

State: Bihar

Agriculture Contingency Plan for District: Katihar

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Sub Region (ICAR)	Humid Eco-system (13.1)		
	Agro-Climatic Zone (Planning Commission)	Mid Gangetic plane Region (IV)		
	Agro Climatic Zone (NARP)	Zone-II		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Saharsa, Supoul, Madhepura, Purnea , Kishanganj, Araria, Katihar, Khagaria,		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		250 30 N	870 40 E	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research Sub-station, Saharsha		
	Mention the KVK located in the district with address	Katihar, P.O. - Tingachiya		
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 Rainy days (number)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	1059.8	38	2 nd week of June	3 rd week of October
	NE Monsoon(Oct-Dec):	98.7	16		

	Winter (Jan- March)	33.3	4	-	-
	Summer (Apr-May)	106.0	6	-	-
	Annual	1297.8 MM	64.0	-	-

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)	291.349	146.927	1.785	39.591	0.282	0.812	10.753	22.289	40.962	9.038

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))*	Area ('000 ha)	Percent (%) of total
	Sandy to Sandy loam	NA	
	Clay soil in deep water logged area	NA	
	Gangetic alluvial soil in Diara area	NA	

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	146.927	169%
	Area sown more than once	100.826	
	Gross cropped area	247.753	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	123.71		
	Gross irrigated area			
	Rainfed area	23.217		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	Not available	NA	NA

Tanks	102		NA	NA
Open wells	69		NA	NA
Bore wells	32		NA	NA
Lift irrigation schemes			NA	NA
Micro-irrigation			NA	NA
Other sources (please specify)			NA	NA
Total Irrigated Area			NA	NA
Pump sets	117112		NA	NA
No. of Tractors			NA	NA
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	16	100%		
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)							Grand total
		<i>Kharif</i>			<i>Rabi</i>			Summer	
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
Rice	52.000	26.000	78.000			NA		78.000	
Maize			NA	22.600		22.600	0	22.600	

	Wheat			NA	31.800		31.800	0	31.800
	Pigeonpea	0.120		0.120			NA	0	0.120
	Mustard			NA	9.820		9.820	0	9.820
	Lentil/Pulses	0.450		0.450			NA	0	0.450

	Plantation crops	Total	Irrigated	Rainfed
NA				
	Fodder crops	Total	Irrigated	Rainfed
NA				
	Total fodder crop area			
	Grazing land			
	Sericulture etc			

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	149.242	242.304	391.546
	Improved cattle			
	Crossbred cattle	0.705	7.036	7.741
	Non descriptive Buffaloes (local low yielding)	19.161	57.573	70.734
	Descript Buffaloes			
	Goat	143.991	301.870	445.861

	Sheep	2.597	4.103	6.700			
	Others (Camel, Pig, Yak etc.)						
	Commercial dairy farms (Number)						
1.9	Poultry	No. of farms	Total No. of birds ('000)				
	Commercial		1122.122				
	Backyard						
1.10	Fisheries (Data source: Chief Planning Officer)						
	A. Capture						
	i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
		1445	1657	212			
	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)		4175.89	3.2	8.643		
	Others						

1.11 Production and Productivity of major crops (2008-9)

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	

										fodder (‘000 tons)
Major Field crops (Crops to be identified based on total acreage)										
	Rice	0.168	2100	0	0	0	0	0.168	2100	
	Maize	0	0	0.156	6500	0	0	0.156	6500	
	Wheat	0	0	59.5	1700	0	0	59.5	1700	
	Pigeonpea	1.616	800			0	0	1.616	800	
	Mustard	0	0	8.838	900	0	0	8.838	900	
	Pulses	0	0	0.329	700	0	0	0.329	700	
Major Horticultural crops (Crops to be identified based on total acreage)										
NA										

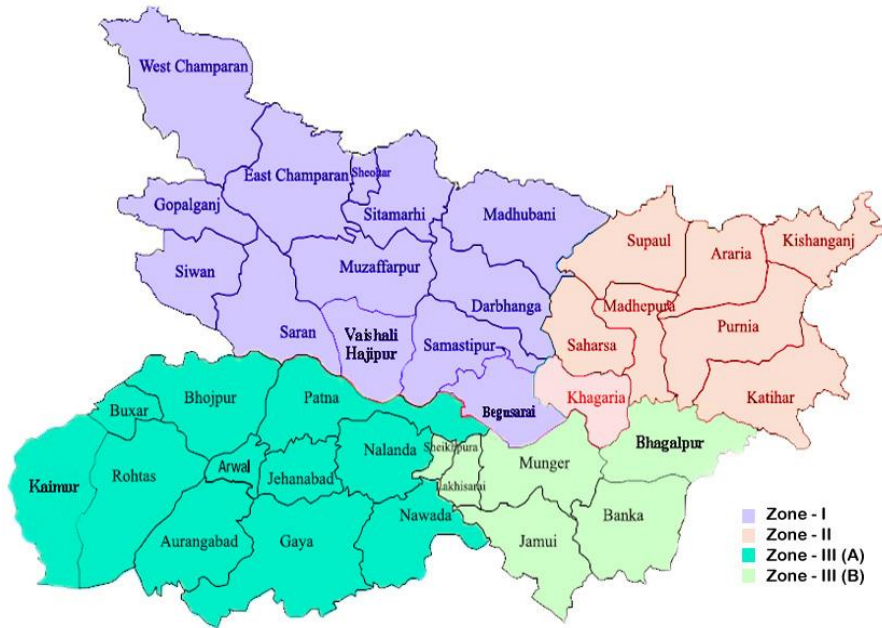
1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Rice	Wheat	Maize	Potato	Jute
	Kharif- Rainfed	4 th week of May to 3 rd week of July				3 rd week of March to 3 rd week of April
	Kharif-Irrigated					
	Rabi- Rainfed					
	Rabi-Irrigated		3 rd week of November to 3 rd week of December	4 th week of October to 3 rd week of November	4 th week of October to 3 rd 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 (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

