State-BIHAR

Agriculture Contingency Plan for District: KAIMUR (Bhabua)

1.0 District Agriculture profile				
1.1	Agro-Climatic / Ecological Zone			
	Agro Ecological Sub Region (ICAR)	Northern Plain, Hot Subhumid (Dry) Eco-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)	Zone-III (Rohtas, Bhojpur, Buxer, Bhabua, Arwal, Patna, Nalanda, Nawada, Sheikhpura, Jahanabad, Aurangabad, Gaya, Munger, Bhagalpur, Banka, Jamui, Lakhisarai		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		25-26^{0}N	83-84^0 E	1800 ft
	Name and address of concerned ZRS/ZARS/RARS/RRS/RRTTS	ZARS, Irrigation Research Centre, Bikramganj, Dist.-Rohtas		
	Mention the KVK located in the district with address	Krishi Vigyan Kendra, Kaimur, Village & Post-Adhaura, Dist.-Kaimur, Bihar, Pin-821116		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Rajendra Agricultural University, Pusa, Samastipur		

1.2	**Rainfall**	**Normal RF (mm)**	**Normal Onset**	**Normal Cessation**
	SW monsoon (June-Sep)	1004.4	3rd week of July	3rd week of September
	NE Monsoon (Oct-Dec)	67.8	1st week of October	
	Winter (Jan-Feb)	46.2		
	Summer (March-May)	45.9		
	Annual	1164.3		

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)	340.4	176.7	96.1	33.2	3.8	14.7	1.5	2.6	8.3	3.1

1.4	**Major Soils**	Area (‘000 ha)	Percent (%) of total
	1. Clay loan soils	80.5	45.6
	2. Sandy loam soils	54.5	30.8
	3. Red Laterite soils	41.6	23.5

1.5	**Agricultural land use**	Area (‘000 ha)	Cropping intensity (%)
	Net sown area	176.7	136.4
	Area sown more than once	64.3	
	Gross cropped area	241.0	

1.6	**Irrigation**	Area (‘000 ha)		
	Net irrigation area	71.7		
	Gross irrigated area	81.6		
	Rainfed area	95.1		
	Sources of Irrigation	Number	Area (‘000 ha)	Percentage of total irrigated area
	Canals	01	55.7	68.3
	Tanks	270	1.0	1.3
	Open wells	6505	0.058	0.07
	Bore wells	18095	9.8	12.1
	Lift irrigation schemes	34	1.01	1.23

	Micro-irrigation	22	0.7	0.85
	Other sources (please specify)		2.45	3.0
	Total Irrigated Area			
	Pump sets	13180		
	No. of Tractors	2275		
	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	06		
	Safe	05		
	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 (as per figures of 2009-10)

1.7	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			**Rabi**				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand Total**
	Rice			81.7					81.7
	Wheat						68.4		68.4
	Lentil						4.8		4.8
	Chickpea						6.4		6.4
	Linseed						1.4		1.4
	Mustard						1.4		1.4
	Maize			0.079					0.079
	Greengram							0.75	0.75

	Horticulture crops-Fruits	**Area ('000 ha) 2010-11**		
		Total	**Irrigated**	**Rainfed**
	Mango	3.37		
	Guava	1.36		
	Aonla	0.04		
	Lemon	0.27		
	Banana	0.21		
	Horticulture crops-Vegetables	**Total**	**Irrigated**	**Rainfed**
	Potato	4.18		
	Onion	0.88		
	Tomato	0.58		
	Cauliflower	0.77		
	Cabbage	0.44		
	Brinjal	0.69		
	Okra	0.85		
	Chilli	0.40		
	Medicinal and Aromatic crops	**Total (year 2009-10)**	**Irrigated**	**Rainfed**
	Japanese Mint	0.005	0.005	
	Satawar	0.012	0.010	0.002
	Tuberose	0.003	0.003	
	Plantation crops	**Total**	**Irrigated**	**Rainfed**
	Siris	50.5		50.5
	Fodder crops	**Total**	**Irrigated**	**Rainfed**
	Berseem	1.050	1.050	
	Oat	0.005	0.005	
	Total fodder crop area			
	Grazing land	3.8	0.029	3.829
	Sericulture etc	0.001		0.001

