL-406, Malika, Arun, HUL-57	for life saving irrigation to upland crops and transplanted 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 4 weeks **2nd week of July**	Rainfed/ tube- well irrigation (Raifall: 900-1050 mm) Non calcareous, Non saline, yellowish red sandy loam soils	Paddy- Lentil Paddy – Chickpea Pigeonpea -fallow	Paddy – Chickpea/ Lentil Pigeonpea – fallow Rice- Prefer Medium to short duration varieties like Saroj (100-110d), Birsa Dhan-201 (100-115d) Pigeonpea – Bahar, Pusa-9, Narendra Arhar-I	• 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. ▪ Drum seeding of rice ▪ Normal sowing of rice can be used with enhanced NPK to boost the early vegetative growth in late plantings under	Seeds from KVK, IRS & BRU, Bikramganj , RAU, Pusa, NSC, BRBN etc.

				sufficient moisture ▪ Interculture for timely weed control in direct seeded rice	
	Medium land Rainfed/ Canal irrigation (Raifall: 900-1050 mm) **Old alluvium, reddish yellow, yellowish brown, loamy soils**	Paddy-Wheat Paddy- Lentil Paddy – Chickpea	Paddy-Wheat Paddy- Lentil Paddy – Chickpea Mid duration Paddy up to 125-130 days Paddy - Rajendra Bhagawati, Rajendra Suwasni Rajshree, Prabhat,	• Where field is moist, direct seeding of medium duration varieties (125 days) can be done during second fortnight of July in midlands. Post-emergence herbicide application use is essential • 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. • Enhanced dose of nitrogen with full basal dose of NPK at the time of transplanting to boost the early vegetative growth in late plantings	
	Low land rainfed/ canal irrigation (Raifall: 900-1050 mm) **Old alluvium, reddish yellow, yellowish brown, heavy loamy soils**	Paddy-Wheat Paddy- Lentil Paddy – Chickpea	Paddy-Wheat Paddy- Lentil Paddy – Chickpea 130-140 days long duration variety should be selected Paddy- Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta		

				under sufficient moisture • Timely interculture for weed control in direct seeded rice • Life saving irrigation	

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**	Rainfed/ tube- well irrigation (Raifall: 900-1050 mm) Non calcareous, Non saline, yellowish red sandy loam soils	Paddy- Lentil Paddy – Chickpea Pigeonpea -fallow	Early Paddy – Lentil Early Paddy Chickpea Blackgram/ Kulthi-Wheat Blackgram- T-9, Navin, Pant Urd-30 , Pant Urd-19 Kulthi- DB-7, BR-5, BR-10, Coimbatore-1 Rice- Prefer short (early matured) varieties like Birsa Dhan 105 (85-90d), Birsa Dhan-106 (90-95d), Rajendra Bhagavathi (early-upland and midland), Dhanlaxmi, Richharia(<100d), Saroj (100-110d), Birsa Dhan-201 (100-115d), Prabhat, Turanta, Pigeonpea - Sharad, Pusa-9	• Direct seeding of Rice • Application of fertilizers especially phosphorous and potash to be ensured under late sown/ transplanted conditions in severely affected districts • Life saving irrigation	Seeds from KVK, IRS & BRU, Bikramganj , RAU, Pusa, NSC, BRBN etc.
	Medium land Rainfed/ Canal irrigation (Raifall: 900-1050 mm) Old alluvium, reddish yellow, yellowish brown, loamy soils	Paddy-Wheat Paddy- Lentil Paddy – Chickpea Paddy- MTU 7029, R. Mahsuri Wheat- HUW-234, PBW- 343	Paddy (Short duration)- Wheat/Lentil/Chickpea Blackgram/ Kulthi-Wheat Paddy- Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj Blackgram- T-9, Navin, Pant Urd-	• Mat nursery (dapog method)/ Community nursery can be raised for quick availability of young seedlings for transplanting of medium duration varieties by first fortnight of August • Direct seedling of Rice	

		Lentil- Local var., Arun Chickpea- Local var., KPG 59	30 , Pant Urd-19 Kulthi- DB-7, BR-5, BR-10, Coimbatore-1	• Raise staggered community nursery preferably with medium duration varieties in mid and lowlands • Enhanced basal dose of NPK to boost the early vegetative growth • Application of fertilizers especially phosphorous and potash to be ensured under late transplanted conditions in severely affected districts • Life saving irrigation	
	Low land rainfed/ canal irrigation (Raifall: 900-1050 mm) **Old alluvium**, **reddish yellow, yellowish brown, heavy loamy soils**	Paddy-Wheat Paddy- Lentil Paddy – Chickpea Paddy- MTU 7029, R. Mahsuri Wheat- HUW-234, PBW- 343 Lentil- Local var., Arun Chickpea- Local var., KPG 59	Paddy (Short Duration)-Wheat Paddy -Vegetable Paddy- Pulses Paddy -Oilseed Paddy- Rajshree, Santosh , Sita Rajendra Suwasni, Rajendra Sweta If dry spell continues, direct seeding of short duration rice varieties (100 days) can be done in midlands by first fortnight of August and extra short duration (70-75 days) up to 25th August Rice (Short Duration)-Wheat Rice- Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj	• Mat nursery (dapog method)/ Community nursery can be raised for quick availability of young seedlings for transplanting of medium duration varieties by first fortnight of August • Direct seedling of Rice • Raise staggered community nursery preferably with medium duration varieties in mid and lowlands • Enhanced basal dose of NPK to boost the early vegetative growth • Application of fertilizers especially phosphorous and potash to be ensured under late transplanted conditions in severely affected districts • Life saving irrigation	