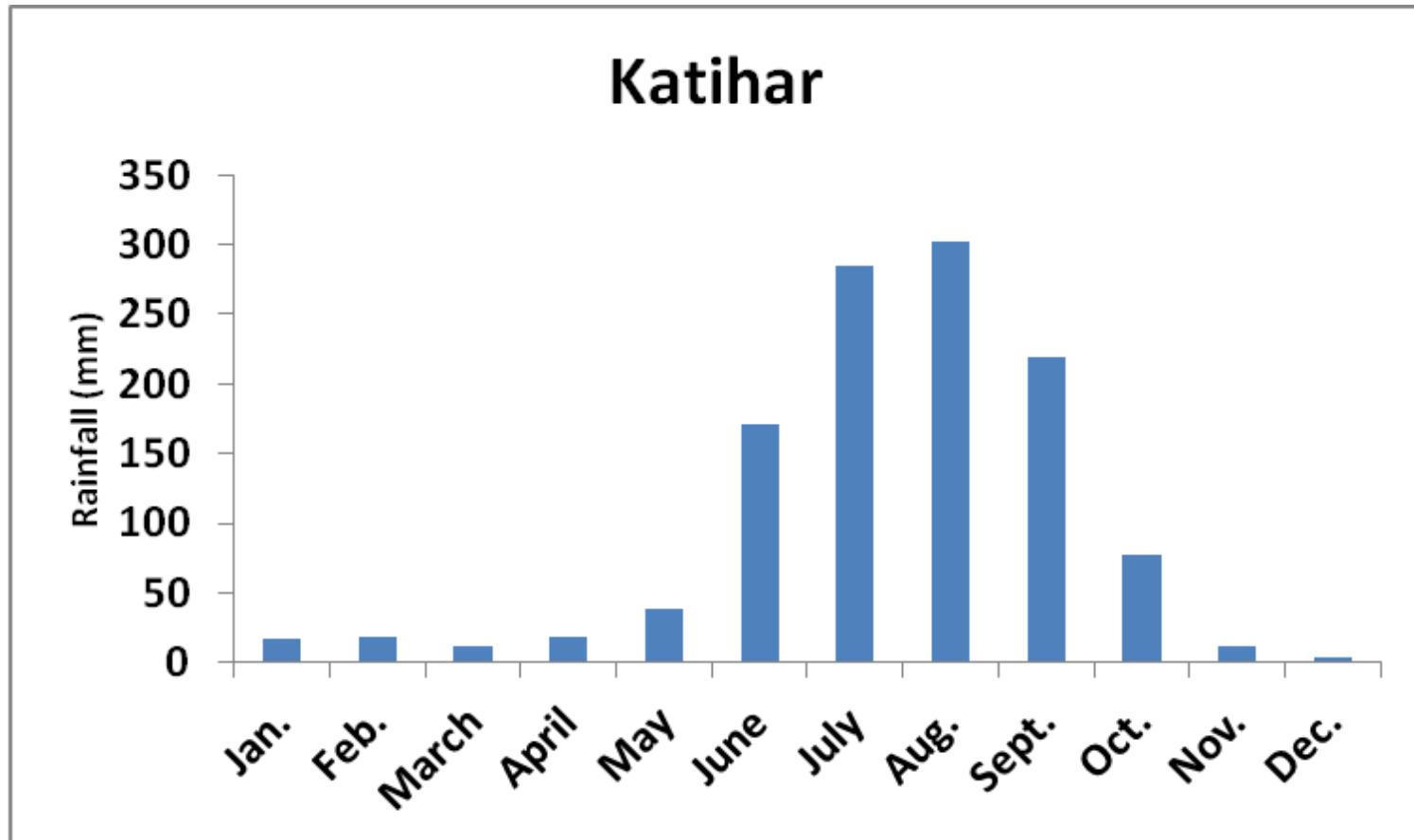
Annexure I

Agro climatic Zones of Bihar

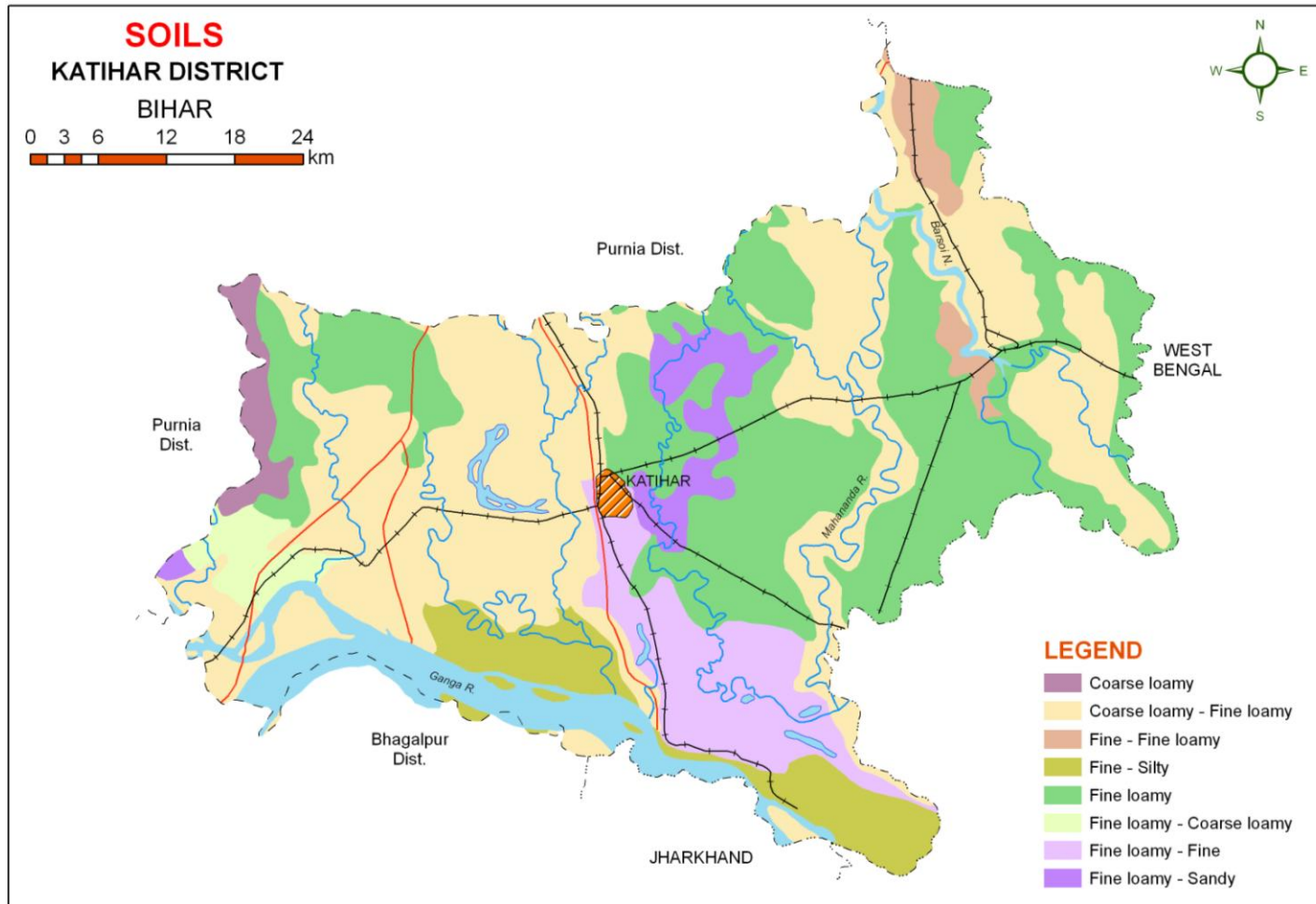


Source: krishi.bih.nic.in

Annexure-II



Annexure-III



Source : NBSS& LUP, Regional Centre, Kolkata

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation ^a	Normal Crop / Cropping system ^b	Suggested Contingency measures		
			Change in crop / cropping system ^c including variety	Agronomic measures ^d	Remarks on Implementation ^e
Early season drought (delayed onset) Delay by 2 weeks (Specify month)* 4 th week of June	Upland	Rice-Wheat	Early Rice – Wheat Rice: Prabhat, Dhanlaxmi, Richharia, Turanta Wheat: HD-2733, PBW-343, PBW-502	• Normal package of practices	Seeds from BRBN, BAU, Sabour, NSC, TDC
	Medium Land	Rice- Wheat	Rice-Wheat Rice-Rajendra Suwasni,pusa 834,Rajshree.R.kasturi,R.sweta Wheat : HD-2733, PBW-443, PBW-502		
	Lowland	Rice- Wheat	Rice – Wheat Rice:Rajshree, Santosh , Rajendra Mahsoori, BPT5204,Swarna Sub 1. Wheat: HD-2733, PBW-443, PBW-502		
		Jute – Maize	Jute: JRO-128, Devki		
Delay by 4 weeks (Specify month)	Upland	Rice- Wheat	Short duration Rice-Wheat Rice:Prabhat, Dhanlaxmi,	▪ Old age 30-35 day seedlings of early rice variety may	Seeds from BRBN, BAU, Sabour, NSC,

2 nd week of July			Richharia, Turanta Wheat: HD-2733, PBW-443, PBW-502	also be using 3-4 seedlings/hill. ▪ 20 days Dapog seedling can be used in rice Direct seeding of rice	TDC
	Medium land	Rice – Wheat	Rice-Wheat Rice: Rajendra Bhagawati, Rajendra Suwasni Wheat: HD-2733, PBW-443, PBW-502 Rajshree, Prabhat	▪ Old age 30-35 day seedlings of early rice variety may also be using 3-4 seedlings/hill. ▪ 20 days Dapog seedling can be used in rice	
	Lowland	Rice – Wheat Jute- Boro rice	Rice – Wheat Rice: Rajshree, Santosh , Sita Rajendra Suwasni.	• Old age rice seedling of 30-35 days may be used with three seedling per hill with close spacing	

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Change in crop/cropping system ^c	Agronomic measures ^d	Remarks on Implementation ^e
Early season drought (delayed onset)					
Delay by 6 weeks (Specify month)	Upland	Rice-Wheat	Short duration Rice – Wheat Rice: Prabhat, Dhanlaxmi, Richharia, Turanta, R.bhagwati Wheat: HD-2733, PBW-443, HP-1731	<ul style="list-style-type: none"> • Direct seeding of rice • Dapog seedling can be used • Drum seeding/Zero tillage for rice & wheat respectively to makeup the 	Seeds from BRBN, BAU, Sabour, NSC, TDC

				time	
