State: BIHAR

Agriculture Contingency Plan for District: DARBHANGA

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Eastern Plain, Hot Subhumid (moist) Eco-Region (13.1)		
	Agro-Climatic Zone (Planning Commission)	MIDDLE GANGETIC PLAIN REGION (IV)		
	Agro Climatic Zone (NARP)	NORTH WEST ALLUVIAL PLAIN ZONE (BI-1)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Zone – 1 (Saran, Siwan, Goplaganj, Muzaffarpur, E. Champaran, W.. Champaran, Sitamarhi, Sheohar, Vaishali, Darbhanga , Madhubani, Samastipur		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		26^0 14' N	85^0 44' E	48 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research Sub-station, Biroul		
	Mention the KVK located in the district with address	KVK, Jale, Darbhanga		
	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 (Zone-I)**	**Normal RF(mm)**	**Normal Rainy days (number)**	**Normal Onset (specify week and month)**	**Normal Cessation (specify week and month)**
	SW monsoon (June-Sep)	1107	45	3rd week of June	2nd week of October
	NE Monsoon(Oct-Dec)/ Post Monsoon	19.3	03		
	Winter (Jan- March)	29.6	03	-	-
	Summer (Apr-May)	78.2	04	-	-
	Annual	1234.1	55	-	-

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)	254.072	172.000	-	21.400	24.000	23.500.	-	-	7.500	

1. 4	**Major Soils**	**Area ('000 ha)**	**Percent (%) of total**
	1. Very deep, calcareous fine loamy,	Not available	Not available
	2. Very deep, loamy surface texture	Not available	Not available

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	172.000	148%
	Area sown more than once	-	
	Gross cropped area	254.000	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	79.000		
	Gross irrigated area	102.000		
	Rainfed area	93.000		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		1.054	-
	Tanks	-		-
	Open wells	-	4.883	-
	Bore wells	-	74.281	-
	Lift irrigation schemes	-	-	-
	Micro-irrigation		-	-
	Other sources (please specify)	-	-	-
	Total Irrigated Area		79.000	

	Pump sets	1240		
	No. of Tractors	2745		
	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%	Arsenic- 0-0.4ppm or 0-400 ppb
	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 latest figures) (Specify year 2008-09)

1.7	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Rice	-	-	102.000	-	-	-	-	102.000
	Wheat	-	-	-	-	-	57.000	-	57.000
	Maize	-	-	-	-	-	15.000	-	15.000
	Mustard/ Toria	-	-	-	-	-	0.644		0.644
	Greengram	-	-	-	-	-		2.187	2.187
	Lentil	-	-	-	-	-	1.573	-	1.573

	Horticulture crops - Fruits	**Area ('000 ha)**		
		Total	**Irrigated**	**Rainfed**

	Mango	12.896	-	-
	Litchi	0.818	-	-
	Guava	0.608	-	-
	Banana	1.751	-	-
	Papaya	0.046	-	-
	Aonla	0.028	-	-
	Horticulture crops - Vegetables	**Total**	**Irrigated**	**Rainfed**
	Potato	7.526	-	-
	Sponge Gourd	2.084	-	-
	Tomato	1.469	-	-
	Cauliflower	1.584	-	-
	Cabbage	1.639	-	-
	Brinjal	2.422	-	-
	Bhendi	1.688	-	-
	Medicinal and Aromatic crops	**Total**	**Irrigated**	**Rainfed**
	Plantation crops	**Total**	**Irrigated**	**Rainfed**
	Eg., industrial pulpwood crops etc.			
	Fodder crops	**Total**	**Irrigated**	**Rainfed**
	Total fodder crop	**-**	**-**	**-**

	area			
	Grazing land	-	-	-
	Sericulture etc	-	-	-

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	101.630	110.389	212.019
	Improved cattle	-	-	-
	Crossbred cattle	2.985	10.932	13.917
	Non descriptive Buffaloes (local low yielding)	-	-	-
	Descript Buffaloes	16.700	159.066	175.766
	Goat	58.207	153.538	211.745
	Sheep	0.341	0.427	0.768
	Camel, Pig, Yak etc.	-	-	-
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	-	29.686	
	Backyard	-	201.061	

1.10 **Fisheries** (Data source: Chief Planning Officer)

A. Capture

i) Marine (Data Source: Fisheries Department) Bihar is a land locked state and only inland fisheries resources are available	**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**
	2301	3924	1623

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)	4144.00	3.2	7.955
	Others	-	-	-