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	Rainfed/ tube- well irrigation (Raifall: 900-1050 mm) Non calcareous, Non saline, yellowish red sandy loam soils	Paddy- Lentil Paddy – Chickpea Pigeonpea -fallow	Early paddy – Sept. Pigeonpea Late wheat- Vegetable pulses oilseed Paddy- Prabhat, Dhanlaxmi, Richharia, Turanta, Late Wheat – HUW-234, DBW-14, HP-1744, HD- 2643 Sept. Pigeonpea –Pusa-9, Sharad Blackgram - T-9, Navin, Pant Urd-30 , Pant, Urd-19 Sesame : Krishna, Pragati Mustard- 66-197-3, Rajendra Sarson-I	• Use of 20 days old Dapog seedling in paddy • Direct seeding of rice/ Drum seedling • Moisture conservation • Inter cultivation • Life saving irrigation to paddy nursery raised • Zero tillage wheat to makeup the time after paddy • Sowing of *rabi* crops such as Wheat, Lentil, Chickpea, Pea, Mustard (Pusa Mahak, RAU TS17), Linseed (Garima) and Vegetables	Seeds from KVK, IRS & BRU, Bikramganj , RAU, Pusa, NSC, BRBN etc.
	Medium land Rainfed/ Canal irrigation (Raifall: 900-1050 mm) Old alluvium, reddish yellow, yellowish brown, loamy soils	Paddy-Wheat Paddy- Lentil Paddy – Chickpea	Sesame –Rabi maize Sesame-Late Wheat Sesame – Krishna, Pragati Rabi Maize- Saktiman-1,2, 3,4, Laxmi, Deoki, Rajendra Hybrid-1,2 Direct seeded rice (DSR) with short duration (80-90 days) varieties (Turanta dhan, Prabhat, Anjali, Vandana, CR-Dhan-40 etc.)	• Use of 20 days old Dapog seedling in paddy • Direct seeding of rice • Mat nursery (dapog method)/ Community nursery can be raised for quick availability of young seedlings for transplanting of medium duration varieties by first fortnight of August • Use of 20 days old dapog seedling in rice. • Enhanced basal dose of NPK in	

			can be taken up in midlands till the end of August subject to availability of at least one assured irrigation Early Rice-Prabhat, Dhanlaxmi, Richharia, Turanta	rice to boost early vegetative growth • Zero for wheat to make up the time after paddy • Life saving irrigation to paddy nursery raised • Supply of contingency crop seeds of Toria, Maize (QPM varieties, Swann composite-65-70 days; HM-4 hybrid baby corn), Arhar (Bahar, NDA1, Pusa 9), Urd (Navin and T9), Cowpea and Horsegram need to be ensured for taking up of sowing in September in midlands • Fodder varieties of Jowar, Maize, Bajra in combination with legumes (cowpea and horsegram) can be taken up wherever feasible to meet the fodder requirements in deficit rainfall districts	
	Low land rainfed/ canal irrigation (Raifall: 900-1050 mm) Old alluvium, reddish yellow, yellowish brown, heavy loamy soils	Paddy-Wheat Paddy- Lentil Paddy – Chickpea	Rice / Sesame –Rabi maize Sesame-Late Wheat Sesame – Krishna, Pragati Rabi Maize- Saktiman-1,2, 3, 4, Laxmi, Deoki, Rice- Prabhat, Dhanlaxmi, Richharia, Turanta	• Application of organic manure and vermicompost initially for paddy and other crops • Normal practices for sesame, Pigeonpea ▪ Weeding ▪ Life saving irrigation	