	Medium land	Rice – Wheat	Rice -Wheat Blackgram/ Horsegram- Wheat Wheat: HD-2733, PBW-443, PBW-502 Blackgram : T-9, Navin, Pant.U-31, Pant.U-19 Horsegram: DB-7, BR-5, BR-10, Coimbatore-1	<ul style="list-style-type: none"> • Transplanting of old age seedling of 30-35 days • Direct seedling of Rice • Use of 20 days old dapog seedling for rice 	
	Lowland	Rice-Wheat Jute- Boro rice	Rice-Wheat Rice: Rajshree, Santosh , Sita,Rajendra Suwasni, Rajendra Sweta Wheat: HD-2733, PBW-343, HP-1731, HD-2824	<ul style="list-style-type: none"> • Direct seedling of Rice • Use of 20 days old dapog seedling for rice 	

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Change in crop/cropping system ^c	Agronomic measures ^d	Remarks on Implementation ^e
Early season drought (delayed onset)					
Delay by 8 weeks (Specify month)	Upland	Early Rice – Late Wheat	Black gram/Til-Wheat Pegion pea(Pre-rabi)-Jute Black gram -P.-9,Sharad. Til- Krishna Wheat: HUW-443,DBW-39, HP-1744,HD- 2643	<ul style="list-style-type: none"> • Application of organic manure and vermicompost initially . 	Seeds from BRBN, BAU, Sabour, NSC, TDC
	Medium land	Maize-Wheat Rice-Wheat	Sesame –Rabi Maize Sesame- Wheat	<ul style="list-style-type: none"> • Application of organic manure 	

			<p>Sesame – Krishna, Pragati Rabi Maize- Saktiman-1,2,3,4, 5. Laxmi, Deoki,</p> <p>Wheat –HUW-468, DBW-39,HD-2733,</p>	and vermicompost initially to crops	
	Lowland	Rice- Potato	<p>Rice-Potato/Rice-Wheat</p> <p>Rice: Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta</p> <p>Wheat: HD-2733, PBW-343, HP-1731, HD-2824</p> <p>Potato :PJ376, Rajendra Aloo-1,2,3, Kufri Jyoti</p>	<ul style="list-style-type: none"> • Application of organic manure and vermicompost initially for rice and other crops 	

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Crop management ^c	Soil nutrient & moisture conservation measues ^d	Remarks on Implementation ^e
Early season drought (Normal onset)					
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Upland	<p>Rice-Wheat</p> <p>Rice: Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj</p> <p>Wheat: HD-2733, PBW 443, HP-1731, HD-2824</p>	<ul style="list-style-type: none"> • Life saving irrigation • Gap filling of existing crop • Thinning 	<ul style="list-style-type: none"> • Application of potash • Inter culturing • Mulching through mechanical weeding for moisture conservation • Conservation tillage • 	Seeds from BRBN, BAU, Sabour, NSC, TDC
	Medium Land	Maize-Wheat	<ul style="list-style-type: none"> • Life saving irrigation • Gap filling 	<ul style="list-style-type: none"> • Application of potash • Inter culturing 	