1.8	**Livestock**	**Male ('000)**	**Female ('000)**			**Total ('000)**
	Non descriptive Cattle (local low yielding)	130.5	64.6			195.1
	Improved cattle	5	6			11
	Crossbred cattle	0.042	3.5			3.5
	Non descriptive Buffaloes (local low yielding)	5	80			85
	Descript Buffaloes		25			25
	Goat	40	50			90
	Sheep	18	17.5			35.5
	Others (Camel, Pig, Yak etc.)	4	5			9
	Commercial dairy farms (Number)					0.035
1.9	Poultry	**No. of farms**	**Total No. of Birds ('000)**			
	Commercial	150	125			
	Backyard	1500	15			
1.10	Fisheries (Data source: Chief Planning Officer)					
	A. Capture					
	i) **Marine** (Data Source: Fisheries Department)	**No. of fishermen**	**Boats**		**Nets**	**Storage facilities (Ice plants etc.)**
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)
	ii) **Inland** (Data Source: Fisheries Department)	**No. of farmers owned ponds**	**No. of Reservoirs**		**No. of village tanks**	
		300	40		40	
	B. Culture					
		Water Spread Area (ha)	**Yield (t/ha)**		**Production ('000 tons)**	
	i) **Brackish water** (Data Source:MPRDA/Fisheries Department)					
	ii) **Fresh water** (Data Source: Fisheries Department)	2469	3.2		2469	

1.11 Production and Productivity of major crops (2006-2010)

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 identified based on total acreage)										
	Rice	382.9	3450					382.9	3450	400
	Wheat			199.7	2570			199.7	2570	200
	Lentil			7.9	885			7.9	885	8
	Chickpea			9.2	990			9.2	990	9
	Linseed			3.7	775			3.7	775	
Major Horticultural Crops (Crops identified based on total acreage)										
	Potato			115.6	18500			115.6	18500	
	Tomato	39.9	10500					39.9	10500	
	Brinjal	24.8	10800					24.8	10800	
	Okra	15.1	10100					15.1	10100	
	Cucurbits	10.3	10300					10.3	10300	

1.12	Sowing window for 5 major field crops (Start and end of normal sowing period)	Rice	Wheat	Chickpea	Linseed	Potato
	Kharif-Rainfed	4th week of June-2nd week of July	-	-	-	-
	Kharif – Irrigated	4th week of May-3rd week of June	-	-	-	-
	Rabi-Rainfed	-	2nd week of October-4th week of October	2nd week of October-4th week of October	2nd week of October-3rd week of October	-
	Rabi-Irrigated	-	2nd week of November-2nd week of December	4th week of October-2nd week of November	3rd week of October-2nd week of November	4th week of October-2nd week of November

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		✓	

1.14	**Include Digital maps of the district for**	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