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. **1st week of July**	Rainfall: 900-1050 mm Rainfed/tube- well irrigation Non calcareous, Non saline, yellowish red soil, sandy loam surface texture	Paddy- Lentil Paddy – Chickpea Pigeonpea -fallow Paddy- MTU 7029 Pigeonpea –Local var., Bahar Lentil- Local var., Arun Chickpea- Local var, KPG 59	• Gap filling of existing crop • Thinning	• Inter culturing • Mulching • Conservation tillage • Life saving irrigation	Seeds from KVK, IRS & BRU, Bikramganj , RAU, Pusa, NSC, BRBN etc.
	Medium land Rainfall: 900-1050 mm Canal irrigation Old alluvium, reddish yellow, yellowish brown, loamy surface texture	Paddy-Wheat Paddy- Lentil Paddy – Chickpea Paddy- MTU 7029, R. Mahsuri Wheat- HUW-234, PBW- 343 Lentil- Local var., Arun Chickpea- Local var., KPG 59	• Gap filling		
	Low land Rainfall: 900-1050 mm Canal irrigation Old alluvium, reddish yellow, yellowish brown, heavy loamy surface texture	Paddy-Wheat Paddy- Lentil Paddy – Chickpea Paddy- MTU 7029, R. Mahsuri Wheat- HUW-234, PBW- 343 Lentil- Local var., Arun Chickpea- Local var.,	• Gap filling through dapog nursery	• Mulching • Application of potassium fertilizer must at final land preparation • Interculture • Conservation tillage • Life saving irrigation	

		KPG 59			

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	Rainfall: 900-1050 mm Rainfed/tube- well irrigation Non calcareous, Non saline, yellowish red soil, sandy loam surface texture	Paddy- Lentil Paddy – Chickpea Pigeonpea -fallow Paddy- MTU 7029 Pigeonpea –Local var., Bahar Lentil- Local var., Arun Chickpea- Local var., KPG 59	• Gap filling of existing crop • Postponement of top dressing	• Inter culturing • Mulching • Conservation tillage • Foliar application of 2% MOP • Life saving irrigation	
	Medium land Raifall: 900-1050 mm **Canal irrigation** **Old alluvium, reddish yellow, yellowish brown, loamy surface texture**	Paddy-Wheat Paddy- Lentil Paddy – Chickpea Paddy- MTU 7029, R. Mahsuri Wheat- HUW-234, PBW- 343 Lentil- Local var., Arun Chickpea- Local var., KPG 59	• Gap filling of existing crop • Postponement of top dressing		
	Low land Rainfall: 900-1050 mm	Paddy-Wheat Paddy- Lentil Paddy – Chickpea Paddy- MTU 7029,	• Gap filling of existing crop • Postponement of top dressing		

	Canal irrigation **Old alluvium**, **reddish yellow, yellowish brown, heavy loamy surface texture**	R. Mahsuri Wheat- HUW-234, PBW- 343 Lentil- Local var., Arun Chickpea- Local var., KPG 59			

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	Rainfall: 900-1050 mm Rainfed/tube- well irrigation Non calcareous, Non saline, yellowish red soil, sandy loam surface texture	Paddy- Lentil Paddy – Chickpea Pigeonpea -fallow Paddy- MTU 7029 Pigeonpea –Local var., Bahar Lentil- Local var., Arun Chickpea- Local var., KPG 59	• Postponement of top dressing of nutrients	• Interculture • Mulching • Conservation tillage • Life saving irrigation • Foliar application of 2% MOP	
	Medium land Rainfall: 900-1050 mm Canal irrigation Old alluvium, reddish yellow, yellowish brown, loamy surface texture	Paddy-Wheat Paddy- Lentil Paddy – Chickpea Paddy- MTU 7029, R. Mahsuri Wheat- HUW-234, PBW- 343 Lentil- Local var., Arun Chickpea- Local var., KPG 59	• IPM practices • Clipping of maize leaves		
	Low land Rainfall: 900-1050	Paddy-Wheat Paddy- Lentil	• If paddy crop withers & gets damaged plan to sow		

	mm Canal irrigation Old alluvium, reddish yellow, yellowish brown, heavy loamy surface texture	Paddy – Chickpea Paddy- MTU 7029, R. Mahsuri Wheat- HUW-234, PBW- 343 Lentil- Local var., Arun Chickpea- Local var., KPG 59	Blackgram/Sesame-Wheat should be followed		

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**
	Rainfall: 900-1050 mm **Rainfed/tube- well irrigation** **Non calcareous, Non saline, yellowish red soil, sandy loam surface texture**	Paddy- Lentil Paddy – Chickpea Pigeonpea -fallow Paddy- MTU 7029 Pigeonpea –Local var., Bahar Lentil- Local var., Arun Chickpea- Local var., KPG 59	• Foliar application of 2% MOP • Mulching • Life saving irrigation	• Open the furrow during evening and left furrow open overnight and plank in the next morning before sunrise for growing of early rabi crops like wheat, Rabi Maize/Pulses /Oilseeds/ Vegetables • Stored water to be used at critical stage of growth • To clean irrigation channel for preventing loss of moisture through seepage	Seeds from KVK, IRS & BRU, Bikramganj , RAU, Pusa, NSC, BRBN etc.
	Medium land Raifall: 900-1050 mm **Canal irrigation** **Old alluvium, reddish yellow, yellowish brown, loamy surface**	Paddy-Wheat Paddy- Lentil Paddy – Chickpea Paddy- MTU 7029, R. Mahsuri Wheat- HUW-234, PBW- 343 Lentil- Local var., Arun Chickpea- Local var., KPG 59	• Foliar application of 2% MOP • Mulching • Life saving irrigation	• Open the furrow during evening and left furrow open overnight and plank in the next morning before sunrise for growing of early rabi crops like wheat, Rabi Maize/Pulses /Oilseeds/ Vegetables • Stored water to be used at critical stage of growth • To clean irrigation channel for	Seeds from KVK, IRS & BRU, Bikramganj , RAU, Pusa, NSC, BRBN etc.