		<p>Maize: Shaktiman-1,2,3,4, 5</p> <p>Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3</p> <p>Wheat: HD-2733, PBW-343, HP-1731, HD-2824</p>		<ul style="list-style-type: none"> • Mulching through weeds for moisture conservation • Conservation tillage • Interculturing • Protective spray of pesticides with adjuvant against pesticides and disease 	
	Lowland	<p>Rice-Wheat-Greengram</p> <p>Rice: Rajshree, Santosh, Sita, Rajendra Suwasni, Rajendra Sweta</p> <p>Wheat: HD-2733, PBW-343, HP-1731, HD-2824</p> <p>Greengram: SML-6-68, Pusa Vishal, Samarat</p>	<ul style="list-style-type: none"> • Life saving irrigation • Gap filling through Dapog nursery 	<ul style="list-style-type: none"> • Application of potash must at final land preparation • Inter culturing • Mulching through weeds for moisture conservation • Conservation tillage • Interculturing • Spray potassic fertilizer with adjuvant at vegetative stage • Protective spray of pesticides with adjuvant against pesticides and disease 	

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Crop management ^c	Soil nutrient & moisture conservation measues ^d	Remarks on Implementation ^e
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm))					

period)					
At vegetative stage	Upland	Rice-Potato/ Rice –Wheat Rice: Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj Potato: PJ376, Rajendra Aloo-1,2,3, Kufri Jyoti Wheat: HD-2733, PBW-343, HP-1731, HD-2824	<ul style="list-style-type: none"> • Gap filling of existing crop • Postponement of top dressing • Protective spray of pesticides with adjuvant against BLB, BLAST & Helminthosporium leaf spot 	<ul style="list-style-type: none"> • Inter culturing • Mulching through weeds • Conservation tillage • Life saving irrigation • Spray of potassic fertilizer with adjuvant • Spray (1%) Urea on the crops 	Seeds from BRBN, BAU, Sabour, NSC, TDC
	Medium land	Rice-Wheat-Greengram Rice: Rajendra Bhagawati, Rajendra Suwasni, Rajshree, Prabhat Wheat: HD-2733, PBW-343, HP-1731, HD-2824 Greengram: SML-6-68, Pusa Vishal, Samarat	<ul style="list-style-type: none"> • Gap filling of existing crop • Postponement of top dressing • Protective spray of pesticides with adjuvant against BLB, BLAST & Helminthosporium leaf spot 	<ul style="list-style-type: none"> • Inter culturing • Mulching through weeds • Conservation tillage • Life saving irrigation • Spray of potassic fertilizer with adjuvant • Spray (1%) Urea on the crops 	

Condition	Major Farming situation^a	Normal Crop/cropping system^b	Suggested Contingency measures		
			Crop management^c	Soil nutrient & moisture conservation measues^d	Remarks on Implementati on^e
Mid season drought (long dry spell)					
At flowering/ fruiting stage	Upland	Rice-Wheat/ Vegetable – Wheat Rice:Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj Wheat: HD-2733, PBW-	<ul style="list-style-type: none"> • IPM practices • Spray of pesticides with spreader 	<ul style="list-style-type: none"> • Interculturing • Mulching through weeds • Conservation tillage • Life saving irrigation 	Seeds from BRBN, BAU, Sabour, NSC, TDC

		343, HP-1731, HD-2824			
	Medium land	Maize-Wheat Maize: Shaktiman-1,2,3,4,5 Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3 Wheat: HD-2733, PBW-343, HP-1731, HD-282	<ul style="list-style-type: none"> • IPM practices • Clipping of maize leaves 	<ul style="list-style-type: none"> • Interculturing • Mulching through weeds • Conservation tillage • Life saving irrigation • Spray of potash and nitrogen fertilizer with adjuvant 	
	Lowland	Rice-Wheat-Greengram Rice: Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta Wheat: HD-2733, PBW-343 HP-1731, HD-2824	<ul style="list-style-type: none"> • IPM practice 	<ul style="list-style-type: none"> • Inter culturing • Mulching through weeds • Life saving irrigation • Conservation tillage 	

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Crop management ^c	Rabi Crop planning ^d	Remarks on Implementation ^e
Terminal drought (Early withdrawal of monsoon)					
	Upland	Rice-Wheat/ Vegetable – Wheat Rice:Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj Wheat: HD-2733, PBW-343, HP-1731, HD-2824	<ul style="list-style-type: none"> • Spray of potassic fertilizer with adjuvant • IPM practices • Life saving irrigation • Mulching 	<ul style="list-style-type: none"> • Stored water to be used at critical stage of growth • To clean irrigation channel for preventing loss of moisture through seepage 	Seeds from BRBN, BAU, Sabour, NSC, TDC
	Medium land	Maize-Wheat Maize: Shaktiman-1,2,3,4 ,5Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3 Wheat: HD-2733, PBW-343, HP-1731, HD-282	<ul style="list-style-type: none"> • Spray of potassic fertilizer with adjuvant • IPM practices • Life saving irrigation • Mulching • Thinning 		

			<ul style="list-style-type: none"> • Clipping of leaves in maize 		
	Lowland	Rice-Wheat-Greengram Rice: Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta Wheat: HD-2733, PBW-343 HP-1731, HD-2824	<ul style="list-style-type: none"> • Spray of potassic fertilizer with adjuvant • IPM practices • Life saving irrigation • Mulching • Thinning 		

2.1.2 Drought - Irrigated situation

Condition	Suggested Contingency measures			
	Major Farming situation ^f	Normal Crop/cropping system ^g	Change in crop/cropping system ^h	Remarks on Implementation ^j
Delayed release of water in canals due to low rainfall			NA	
Limited release of water in canals due to low rainfall			NA	
Non release of water in canals under delayed onset of monsoon in catchment			NA	
Lack of inflows into tanks due to insufficient /delayed onset of monsoon			NA	

Condition	Suggested Contingency measures			
	Major Farming situation ^f	Normal Crop/cropping system ^g	Change in crop/cropping system ^h	Agonomic measures ⁱ
Insufficient groundwater recharge due to low rainfall	NA			