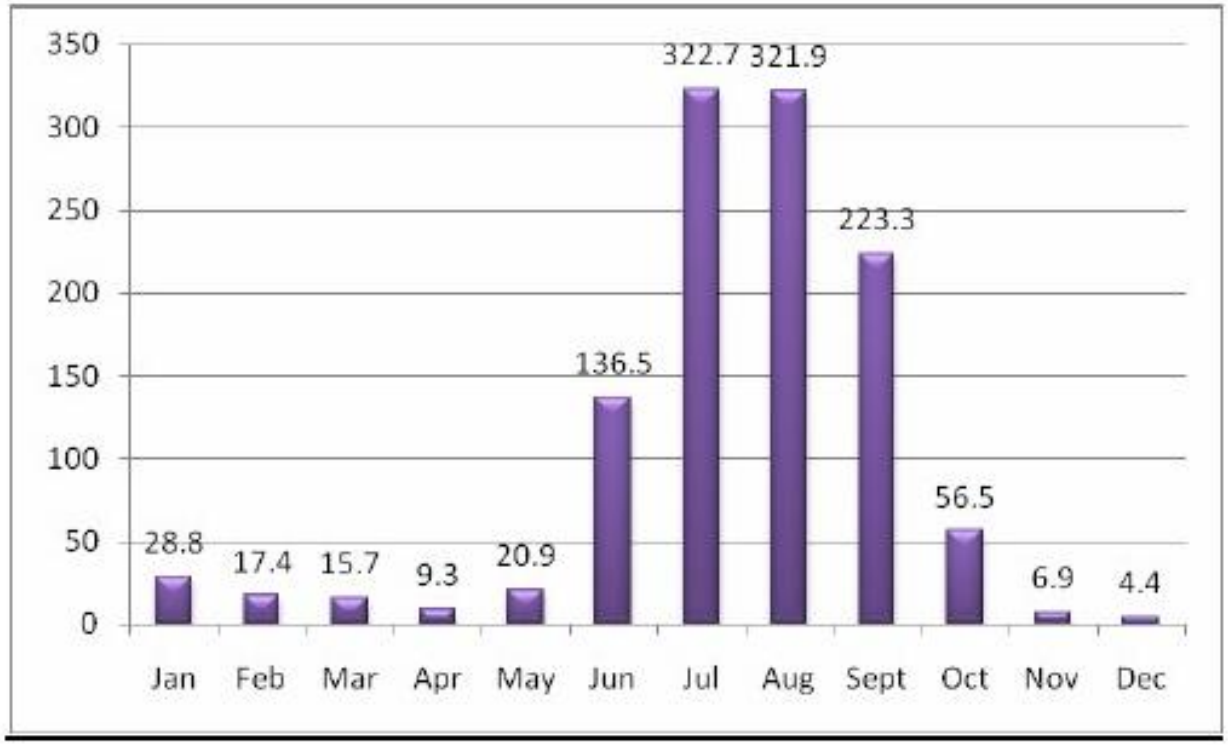
Annexure-I

Agro climatic Zones of Bihar

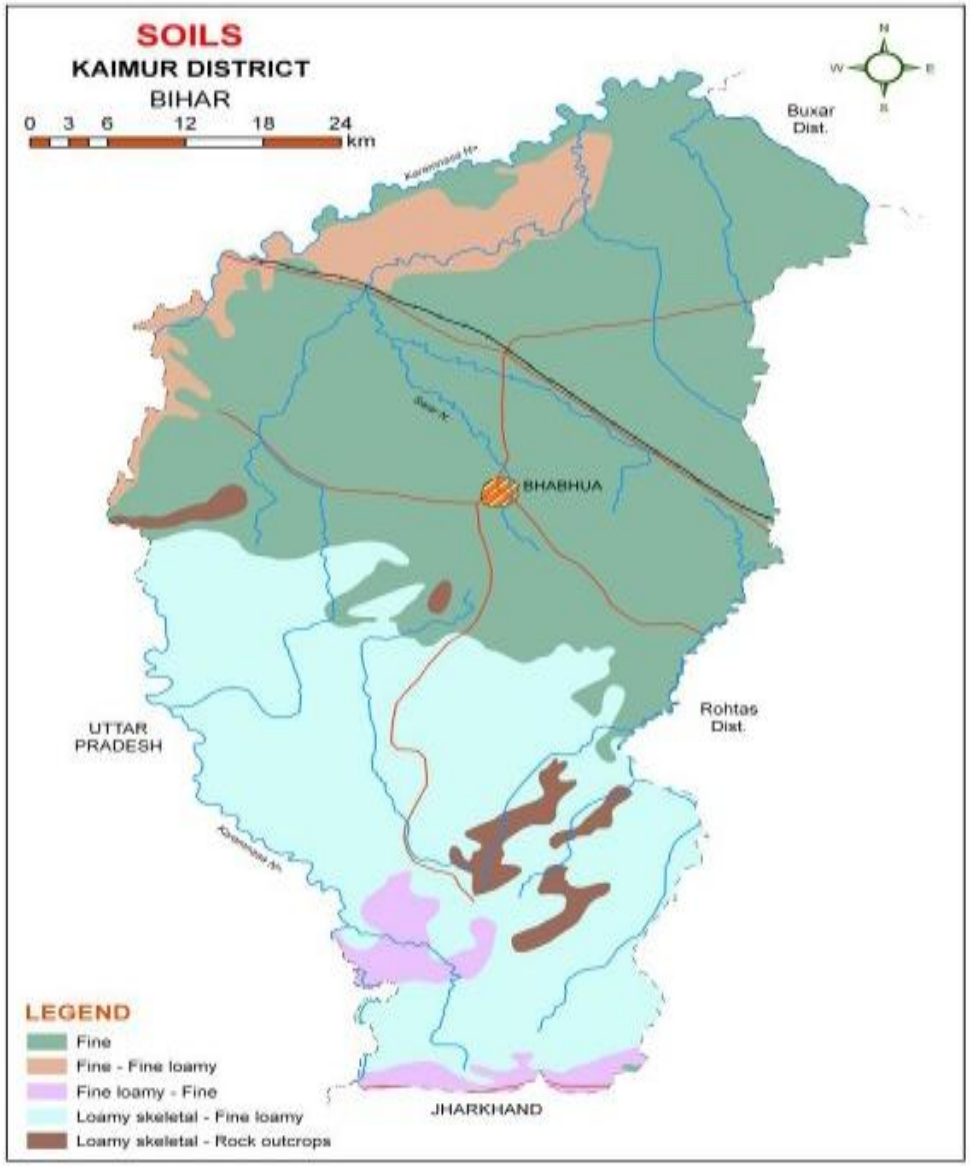
Source: krishi.bih.nic.in

Annexure-II

Mean Annual Rainfall (mm)



Annexure-III



Source: NBSS&LUP, 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 Implementa-tion**
Delay by 2 weeks 1st week of August	Upland Shallow red soils	Pigeon pea-Fallow	Pigeonpea-ML-13, Narendra, Arhar-1, IPL-3, IPL-203, Groundnut (K-,6, Dharani)	• Line sowing • Balance doze of fertilizer	-
		Fallow-Wheat/Chickpea Blackgram/Greengram/ Lentil/Linseed	Black gram Black gram-Pant Urd-19 Narendra Urd, Green gram-IPM-2,3	-	
		Rice-Lentil/Chickpea	Early Rice-Lentil/Chickpea Prefer medium to long duration varieties (Lentil-HUL-57, Chickpea-JAKI-9218)	• 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	
	Medium land Fine loamy soils	Rice- Wheat	Rice-Wheat Rice-Rajendra Bhagwati, Abhishek, Sugandha-2/3,Sita, Sarju-52, PRH-10, P-6444, Wheat-K-307, CBW-38, PBW-343, K-1006		
	Lowland Clay loamy soils	Rice-Wheat	Rice-Wheat Rice-R.Mansoori-1, MTU-7029, Sugandha, Rajendra Sweta, SwarnaSub.-1		

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 4 weeks 3rd week of August	Upland Shallow red soils	Rice-Wheat	Short duration Rice-Wheat Rice-Turanta, Vandana, Lalat, Sahbhagi, Prabhjat, Pusa-2-21	• Direct seeding of Rice • Application of fertilizers especially phosphorous and potash to be ensured under late transplanted conditions.	Seed from KVK, Adhaura, RAU, BAU, Pusa, BRBN, BHU, NSC
		Fallow-Wheat/Lentil/Chickpea/ Mustard/Linseed	Dhaicha (Green manuring)-Wheat/Lentil/Chickpea/Mustard/ Linseed Dhaicha-Punjab Dhaicha-1, Jahirabad-2, Local		
	Medium land Fine loamy soils	Rice-Wheat	Maize-Wheat Maize-Shaktiman-1,2,3,4,5, Suwan, Devaki, Ganga-11	• Apply full basal dose of NPK • Planting of Maize through dibbling method	
		Rice-Wheat	Short duration Rice-Wheat Short duration Rice-R. Bhagwati, Prabhat, PRH-10, R. Subhasini	• 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 lowland.	
	Lowland Clay loamy soils	Rice-Wheat	Medium duration Rice-Wheat, Rice-R.Sweta, Sita Rajshree		