	texture			preventing loss of moisture through seepage	
	Low land **Rainfall: 900-1050 mm** **Canal irrigation** **Old alluvium, reddish yellow, yellowish brown, heavy loamy surface texture**	Paddy-Wheat Paddy- Lentil Paddy – Chickpea Paddy- MTU 7029, R. Mahsuri Wheat- HUW-234, PBW- 343 Lentil- Local var., Arun Chickpea- Local var., KPG 59	• Foliar application of 2% MOP • Mulching • Life saving irrigation	• Open the furrow during evening and left furrow open overnight and plank in the next morning before sunrise for growing of early rabi crops like wheat, Rabi Maize/Pulses /Oilseeds/ Vegetables • Stored water to be used at critical stage of growth • To clean irrigation channel for preventing loss of moisture through seepage	Seeds from KVK, IRS & BRU, Bikramganj , RAU, Pusa, NSC, BRBN etc.

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	**Rainfall: 900-1050 mm** **Rainfed/tube- well irrigation** **Non calcareous, Non saline, yellowish red soil, sandy loam surface texture**	Paddy- Lentil/ Paddy – Chickpea/ Pigeonpea -fallow	-	-	-
	Medium land **Rainfall: 900-1050 mm** **Canal irrigation**	Rice- wheat Paddy – Chickpea/ Rice- Lentil	Short duration paddy-Wheat Paddy- Saket, Santosh , Rajendra	• Dapog nursery for rice • Direct seedling of rice • Application of organic manure and vermicompost • Mulching	Seeds from KVK, IRS & BRU, Bikramganj , RAU, Pusa, NSC, BRBN etc.

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Old alluvium, reddish yellow, yellowish brown, loamy surface texture		Suwasni, Rajendra Sweta, MTU1010 Wheat- HUW-234, HD2643, PBW 373	• Life saving irrigation at critical stages •	
	Low land **Rainfall: 900-1050 mm** **Canal irrigation** **Old alluvium, reddish yellow, yellowish brown, heavy loamy surface texture**	Rice- wheat Paddy – Chickpea/ Rice- Lentil	Short to medium duration paddy-Wheat Paddy- Saket, Santosh , Rajendra Suwasni, Rajendra Sweta, MTU1010 Wheat- HUW-234, HD2643, PBW 373	• Dapog nursery for rice • Direct seedling of rice • Application of organic manure and vermicompost • Mulching • Life saving irrigation at critical stages •	

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	Rainfall: 900-1050 mm Rainfed/tube- well irrigation Non calcareous, Non saline, yellowish red soil, sandy loam surface texture	Paddy- Lentil/ Paddy – Chickpea/ Pigeonpea -fallow	Not applicable		Seeds from KVK, IRS & BRU, Bikramganj , RAU, Pusa, NSC, BRBN etc.
	Medium land	Rice- wheat	Short – medium duration	• Dapog nursery for rice	Seeds from KVK,

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Rainfall: 900-1050 mm Canal irrigation Old alluvium, reddish yellow, yellowish brown, loamy surface texture	Paddy – Chickpea/ Rice-Lentil/ Rice- Chickpea	paddy-Wheat Paddy- Saket, Santosh , Rajendra Suwasni, Rajendra Sweta, MTU1010 Wheat- HUW-234, HD2643, PBW 373	• Direct seedling of rice • Mulching • Application of organic manure and vermicompost • Life saving irrigation	IRS & BRU, Bikramganj , RAU, Pusa, NSC, BRBN etc.
	Low land Rainfall: 900-1050 mm Canal irrigation Old alluvium, reddish yellow, yellowish brown, heavy loamy surface texture	Rice- wheat/ Paddy – Chickpea/ Rice- Lentil	Short duration paddy-Wheat Paddy- Saket, Santosh , Rajendra Suwasni, Rajendra Sweta, MTU1010 Wheat- HUW-234, HD2643, PBW 373	• Dapog nursery for rice • Direct seedling of rice • Life saving irrigation • Spray of potassic fertilizer with adjuvant • Mulching • Application of organic manure and vermicompost	Seeds from KVK, IRS & BRU, Bikramganj , RAU, Pusa, NSC, BRBN etc.