2.2 Unusual rains (untimely, unseasonal etc) (for both rainfed and irrigated situations)

Condition	Suggested contingency measure			
	Vegetative stage ^k	Flowering stage ^l	Crop maturity stage ^m	Post harvest ⁿ
Continuous high rainfall in a short span leading to water logging				
Rice	<ul style="list-style-type: none"> • Drainage management • Replanting through Dapog nursery if needed • Gap filling • Resowing through drum seeder 	<ul style="list-style-type: none"> • Drainage management • Subsequent crop if totally damaged i.e. Toria 	<ul style="list-style-type: none"> • Drainage management • Subsequent crop if totally damaged • Harvest at physiological maturity 	Storage at safer place
Maize	<ul style="list-style-type: none"> • Drainage management • Gap filling • Resowing, if completely damaged 	<ul style="list-style-type: none"> • Drainage management • Alternative maize or other rabi crop if totally damaged 	<ul style="list-style-type: none"> • Drainage management • Subsequent if totally damaged • Harvest at physiological maturity 	Storage at safer place
Vegetable	<ul style="list-style-type: none"> • Resowing , if required • Replanting 	<ul style="list-style-type: none"> • Drainage management 	<ul style="list-style-type: none"> • Drainage management 	Storage at safer place
Horticulture				
Mango	<ul style="list-style-type: none"> • Drainage management • Replanting if completely damaged • Gap filling 	<ul style="list-style-type: none"> • Drainage management 	<ul style="list-style-type: none"> • Drenching with copper fungicides • Drainage management • Harvesting at proper maturity 	
Banana	<ul style="list-style-type: none"> • Drainage management 	<ul style="list-style-type: none"> • Drainage management 	<ul style="list-style-type: none"> • Drainage management 	

	<ul style="list-style-type: none"> • Replanting, if completely damaged 		<ul style="list-style-type: none"> • Spray and pasting of trunk 	
Heavy rainfall with high speed winds in a short span²				
Rice	<ul style="list-style-type: none"> • Drainage management • Replanting if completely damaged • Gap filling if needed 	<ul style="list-style-type: none"> • Drainage management • Subsequent crop if totally damaged i.e. Toria 	<ul style="list-style-type: none"> • Drainage management • Subsequent crop if totally damaged 	Storage at safer place
Maize	<ul style="list-style-type: none"> • Resowing If completely damaged • Gap filling if needed • Drainage management 	<ul style="list-style-type: none"> • Drainage management • Alternative maize or other crop if totally damaged 	<ul style="list-style-type: none"> • Drainage management • Subsequent crop if totally damaged 	Storage at safer place
Vegetable	<ul style="list-style-type: none"> ▪ Drainage management ▪ Gap filling 	<ul style="list-style-type: none"> • Drainage management 	<ul style="list-style-type: none"> • Drainage management • Drenching with copper fungicide 	
Horticulture				
Mango	<ul style="list-style-type: none"> • Drainage management • Replanting if substantially damaged 	<ul style="list-style-type: none"> • Drainage management • Drenching with copper fungicides 	<ul style="list-style-type: none"> • Drainage management • Harvest at proper time 	
Banana	<ul style="list-style-type: none"> • Drainage management • Replanting if substantially damaged 	<ul style="list-style-type: none"> • Drainage management • Staking 	<ul style="list-style-type: none"> • Drainage management • Harvest at proper time 	
Outbreak of pests and diseases due to unseasonal rains				
Rice	<ul style="list-style-type: none"> • Seedling treatment with Carbendazin + Imidachloroprid • Spray of pesticides with adjuvant 	<ul style="list-style-type: none"> • Spray of specific pesticides with adjuvant • Drainage management 	<ul style="list-style-type: none"> • Spray of specific pesticides with adjuvant • Drainage management 	Storage at safer place
Maize	<ul style="list-style-type: none"> • Application of granular insecticides viz. Thimet 10 G/Carbofuran 3G in whorl of maize 	<ul style="list-style-type: none"> • Spray of specific pesticides with adjuvant • Drainage management 	<ul style="list-style-type: none"> • Spray of specific pesticides with adjuvant • Drainage management 	Storage at safer place
Vegetable	<ul style="list-style-type: none"> • Drainage management • Spraying of insecticide & 	<ul style="list-style-type: none"> • Spray of specific pesticides with adjuvant 	<ul style="list-style-type: none"> • Spray of specific pesticides with adjuvant 	Safe storage & transportation

	fungicide	• Drainage management	• Drainage management	
Horticulture				
Mango	<ul style="list-style-type: none"> • Spray of pesticides with adjuvant • Drainage management 	<ul style="list-style-type: none"> • Spray of specific pesticides with adjuvant • Drainage management 	<ul style="list-style-type: none"> • Spray of specific pesticides with adjuvant • Drainage management 	
Banana	<ul style="list-style-type: none"> • Spray of pesticides with adjuvant • Drainage management 	<ul style="list-style-type: none"> • Spray of specific pesticides with adjuvant • Drainage management 	<ul style="list-style-type: none"> • Spray of specific pesticides with adjuvant • Drainage management 	

2.3 Floods

Condition	Suggested contingency measure ^o			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation ¹	Seedling/ Nursery stage	Vegetative stage	Reproductive stage	At harvest
Water logging/Partial inundation	Seedling/ Nursery stage	Vegetative stage	Reproductive stage	At harvest
Rice: Swarna-Sub-I & local variety Desaria Barogar	<ul style="list-style-type: none"> • Drainage management • Re transplanting through Dapog nursery if completely damaged • Gap filling 	<ul style="list-style-type: none"> • Drainage management • Alternative crops if totally damaged • Gap filling • 40-45 days old seedlings may be used • Kharuhan (double transplanting) 	<ul style="list-style-type: none"> • Drainage management • Harvest at physiological maturity • Lentil as paira crop can be taken 	Storage at safer place
Maize	<ul style="list-style-type: none"> • Drainage management • Re sowing if substantially damaged • Gap filling, if needed 	<ul style="list-style-type: none"> • Drainage management • Alternative crops if totally damaged like maize or subsequent crop i.e. Toria 	<ul style="list-style-type: none"> • Drainage management • Harvest at physiological maturity 	Storage at safer place

Horticulture				
Mango	<ul style="list-style-type: none"> • Replanting if substantially damaged • Gap filling • Drainage management 	<ul style="list-style-type: none"> • Drenching with copper fungicides • Drainage management 	<ul style="list-style-type: none"> • Drenching with copper fungicides • Drainage management 	Judicious harvesting
Banana	<ul style="list-style-type: none"> • Replanting if substantially damaged • Gap filling • Drainage management 	<ul style="list-style-type: none"> • Drenching with copper fungicides • Drainage management 	<ul style="list-style-type: none"> • Drenching with copper fungicides • Drainage management 	Judicious harvesting
Continuous submergence for more than 2 days²				
Rice: Swarna-Sub-I & local variety Desaria Barogar	<ul style="list-style-type: none"> • Gap filling, if needed • Re-sowing if damaged after receding of flood 	<ul style="list-style-type: none"> • Replanting through Kharuhan (double transplanting) by 3-4 seedlings per hill • Short duration rice variety 	<ul style="list-style-type: none"> • Toria/Late wheat if completely damaged 	Storage at safer place
Maize	<ul style="list-style-type: none"> • Re-sowing if damaged after receding of flood 	<ul style="list-style-type: none"> • Resowing or gap filling as the case may be 	<ul style="list-style-type: none"> • Toria/Late wheat if completely damaged 	Storage at safer place
Horticulture				
Mango	<ul style="list-style-type: none"> • Drainage management 			
Banana	<ul style="list-style-type: none"> • Drainage management 			
Sea water intrusion³	NA			