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/Cropping system**	**Change in crop/cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks 1st week of September	Upland Shallow red soils	Fallow-Lentil/Chickpea/Linseed/ Mustard	Niger-Lentil	• Balance use of fertilizer	Seed from KVK, Adhaura, RAU, Pusa BRBN, BHU, NSC, AICRP
		Pigeon pea-Fallow	Pigeon pea-Fallow, Pigeonpea-M-13. IPA-203	Adopt seed rate@20 kg/ha	
	Medium land Fine loamy soils	Rice-Wheat	Rice-Wheat, Rice-Hira, Turanta	• Direct seed of Rice • Application for fertilizers especially phosphorous and potash to be ensured under late transplanted conditions • Life saving irrigation	
		Rice-Wheat	Black gram/Green gram-Wheat Blackgram-PantU-19 & 31, T-9 Greengran-HUM-12. HUM-16	-	
		Rice-Wheat	Tomato-Wheat Tomato-Kashi Amrit, Swarna, Vaibhav, Swarn Lalima, DVRT-2	-	
	Lowland Clay loamy soils	Rice-Wheat	Short duration Rice-Wheat Rice-Hira, Turanta, Vandana	• Application of organic manure and vermi compost initially for Rice and other crops. • Fodder varieties of Jowar, Maize, Bajra in combination with legumes (cowpea and horse gram) can be taken up wherever feasible to meet the fodder requirements in deficit rainfall districts.	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/Cropping system**	**Change in crop/cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks 3rd week of September	Upland Shallow red soils	Fallow-Wheat	Urd-31, Naveen	• Life saving irrigation	Seed from KVK, Adhaura, RAU, Pusa BRBN, BHU, NSC
		Fallow-Lentil/Chickpea	Black gram/Green gram-Lentil/Chickpea Black gram- T-9, PantU-19, Pant	Adopt seed rate@20 kg/ha	
	Medium land Fine loamy soils	Fallow-Wheat	Sep. Pigeon pea-Fallow Sep. Pigeonpea-P-9, Sharad, Narendra Arhar-1	• Light irrigation at critical stage.	
		Fallow-Lentil/Chickpea	Black gram/Green gram-Lentil/Chickpea Black gram- T-9, PantU-19, Pant Urd-31	-	
		Fallow-Wheat	Tomato-Maize Tomato-Kashi Amrit, Swarna, Vaibhav, Swarn Lalima, DVRT-2, Maize-Hybrid Kanchan.	-	

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.	Upland Shallow red soils	Rice-Lentil/Chickpea	• Re-transplanting of short duration Rice in case of heavy loss • Gap filling • Life saving irrigation	• Mulching through mechanical weeding	Seed from RAU, Pusa NSC, TDC
	Medium land Fine loamy soils	Rice-Wheat			
	Lowland Clay loamy soils	Rice- Wheat			

Condition			Suggested Contingency measures		
Mid season drought (Long dry spell, consecutve-2 week 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	Upland Shallow red soils	Rice-Lentil/Chickpea	• Gap filling • Postpone the top dressing	• Mulching • Life saving irrigation	Seed from RAU, Pusa NSC, TDC
	Lowland Clay loamy soils	Rice-Wheat			