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	**Rainfall: 900-1050 mm** **Rainfed/tube- well irrigation** **Non calcareous,**	Paddy- Lentil Paddy – Chickpea Pigeonpea -fallow	Not applicable		

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Non saline, yellowish red soil, sandy loam surface texture				
	Medium land Rainfall: 900-1050 mm **Canal irrigation** **Old alluvium, reddish yellow, yellowish brown, loamy surface texture**	Rice- wheat/ Rice- Lentil/ Rice- Chickpea	Blackgram- wheat Wheat- HUW-234, PBW- 343, PBW 373, HD 2643 Blackgram- T-9	• Life saving irrigation • Folair spray with 2% potassic fertilizer with adjuvant • Mulching • Application of organic manure and vermicompost	Seeds from KVK, IRS & BRU, Bikramganj , RAU, Pusa, NSC, BRBN etc.
			Maize- Lentil Maize: Shatiman 1 &2, Suwan, Ganga-11 Lentil- PL-406, Malika, Arun, HUL-57	• Life saving irrigation • Folair spray with 2% potassic fertilizer with adjuvant • Mulching • Thinning • Application of organic manure and vermicompost	
			Kulthi- Chickpea Chickpea- KPG 59, KWR-108, Pusa- 372, RAU- 52 Kulthi- DB-7, BR-5, BR-10		
	Low land Rainfall: 900-1050 mm **Canal irrigation** **Old alluvium, reddish yellow,**	Rice- wheat Paddy – Chickpea	Blackgram- wheat Wheat- HUW-234, PBW- 343, PBW 373, HD 2643 Blackgram- T-9,	• Application of organic manure and vermicompost • Mulching • Life saving irrigation	Seeds from KVK, IRS & BRU, Bikramganj , RAU, Pusa, NSC, BRBN etc.

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	yellowish brown, heavy loamy surface texture	Rice- Lentil	Maize- Lentil Maize: Shatiman 1 &2, Suwan, Ganga-11 Lentil- PL-406, Malika, Arun, HUL-57		
		Rice- Chickpea	Kulthi- Chickpea Chickpea- KPG 59, KWR-108, Pusa- 372, RAU- 52 Kulthi- DB-7, BR-5, BR-10		

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	Not applicable			
	Medium Land				
	Low land				
Insufficient groundwater recharge due to low rainfall					
Any other condition (specify)					

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 management • Retransplanting through Dapog nursery if needed • Gap filling • Resowing through drum seeder	• Drainage management • Subsequently crop if totally damaged i.e. Toria	• Drainage management • Subsequent crop if totally damaged • Harvest at physiological maturity	Storage at safer place
Maize	• Drainage management • Gap filling • Resowing, if completely damaged	• Drainage management • Alternative maize or other rabi crop if totally damaged	• Drainage management • Subsequent if totally damaged • Harvest at physiological maturity	Storage at safer place
Pigeonpea	• Drainage management • September sowing if Khrif Pigeonpea is completely damaged • Gap filling if needed	• Drainage management • Alternative maize or other rabi crop if totally damaged	• Drainage management • Subsequent if totally damaged • Harvest at physiological maturity	Storage at safer place
Vegetable	• Resowing , if required • Replanting	• Drainage management	• Drainage management	Storage at safer place
Horticulture				
Mango	• Drainage management • Replanting if completely damaged • Gap filling	• Drainage management	• Drenching with copper fungicides • Drainage management • Harvesting at proper maturity	
Papaya	• Drainage management • Replanting, if completely damaged	• Drainage management	• Drainage management • Spray and pasting of trunk	
Heavy rainfall with high speed winds in a short span[2]				

Paddy	• Drainage management • Replanting if completely damaged • Gap filling if needed	• Drainage management • Subsequent crop if totally damaged i.e. Toria	• Drainage management • Subsequent crop if totally damaged	Storage at safer place
Maize	• Resowing If completely damaged • Gap filling if needed • Drainage management	• Drainage management • Alternative maize or other crop if totally damaged	• Drainage management • Subsequent crop if totally damaged	Storage at safer place
Pegeonpea	• Resowing If completely damaged • Gap filling if needed • Drainage management	• Drainage management • Alternative crop if totally damaged	• Drainage management • Alternative crop if totally damaged	Storage at safer place
Vegetable	▪ Drainage management ▪ Gap filling	• Drainage management	• Drainage management • Drenching with copper fungicide	
Horticulture				
Mango	• Drainage management • Replanting if substantially damaged	• Drainage management • Drenching with copper fungicides	• Drainage management • Harvest at proper time	
Guava	• Drainage management • Replanting if substantially damaged	• Drainage management • Drenching with copper fungicides	• Drainage management • Harvest at proper time	
Outbreak of pests and diseases due to unseasonal rains				
Paddy	• Seedling treatment with Carbendazin + imidachloroprid • Spray of pesticides with adjuvant	• Spray of specific pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	Storage at safer place
Maize	• Application of granular insecticides viz. Thimet 10 g/Carbofuran 3g in whorl of maize	• Spray of specific pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	Storage at safer place
Pigeonpea	• Use of pesticides	• Spray of specific pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	Storage at safer place
Vegetable	• Drainage management • Spraying of insecticide & fungicide	• Spray of specific pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	Safe storage & transportation