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				
Rice	Life saving irrigation	Life saving irrigation Spray of potassic fertilizer with adjuvant	Life saving irrigation Spray of potassic fertilizer with adjuvant	

Maize	Life saving irrigation	Life saving irrigation	Life saving irrigation	
Wheat			Life saving irrigation (Terminal heat)	
Horticulture				
Mango	Life saving irrigation	Life saving irrigation	Life saving irrigation	
Cold wave				
Wheat		Irrigation, interculturing, mulching by weeds		
Maize		Irrigation, interculturing, mulching by weeds		
Mustard		Irrigation, interculturing, mulching by weeds		
Potato		Irrigation, interculturing, mulching by weeds		
Pulses		Irrigation, interculturing, mulching by weeds		
Horticulture				
Bhendi		Irrigation, interculturing, mulching by weeds		
Brinjal		Irrigation, interculturing, mulching by weeds		
Chilli		Irrigation, interculturing, mulching by weeds		
Tomato		Irrigation, interculturing, mulching by weeds		
Bottle gourd		Irrigation, interculturing, mulching by weeds		
Frost				
Wheat		Irrigation, interculturing,		

		mulching by weeds		
Horticulture				
Bhendi		Irrigation, interculturing, mulching by weeds		
Brinjal		Irrigation interculturing, mulching by weeds		
Tomato & Potato		Earth up to 15cm ht. Irrigation interculturing, mulching by weeds	Spray Dithane M-45/ Mancozeb @ 2.5 gm/lit of water in 3 rd week of December at 10 days interval 3 times	Harvest in dry weather
Hailstorm NA	NA			
Horticulture	-	-	-	-
Cyclone	-	-	-	-
Horticulture	-	-	-	-

2.5 Contingent strategies for Livestock, Poultry & Fisheries

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and Fodder availability	Not Applicable		

<p>Cyclone</p>	<p>Harvest all the possible wetted grain (rice/ wheat/maize etc) and use as animal feed after drying.</p> <p>Arrange for storing minimum required quantity of hay (25-50 kg) and concentrates (10-25 kg) per animal in farmer's / LS keepers house/ shed for feeding during cyclone.</p> <p>Don't allow the animals for grazing in case of early forewarning (EFW)</p> <p>In case of EFW, shift the animals to safer places.</p> <p>Identification of animals may be done.</p> <p>Keep animals untied in the shed in case of EFW.</p>	<p>Treatment of the sick, injured and affected animals through arrangement of mobile emergency veterinary hospitals / rescue animal health workers.</p> <p>Diarrhea out break may happen, arrangement should be made to mitigate the problem</p> <p>Protect the animals from heavy rains and thunder storms</p> <p>In severe cases un-tether or let loose the animals</p> <p>Arrange transportation of highly productive animals to safer place</p> <p>Spraying of fly repellants in animal sheds</p>	<p>Repair of animal shed</p> <p>Deworm the animals through mass camps</p> <p>Vaccinate against possible out breaks</p> <p>Proper disposal of the dead animals / carcasses by burning / burying with lime/ bleaching powder in pit</p> <p>Bleach / chlorinate (0.1%) drinking water or water resources</p> <p>Collect drowned crop material, dry it and store for future use</p> <p>Sowing of above mention short duration fodder crops in unsown and water logged areas</p> <p>Application of urea (20-25kg/ha) in the CPR's to enhance the bio mass production.</p>
<p>Floods</p>	<p>1. Reserve feed/ fodder bank at community level</p> <p>Each district should have reserves (feeding 5000 ACU maintenance ration for about 1-3 weeks period) of the following at any point of the year for mobilization to the needy areas. Complete feed block or urea molasses mineral bricks may be</p>	<p>1. Immediate measures</p> <p>Transportation of animals to elevated areas.</p> <p>Temporary shelter arrangement.</p> <p>Stall feeding of animals with stored hay and concentrates.</p> <p>Proper hygienic and sanitation of the animal shed/ temporary shelter. Application of lime/ bleaching</p>	<p>Repair of animal shed.</p> <p>Bring back the animals to the shed.</p> <p>Cleaning and disinfection of the shed with bleaching powder/ lime or ash.</p> <p>Bleach (0.1%) drinking water / water sources</p>