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 Shallow red soils	Rice-Lentil/Gram/Linseed	-	• Mulching • Life saving irrigation	Seed from RAU, Pusa NSC, TDC
	Midland Fine loamy soils	Rice-Wheat	-		
	Lowland Clay loamy soils	Rice-Wheat	-		
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 Shallow red soils	Rice-Lentil/Chickpea	• Mulching • Foliar application of 2% MOP • Life saving irrigation	• Open the furrow during evening and left the furrow open overnight & plank in the next morning before sunrise for growing of early Rabi crops like Toria, Lentil & Chickpea	
	Midland Fine loamy soils	Rice-Wheat			
	Lowland Clay loamy soils	Rice-Wheat			

2.1.2 Drought - Irrigation 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 in low rainfall	Midland Fine loamy soils	Rice-Wheat	Rice-Wheat Medium duration Rice: R. Bhagwati, R.Sweta, Sarju-52	• Life saving irrigation • Mulching	
	Lowland Clay loamy soils	Rice-Wheat			

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 in low rainfall	Midland Fine loamy soils	Rice-Wheat	Rice-Wheat Medium duration Rice: R. Bhagwati, R.Sweta, Sarju-52	• Life saving irrigation • Mulching	
	Lowland Clay loamy soils	Rice-Wheat			

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 on set of monsoon in catchment	Midland & Lowland	Rice-Wheat	Black gram/Green gram-Wheat Blackgram-T-9, Pant U-19, Pant U-30, Greengram-HUM-12, HUM-16	• Life saving irrigation	

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	Not Applicable				

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	Pigeon pea-Fallow Pigeonpea-P-9, Mal.-13, N. Pegeonpea-1	Sprinkler irrigation system	
		Rice-Wheat	Short duration Rice-Mustard Rice-Turanta, Vandana, Prabhat	• Organic manure & Vermi-compost application • Direct seeding of rice • Sprinkler irrigation system	
			Short duration Rice-Lentil		
			Rice-Turanta, Vandana, Prabhat		

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 management • Gap filling	• Drainage management • Subsequently crop if totally damaged i.e. Toria	• Drainage management • Subsequent crop if total damaged • Harvest at physiological maturity	i) Storage at safer place ii) Moisture level should be 9-10%
Pigeon pea	• Drainage management • September sowing in Kharif Pegeon pea is completely damaged • Gap filling needed	• Drainage management • Alternative Rabi crop (OLS & PLS if totally damaged	• Drainage management • Harvest at physiological maturity	Storage at safer place
Heavy rainfall with high speed winds in a short span[2]				
Rice	• Drainage management • 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
Pigeon pea	• Drainage management • September sowing in Kharif Arhar is completely damaged • Gap filling in needed	• Drainage management • Alternative Rabi crops (OLS & PLS) if totally damaged	• Drainage management • Harvest at physiological maturity	Storage at safer place
Outbreak of pests and diseases due to unseasonal rains				
Rice	• Seedling treatment with granular insecticide- Cartap hydrochloride Or phorate 10G or	• Use cropper fungicides against Bacterial leaf blight. • Split application of N	• Harvest at physiological maturity	Proper drying and safe storage

	carbofuran 3G • Maintain shallow water in nursery beds • Providing good drainage.	fertilizer (3-4 times)		
Pigeon pea	Pigeon pea	• Provide drainage • Seed treatment with 1g carbendizim + 2g thiram/kg seed.	• Provide drainage	Provide drainage

2.3 Floods

Condition	**Suggested contingency measure**			
Transient water logging/partial inundation	**Seedling/nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Rice	• 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 for transplanting • Kharuhan (double transplanting)	• Drainage management • Harvest at physiological maturity • Lentil as paira crop can be taken	Storage at safer place
Continuous submergence for more than 2 days[2]				
Rice	• 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