Horticulture				
Mango	• Spray of pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	
Guava	• Spray of pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	

2.3 Floods

Condition	**Suggested contingency measure**			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Water logging/Partial inundation	Seedling/ Nursery stage	Vegetative stage	Reproductive stage	At harvest
Paddy For such situation var. like Swarna-Sub-I & local var. of Desaria Barogar etc. should be taken	• Drainage management • Re transplanting through Dapog nursery if completely damaged • Gap filling	• Drainage management • Alternative crops if totally damaged • Gap filling • 40-45 days old seedlings may be used • Kharuhan (double transplanting)	• Drainage management • Harvest at physiological maturity • Lentil as paira crop can be taken	Storage at safer place
Maize	• Drainage management • Re sowing if substantially damaged • Gap filling, if needed	• Drainage management • Alternative crops if totally damaged like maize or subsequent crop i.e. Toria	• Drainage management • Harvest at physiological maturity	Storage at safer place
Pigeon pea	• Drainage management • Re sowing if substantially damaged • Gap filling if needed	• Drainage management • Any rabi crop can e taken, if completely damaged	• Drainage management • Harvest at physiological maturity	Storage at safer place
Horticulture				
Mango	• Replanting if substantially damaged • Gap filling	• Drenching with copper fungicides • Drainage management	• Drenching with copper fungicides • Drainage management	

	• Drainage management			
Guava	• Replanting if substantially damaged • Gap filling • Drainage management	• Drenching with copper fungicides • Drainage management	• Drenching with copper fungicides • Drainage management	
Continuous submergence for more than 2 days[2]				
Rice (for such situation Swarna Sub-1 should be grown)	• Gap filling, if needed • Re-sowing if damaged after receding of flood	• Replanting through Kharuhan (double transplanting) by 3-4 seedlings per hill • Short duration rice variety	• Toria/Late wheat if completely damaged	Storage at safer place
Maize	• Re-sowing if damaged after receding of flood	• Resowing or gap filling as the case may be	• Toria/Late wheat if completely damaged	Storage at safer place
Horticulture				
Mango	Drainage management			
Guava				
Sea water intrusion[3]	**Not Applicable**			

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

Extreme event type	**Suggested contingency measure[r]**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave				
Paddy , Maize, Pigeonpea	Life saving irrigation	Life saving irrigation	Life saving irrigation	-
Wheat	-	-	Life saving irrigation (Terminal heat)	-
Horticulture				
Mango, Papaya	Life saving irrigation	Life saving irrigation	Life saving irrigation	
Cold wave				
Wheat, Maize, Mustard , Potato , Pulses				
		Irrigation, interculture and use as mulch with uprooted weeds		

Horticulture				
Bhindi, Brinjal , Chili, Tomato, Lauki		Irrigation, interculture and use as mulch with uprooted weeds		
Frost				
Wheat , Gram , Redgram, Lentil		Irrigation, interculture and use as mulch with uprooted weeds		
Horticulture				
Bhindi	Treat the seeds in 0.2% soln of Dithane M-45	Irrigation, interculture and use as mulch with uprooted weeds		
Brinjal				
Chilli				
Tomato & Potato	Treat the seeds in 0.2% soln of Dithane M-45	Earth 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
Hailstorm	Not applicable			
Cyclone	Not applicable			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event[s]	**During the event**	**After the event**
Drought			
Feed and fodder availability			
Drinking water			
Health and disease management			
Floods			