	<p>stored. Checking of feed availability may be made at 3 months interval, particularly before onset of monsoon.</p> <p>Silage:20-50 t</p> <p>Urea molasses mineral bricks (UMMB): and complete feed block (CFB) 50-100 t</p> <p>Hay:100-250 t</p> <p>Concentrates: 20-50 t</p> <p>Minerals and vitamin supplements mixture:1-5 t</p> <p>2. Preparation and storage of silage and hay and crop by-products at household level. The feed storage may be established in high land where shelter may be taken during flood.</p> <p>Preserve the fodder in the form of hay from Berseem, Cowpea, Oat & other grasses as well as silage from</p> <p>(a) Maize- harvesting at dough stage.</p> <p>(b) Sorghum - at flowering stage.</p> <p>(c) Oat</p> <p>(d) Hybrid Napier – 40-45 day old.</p> <p>(e) Water hyacinth mixing with rice straw in ratio of 4:1 with 70 kg molasses /ton of clean water hyacinth.</p>	<p>powder or ash may be applied around shed.</p> <p>In severe floods, un-tether or let loose the animals</p> <p>Emergency outlet establishment for required medicines or feeds in each village.</p> <p>Checking of animals for injury and illness.</p> <p>Spraying of fly repellants in animal sheds. Smoke may be generated at night inside the shed to prevent animals from mosquito bite.</p> <p>Govt. may supply feed block or urea molasses minerals bricks or concentrate as flood relief. Bleaching powder and lime may also be supplied.</p> <p>If stored feed are not available, feeding of animals may be done with top feeds (tree leaves,, aquatic plants, sugarcane tops) etc. as mentioned in drought.</p> <p>Fungal infected straw/ feed should not be fed.</p> <p>Bleach (0.1%) drinking water / water sources. If bleaching powder is not available, treat with lime powder.</p> <p>Produce smoke with mosquito replants in the shed during night.</p> <p>Vaccination schedule</p> <p>Cattle and Buffalo</p> <p>Hemorrhagic Septicemia Vaccine</p> <p>Black Quarter Vaccine</p> <p>FMD Vaccine</p> <p>Anthrax Vaccine as per endemicity.</p> <p>Sheep and Goat</p> <p>Hemorrhagic Septicemia Vaccine</p>	<p>Deworming with brood spectrum dewormers.</p> <p>Vaccination against possible outbreaks</p> <p>Proper disposal of the dead animals / carcasses by burning / burying with lime and bleaching powder in pit. . Subsidy may be given for proper disposal of dead animals.</p> <p>Proper drying the harvested crop material and proper storage.</p> <p>Wet feed/ straw may be dried for animal feeding. Care should be taken not to feed fungal infected feed. Wet straw may be treated with urea (1%) to prevent fungal growth and enrichment.</p> <p>Govt. may supply cattle feed at frequent interval or at sufficient quantity to feed the animals.</p> <p>If available feed is insufficient quantity, concentrate mixture may only be fed to milch and pregnant animals.</p>
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	<p>Bales of hay and other dry fodder should be stored and covered with asbestos sheet or polythene sheet.</p> <p>Preserve crop by-products like broken rice/ wheat/ maize, bran, chunies etc and dried plant of masoor, moong, etc in <i>bhuskar</i>. The height of <i>bhuskar</i> may be high (above the water level of last flood).</p> <p>3, Creation of permanent fodder seed banks in all flood prone areas.</p> <p>4. General precautions</p> <p>In case of EFW, harvest all the crops (Sorghum, Maize, Rice, Wheat, Horse gram, etc) that can be useful as fodder in future (store properly)</p> <p>Don't allow the animals for grazing</p> <p>Arrange for storing minimum required quantity of hay (25-50kg) and concentrates (25kgs) per animals in farmer / LS keepers house / shed for feeding animals during floods</p> <p>Arrangement for transportation of animals from low lying area and also</p>	<p>PPR Vaccine FMD Vaccine Goat pox Vaccine Enterotoxemia Vaccine Anthrax Vaccine as per endemicity</p> <p>Pigs</p> <p>Hemorrhagic Septicemia Vaccine PPR Vaccine FMD Vaccine Goat pox Vaccine Enterotoxemia Vaccine Anthrax Vaccine as per endemicity.</p> <p>Dogs</p> <p>Rabies Vaccine</p> <p>Poultry</p> <p>Mareks disease vaccine RDV (F₁ & R₂B), FPV, IBRV & IBDV</p>	<p>Feed wastage may be reduced by offering feed in small quantity feed in several times (4 times a day)</p> <p>Aquatic plants like duck weed, water hyacinth and banana plants may be fed to dry and unproductive animals along with wheat straw. Sugarcane tops, bamboo leaves and mango leaves may be fed to milching, pregnant and small ruminants. When local grass will be available, may be fed to all animals.</p> <p>Newly grown grasses may contain high amount of nitrate. Care may be taken to feeding grasses after flood water is receded.</p> <p>There may be leaching of essential minerals due to water logging. So, mineral mixture may be fed to all animals. Mineral mixture may be supplied by the Govt. at subsidized rate.</p>
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	<p>for rescue animal health workers.</p> <p>Keep animals untied in the shed.</p> <p>Permanent marking/ identification of animals.</p> <p>5. Strengthening of co-operative sectors in flood prone areas for milk marketing and inputs of medicine, seed, feed and veterinary care. One person in each village may be trained with primary veterinary health care and emergency rescue operation.</p> <p>6. Emergency kit preparation</p> <p>Emergency medicine</p> <p>Temporary shelter</p> <p>Torch</p> <p>Rope</p>		<p>Timely treatment of animals may be done by increasing of number of veterinary dispensary and mobile veterinary clinics. Medicine may be supplied at free of cost. Flood prone zones are susceptible to liver fluke, so, drug may be given to control fluke infestation.</p> <p>Smoke may be generated at night inside the shed to prevent animals from mosquito bite.</p> <p>Farmers may be given soft loan for purchase of new animals. Cooperative society may be extended to this area which will help in following</p> <ol style="list-style-type: none"> 1. Society will provide loan through bank. In a month, price of 3 weeks milk will be given to the farmers and 1 week price will be given to bank for repay of loan. 2. Farmers will get
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			<p>medicine at wholesale rate.</p> <ol style="list-style-type: none"> 3. Concentrate feed will be provided by co-operative at subsidized rate. 4. Timely treatment of animals will be done. 5. Marketing channel for milk will be steady. <p>Subsidy may be given for construction of temporary animals shed (Bamboo based).</p> <p>Animals should come under insurance coverage.</p> <p>Small-scale income generating activities like backyard poultry, duckery, goatery may be started. For this purpose, farms may be developed in non-flood prone zones where these animals will be raised up to certain age and will be distributed to the affected farmers for immediate income generation.</p> <p>Fodder cultivation may be encouraged with supply of fodder seed.</p>
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<p>Heat & Cold wave</p>	<p>Arrangement for protection from heat wave</p> <ul style="list-style-type: none"> i) Plantation around the shed ii) Water sprinklers / foggers in the shed or frequent washing of animals. iii) Application of white reflector paint on the roof or putting rice straw on the roof of the shed. <p>Cold wave : Covering all the wire meshed walls / open area with gunny bags/ polyethylene sheets (with a mechanism for lifting during the day time and putting down during night time)</p>	<p>Allow the animals early in the morning or late in the evening for grazing during heat waves</p> <p>Allow for grazing between 10AM to 3PM during cold waves</p> <p>Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves</p> <p>Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves. Molasses may be added in the concentrate feed during heat waves.</p> <p>Put on the foggers / sprinklers and frequent washing of animals during heat waves and heaters during cold waves</p> <p>In severe cases, vitamin 'C' and electrolytes should be added in H₂O during heat waves.</p> <p>Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>
<p>Health and Disease management</p>	<p>Specify the endemic diseases (species wise) in that region.</p> <p>Identification of veterinary staff and animal health workers.</p> <p>Constitution of Rapid Action Veterinary Force</p> <p>Storage of emergency medicines and medical kits</p> <p>Timely vaccination (as per enclosed</p>	<p>Rescue of sick and injured animals and their treatment</p> <p>Conducting mass animal health camps</p> <p>Animals may be checked for any external injury and illness, Pregnant animals may be checked for any discomfort and uneasiness.</p>	<p>Conducting psahu sibir, mass animal health camps, fertility camps and deworming camps.</p> <p>Conducting fertility camps.</p> <p>Disposal of carcass by above means.</p> <p>Pregnancy toxemia may occur due to prolonged under-feeding.</p> <p>Hypoglycemia is also observed.</p> <p>Treatment may be provided to affected animals.</p>