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				
Pigeon pea				
Wheat				
Horticulture				
Mango	Provide irrigation	Provide irrigation	Provide irrigation, Mulching	
Papaya	Provide irrigation	Provide irrigation	Provide irrigation, Mulching	
Cold wave				
Wheat		Provide irrigation, Mulching		
Mustard		Provide irrigation, Mulching		
Pulses		Provide irrigation, Mulching		
Frost				
Wheat		Provide irrigation, Mulching		
Pigeon pea		Provide irrigation, Mulching		
Lentil		Provide irrigation, Mulching		
Horticulture				
Tomato & Potato		Earth up to 15 cm ht. provide irrigation, mulching		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	1. Cultivation of fodder tree 2. Storage of improved Quality Fodder	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 5. Azolla feeding with concentrates	Production of forage crops 1. Balanced feeding of Animal supported with little higher concentrate mixture 2. Jowar / Cowpea 3. Maize in September 4. Berseem in Nov.-Dec. 5. Napier / Para grass
Drinking water, Culling of sick animals and disposal of carcass	Repairing of water storage tank, tube-well, hand pump, well etc. for water availability	1) To ensure drinking water (electrolyte, Gur, Salt added water) to avoid dehydration in animals 2) To provide anti-stress drugs in drinking water to build up resistance to animals	After drought adliv water and medicines should be given to animals to prevent disease in rainy season
Health and disease management	Veterinary preparedness with Medicines, Vaccines and provision for mobile ambulatory van * Vaccination Mass vaccination should be conducted by a team of Department staff with proper maintenance of detailed Inoculation	Health camp and treatment Diseases that can occur during drought by drinking contaminated water should be given special attention and accordingly medicines should be available in the heath camp for the following mentioned	Sanitation, deworming, treatment, health camps <u>Maintenance of Sanitation</u> : 1) Well ventilated animal shed should be created 2) Proper disposal of urine and cow-dung to avoid contamination

	Register. Vaccines to be used for different animals <u>Cattle and Buffalo</u> Hemorrhagic Septicemia Vaccine Black Quarter Vaccine FMD Vaccine Anthrax Vaccine as per endemicity <u>Sheep and Goat</u> Hemorrhagic Septicemia Vaccine PPR Vaccine FMD vaccine Goat pox vaccine Enterotoxemia Vaccine Anthrax Vaccine as per endemicity <u>Pigs</u> Hemorrhagic Septicemia Vaccine PPR Vaccine FMD Vaccine Goat pox Vaccine Enterotoxemia Vaccine Anthrax Vaccine as per endemicity <u>Dogs</u> Rabies Vaccine List of life saving Medicines Corticosteroids Nikethamide Antiblat Adrenaline Antihistaminic Antidotes for common poisoning Antisnake venom Broad spectrum antibiotics Anti-inflammatory Antipyretic and Analgesics	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 pneumonia <u>Treatment of Non-infectious</u> 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	3) Disinfect the premises by application of bleaching powder <u>De-worming</u> : To control ticks infestation in animals <u>Health Camp after the drought</u> : Protection of livestock from out breaking and communicable diseases be made. Health camps are to be organised in drought affected areas to restore the normal breeding capacity of breedable population as well as to restore the normal health of livestock .

	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 emergencies.		
Flood			
Cyclone			
Heat wave and cold wave			

* based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			Convergence / linkages with ongoing programmes, if any
	Before the event*	During the event	After the event	
Drought				
Shortage of feed ingredients				
Drinking water				
Health and disease management	Vaccines to be used Mareks disease vaccine RDV (F1 & R2B) FPV, IBRV & IBDV	Vaccines to be used Mareks disease vaccine RDV (F1 & R2B) FPV, IBRV & IBDV	Vaccines to be used Mareks disease vaccine RDV (F1 & R2B) FPV, IBRV & IBDV	
Floods				
Cyclone				
Heat wave and cold wave				

* Based on forewarning wherever available

2.5.3 Fisheries / Aquaculture

	Suggested contingency measures		
	Before the event*	During the event	After the event
1) Drought			
A. Capture			
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) Maintenance of remaining stock till favorable condition achieved (ii) If not feasible, total harvesting or transfer of fishes may be done. Preparation of 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.	
2) Floods			
3) Cyclone / Tsunami			
4) Heat wave and cold wave			

* Based on forewarning wherever available