Feed and fodder availability	**1. Cultivation of fodder tree** **2. Storage of Improved Quality Fodder** **3. Conservation & Storage of** • **Feed & Fodder** • **Hay & Silage: —** Preserve the fodder in the form of hay from Berseem & other grasses as well as silage from (a) Maize- harvesting at well developed cob. (b) Jowar - at flowering stage. (c) Oat (d) Hybrid Napier – 40-45 day old. (e) Water hycianth mixing with Paddy straw in ratio of 4:1 with 70 kg molasses /ton of clean water hycianth. (f) Potato leaves mixing with wheat straw in ratio of 7:1 and should be supplemented with 3% molasses. **Hay: –** • Berseem/Lucerne and other grasses. • Bales of hay and other dry fodder should be stored in dry places at a height of last flood level and covered with asbestos sheet or polythene sheet. **4. Development & storage of: –** (a) Complete Feed Block (CFB) (b) Urea-Molasses-Mineral-Block (U.M.M.B) **5.** Development of Fodder Bank	**1. Feeding of Complete Feed Block** **2. Feeding of** Urea-Molasses-Mineral-Block **& Fodder** **3. Feeding of stored Hay/Silage/Improved Quality Fodder** **4. Feeding of Tree leaves some of which are as follows:** **1.** Bamboo leaves **2.** Neem **3.** Bargad 4. Peepal 5. Seesam 6. Subabul Use of unconventional feed stuff: (i) Aquatic Plants – water hycianth (i) Lotus (ii) Aquatic weeds	**Production of forage crops** **1. Balanced feeding of Animal supported with little higher concentrate mixture** **2. Cultivation of fodder** Rabi maize if water stagnated upto Nov/ December **3.** Jowar/Cowpea **4.** Maize in September
Drinking water			
Health and disease management	**Veterinary Preparedness with Medicines, Vaccines and provision for mobile ambulatory van.** • **Vaccination** During flood stress becomes an incriminating factor for the precipitation of diseases in livestock and poultry. So, necessary vaccination of livestock and poultry should be done against economically important contagious disease.	**Animal safety, Health camp and Treatment** **Important Suggestions for animal and Poultry safety** During flood, all efforts should be made to rescue most of the livestock and poultry as carefully as possible.	**Sanitation, deworming, treatment, health camps Culling of Sick animals and disposal of carcass** **Maintenance of Sanitation:** Adequate attention is to be paid to disinfect the premises of

	This will be helpful not only to check epidemic in animals, but also to reduce the probability of zoonoses in human beings. Care should be taken for mass vaccination of livestock and poultry with a view to covering 80% of livestock population in order to achieve herd immunity. Mass vaccination should be conducted by a team of Department staff with proper maintenance of detailed Inoculation Register. Pro-active steps should be taken to receive and stock the required doses of vaccines against different diseases for their use in face of Flood.	The people should be made conscious through announcement with the help of mikes or other means of communication, so that they may escape with their livestock and poultry to safe area. The fisherman or the people who knows swimming should be deputed for the rescue of drowning and floating animals and birds. During flood do not leave halter or headstalls on animals. Do not tie animals together when releasing. Report the location, identification and disposition of livestock and poultry to authorities handling the disaster. **Health camp and treatment** Water borne diseases are one of the most common phenomena during the flood Diarrhoeal diseases outbreaks can Report the location, identification and disposition of livestock and poulrty to authorities handling the disaster. **Health camp and treatment** Water borne diseases are one of the most common phenomena during the flood	temporary sheds with the help of bleaching powder, phenol, carbolic acid etc. In no case the carcass/ cadaver should come in contact with healthy animals rehabilitated in sheds. Arrangements should be made accordingly. **De-worming after the flood:** Immediately after flood, the animals like cattle, buffalo. Sheep, goat, pig, dog and poultry need to be de-wormed with suitable broad spectrum anthelmentics. This will enable the animals to regain proper health. In water logged area, sucks can be introduced as biological control measures against snails to protect livestock from parasitec disease. **Treatment of sick animals:** The **Disposal of Carcass:** the disposal of dead animals and birds are to be done by Animal Husbandry Department. Accordingly, necessary arrangement should be made for prompt and easy disposal of carcasses during the Flood and Post-Flood period.

		Diarrhoeal diseases outbreaks can occur after drinking contaminated water. Diseases that can occur during flood should be given special attention and accordingly medicines should be available in the health camp for the following mentioned diseases. **Salmonella spp.** **Escherichia coli** **Giardiasis** **Amoebiasis** **Rotavirus** **Leptospirosis** **Scabies** **Black leg** **Malignant Edema** **Foot rot** **Anthrax** **Botulism** **Tetanus** **Red water** **Black disease** **Entertoxemia** **Liver fluke** **Amphistomiasis** **Brooders pnemonia** **Treatment of Non infectious** Arrangement should be made for the treatment of drowning and traumatic injuries, aspiration pneumonia, lameness and other surgical cases in the health camp. **Disinfection of livestock premises**	Carcasses of animals affected by the disease are the chief source of soil infection. They harbour the germs in large numbers and liberate them from both artificial and natural body openings into the surrounding soil. **Methods of Carcass disposal to be adopted** **Burial** **Burning** **Composting** **Vulturing** **s. Health Camp after the flood:** Protection of livestock from out breaking and communicable diseases be made. Health camps are to be organised in Flood affected areas to restore the normal breeding capability of breedable population as well as to restore the normal health of livestock and poultry.