	<p>vaccination schedule) against all endemic diseases</p> <p>Surveillance and disease monitoring network establishment</p> <p>Provision for mobile ambulatory van.</p>	<p>Animals may be dewormed with suitable anti-parasitic drug and be checked and treated for ecto-parasites, if any. Deworming will improve fodder and feed absorption.</p> <p>During flood do not leave halter or headstalls on animals.</p> <p>Do not tie animals together when releasing.</p> <p>Report the location, identification and disposition of livestock and poultry to authorities handling the disaster.</p> <p>During flood cases of malaria, diarrhea, respiratory infection, fever, injury, leg gangrene and snake bite may be high. Precaution may be taken to treat the affected animals.</p>	<p>Adequate attention is to be paid to disinfect the premises of 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.</p> <p>During flood cases of malaria, diarrhea, respiratory infection, fever, injury, leg gangrene, water born diseases and snake bite may be high. Precaution may be taken to treat the affected animals</p> <p>Diseases that can occur during flood should be given special attention and accordingly medicines should be made available in the health camp for the following mentioned diseases.</p> <p>Salmonella spp.</p> <p>Escherichia coli</p> <p>Giardiasis</p> <p>Amoebiasis</p> <p>Rotavirus</p> <p>Leptospirosis</p> <p>Scabies</p>
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			Black leg Malignant Edema Foot rot Anthrax Botulism Tetanus Red water Black disease Entertoxemia Liver fluke Amphistomiasis Brooders pneumonia Malaria
Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	Submission for insurance claim and availing insurance benefit Purchase of new productive animals
Drinking water	Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) Identification of water resources	Restrict wallowing of animals in water bodies/resources	Specify the options (place and area) for establishment of drinking water reserves

Vaccination schedule in small ruminants (Sheep & Goat)

Disease	Season
Foot and mouth disease (FMD)	Before rainy season and in winter / autumn
PPR	All seasons, preferably in June-July

Black quarter (BQ)	May / June
Enterotoxaemia (ET)	May
Haemorrhagic septicaemia (HS)	March / June
Sheep pox (SP)	December / March

Vaccination programme for cattle and buffalo:

Disease	Age and season at vaccination
Anthrax	In endemic areas only, Feb to May
HS	May to June
BQ	May to June
FMD	November to December

2.5.2 Poultry

	Suggested contingency measures		
	Before the event^a	During the event	After the event
Drought			

Floods			
Shortage of feed ingredients	In case of EFW, shift the birds to safer place Storing of house hold grain like maize, broken rice, wheat etc, Culling of weak birds	Use stored feed as supplement Don't allow for scavenging	Routine practices are followed
Drinking water	Provide clean drinking water	Sanitation of drinking water	Sanitation of drinking water
Health and disease management	In case of EFW, add antibiotic powder in drinking water to prevent any disease outbreak	Sanitation of poultry house with bleaching powder/ lime etc. Treatment of affected birds Prevent water logging surrounding the sheds Assure supply of electricity Sprinkle lime powder to prevent ammonia accumulation due to dampness	Disposal of dead birds by burning / burying with lime powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD
Cyclone			

Shortage of feed ingredients	In case of EFW, shift the birds to safer place Storing of house hold grain like maize, broken rice, bajra etc, Culling of weak birds	Use stored feed as supplement Don't allow for scavenging Protect from thunder storms	Routine practices are followed
Drinking water	Provide clean drinking water	Sanitation of drinking water	Sanitation of drinking water
Health and disease management	In case of EFW, add antibiotic powder in drinking water to prevent any disease outbreak	Sanitation of poultry house Treatment of affected birds Prevent water logging surrounding the sheds Assure supply of electricity Sprinkle lime powder to prevent ammonia accumulation due to dampness	Disposal of dead birds by burning / burying with lime powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD
Heat wave and cold wave			
Heat wave			
Shelter/environment management	Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day	Routine practices are followed
Health and disease management	Deworming and vaccination against RD and fowl pox	Supplementation of house hold grain	Routine practices are followed

		<p>Provide cool and clean drinking water with electrolytes and Vitamin C</p> <p>In hot summer, add anti-stress probiotics in drinking water or feed.</p> <p>Increase energy and vitamin concentration in feed (supplementation with grain).</p>	
Cold wave			
Shelter/environment management	<p>Provision of proper shelter</p> <p>Arrangement for brooding</p> <p>Assure supply of continuous electricity</p>	<p>Close all openings with polythene sheets</p> <p>In severe cases, arrange heaters</p> <p>Don't allow for scavenging during early morning and late evening</p>	Routine practices are followed
Health and disease management	<p>Arrangement for protection from chilled air</p>	<p>Supplementation of grains</p> <p>Antibiotics in drinking water to protect birds from pneumonia</p>	Routine practices are followed

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event ^a	During the event	After the event
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 (iii) Deepening of ponds for more storage of water	(i) Partial harvesting (ii) Addition of water (iii) Stocking of air breathing fishes (Singhi, Magur or Murrel)	(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.	(i) 10 to 15% exchange of water
(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 size /marketable size fishes (iii) construction of earthen	i. Collection of naturally bred seeds (Spawn /fry /fingerling) from flooded water ii. Stocking in nursery ponds	i. Retain the water in pond immediately after flood through repairing of damaged dyke etc. ii. Netting of pond

	nursery ponds in upland areas	for rearing.	iii. Removal of unwanted, predatory/weed fishes
		iii. Enhancement of dykes by sand bags	iv. Sale of large size fishes
(ii) Water contamination and changes in water quality	Arrangement of regular water quality monitoring		Use of KMnO ₄ as prophylactics
(iii) Health and diseases	<ul style="list-style-type: none"> i. Use lime @ 200 kg/ ha / Potassium permanganate @ 2% ii. Arrangement of CIFAX and medicines & chemical stock 	Use of Potassium permanganate as prophylactics	<ul style="list-style-type: none"> -Sampling of fishes and water for disease analysis - Liming, use of drugs/ medicine if required
(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 Removal of culture inputs from the site	Arrangement of advance size fingerling/ yearlings for stocking	Stocking of large size fingerlings of carps Restoration of 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)			
4. Heat wave and cold wave			
A. Capture			
Marine			
Inland			
B. Aquaculture			
(i) Changes in pond environment (water quality)			
(ii) Health and Disease management			