		and Poultry shed Disinfection of livestock premises and the temporary sheds should be done with the help of bleaching powder, phenol, carbolic acid etc	
Cyclone			
Feed and fodder availability			
Drinking water			
Health and disease management			
Heat wave and cold wave			
Shelter/environment management			
Health and disease management			

[s] based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			**Convergence/linkages with ongoing programs, if any**
	Before the event[a]	**During the event**	**After the event**	
Drought				
Shortage of feed ingredients				
Drinking water				
Health and disease management				
Floods				

Shortage of feed ingredients				
Drinking water				
Health and disease management	**Vaccines to be used for different animals and Poultry** **Cattle and Buffalo** Hemorrhagic SepticemiaVaccine Black Quarter Vaccine FMD Vaccine Anthrax Vaccine as per endemicity. **Sheep and Goat** Hemorrhagic Septicemia Vaccine PPR Vaccine FMD Vaccine Goat pox Vaccine Enterotoxemia Vaccine Anthrax Vaccine as per endemicity **Pigs** Hemorrhagic Septicemia Vaccine PPR Vaccine FMD Vaccine Goat pox Vaccine Enterotoxemia Vaccine Anthrax Vaccine as per endemicity. **Dogs** Rabies Vaccine **Poultry** Mareks disease vaccine RDV (F_1 & R_2B), FPV, IBRV & IBDV **(Annexure-1)** • **Medicines**			

	All Districts should be earmarked for flood. An inventory of required medicines to treat the affected livestock in case of eventualities should be made. The Govt. should take steps to procure sufficient quantity of essential life saving medicines. **List of life saving Medicines** Corticosteroids Nikethamide Antibloat Adrenaline Antihistaminic Antidotes for common poisoning Antisnake venom Broad spectrum antibiotics Anti-inflammatory Antipyretic and Analgesics Fluids and Electrolytes • **Mobile Veterinary Clinics** Mobile Veterinary Clinics should be kept ready at Veterinary Hospital or Veterinary Camps so that immediate treatment of injured and affected animals may be done. For this MVC must have adequate drugs like antibiotic, analgesic, dewormer, ointment, antisnake venom and emergency health care facilities along with trained personnel. A good no. of mobile clinic teams should be planned consisting dedicated and experienced technical workers with allotment of area of operation. The teams should be kept in readiness **having required stock of medicines and equipment** to work in any adverse situation.			

	A telephone directory should be maintained at the District level by collecting the telephone nos. of Vets, Para-Vets, NGOs / youth clubs / societies, volunteers etc. to collect feedback and plan the activities during the emergency. An emergency kit for poultry should be made ready well in advance. The Poultry kit should have Cage, mask, mash, pellet feed trough, waterers, detergents, poultry vaccines, Veterinary drugs, workers protection uniform etc.			
Cyclone				
Shortage of feed ingredients				
Drinking water				
Health and disease management				
Heat wave and cold wave				
Shelter/environment management				
Health and disease management				

[a] based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event[a]	**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	(i) Thinning of population (ii) Arrangement of water supply from external resource	(i) Partial harvesting (ii) Addition of water (iii) Stocking of air breathing fishes	(i) Maintenances of remaining stock till favorable condition achieved (ii) If not feasible, total harvesting or transfer of fishes may be done. (iii) Preparation of the pond for next crop.
(ii) Impact of salt load build up in ponds / change in water quality	(i) Regular monitoring of water quality parameter. (ii) Arrangement of aeration (iii) Addition of water from external resource	(i) Arrangement of aeration. (ii) Addition of water (iii) Monitoring of water quality (iv) Reduction of manuring according to water level.	
(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	(i) Elevation/ Renovation of pond dyke. (ii) Sale of Table/marketable size fishes (iii) construction of earthen nursery ponds in upland areas	Collection of naturally bred seeds (Spawn /fry /fingerling) from flooded water Stocking in nursery ponds for rearing	-Retain the water in pond immediately after flood through repairing of damaged dyke etc. -Netting of pond -Removal of unwanted, predatory/weed fishes -Sell of large size fishes

(ii) Water contamination and changes in water quality	Arrangement of regular water quality monitoring		
(iii) Health and diseases	(a) Use lime/ potassium permanganate (b) Arrangement of CIFAX and medicines & chemical stock		-Sampling of fishes and water for disease analysis - Liming, use of drugs/ medicine if required in consultancy of fisheries experts
(iv) Loss of stock and inputs (feed, chemicals etc)	Raising the height of dyke by fencing with net and bamboo poles to prevent loss of stock	Arrangement of advance size fingerling/ yearlings for stocking	Stocking of large size fingerlings carp Fertilization of pond and regular feeding of fish Harvesting and sale of fish
(v) Infrastructure damage (pumps, aerators, huts etc)	Repairing/ arrangement of alternate safe place to keep pumps aerators etc.	A regular water on the flood and infrastructure facilities.	Re establishment of the infra structural facility.
(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/huts etc)			
(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