1.11 Production and Productivity of major crops (Average of last 5 years: 2004, 05, 06, 07, 08)

1.11	Name of crop	***Kharif***		***Rabi***		**Summer**		**Total**		**Crop residue as fodder** ('000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Rice	224.000	2200		-	-	-	-	-	-
	Wheat	-	-	138.330	2426	-	-	-	-	-
	Maize	-	-	45.300	032	-	-	-	-	-
	Mustard/Toria	--	-	4.005	6218	-	-	-	-	-
	Greengram	-	-	-	-	13.125	600.1	-	-	
	Lentil	-	-	11.325	7.2	-	-	-	-	-
Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango	-	-	-	-	--	-	114.025	-	-
	Guava	-	-	-	-	-	-	4.980	-	-
	Banana	-	-	-	-	-	-	74.362	-	-
	Litchi	-	-	-	-	-	-	5.768	-	-
	Lemon	-	-	-	-	-	-	5.577	-	-

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	Rice	wheat	Maize	Lentil	Potato
	Kharif- Rainfed	-	-	-	-	-

	Kharif-Irrigated	3rd week of May to 4th week of June	-	-	-	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	-	2nd week of November to 2nd week of December	3rd week of October to 2nd week of November	3rd week of October to 2nd week of November	4th week of October to 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 Annexure 2	Enclosed: No
		Soil map as Annexure 3	Enclosed: YES

Annexure-I


DARBHANGA
Bihar
N
SITAMARHI
Jale
Kamtaul
MADHUBANI
Keotiranway
Singhwara
DARBHANGA
Manigachi
MUZAFFARPUR
Simri
Kursor
Bahadurpur
Bahera
Ghanshyampur
Haiaghat
Baghmati
Benipur
Mahinawan
Biraul
Baheri
SAHARSA
Hanti
Bachauli
SAMASTIPUR
Kusheshwar Asthan
KHAGARIA
District Boundary
Major Road
District Headquarter
Taluk Headquarter
Town
Roads
River
Railway Track
Map not to Scale
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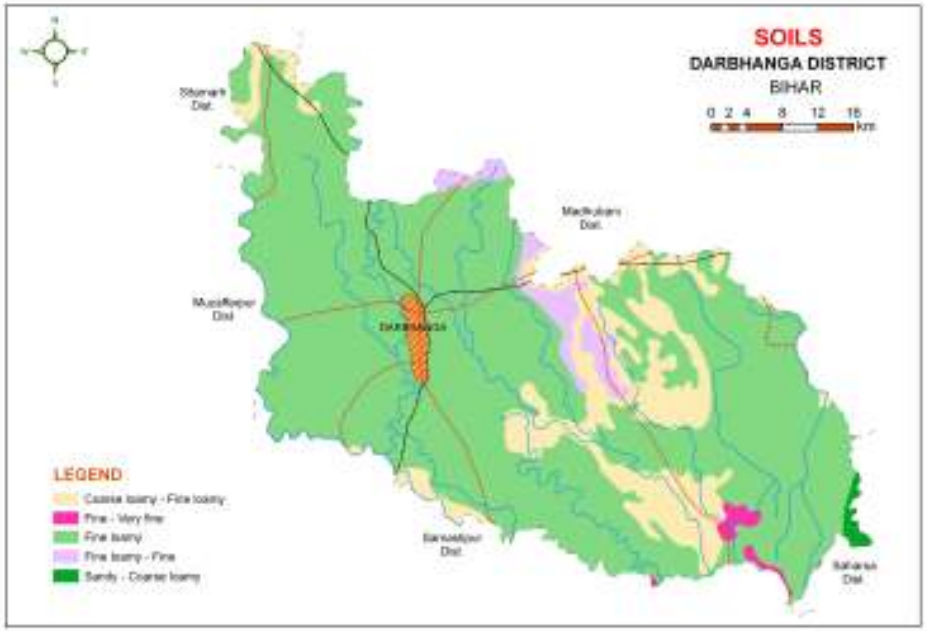
ANNUAL RAINFALL &TEMPERATURE

Annexure-III



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks **1st week of July**	**Very deep, calcareous fine loamy, loamy surface texture**	1.Rice -Wheat 2.Pigeonpea-Greengram	1.Early Rice – Wheat 2.Pigeonpea – Greengram **Greengram**: Pusa Bashaki, SML- 668, PDM-44, T-44 **Rice**: Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj **Pigeonpea** : Bahar, Pusa-9 Narendra , Arhar-1 **Wheat:** HD-2733, PBW-343, HP-1731	• Normal package of Practices • Direct seeding of rice can be done • Life saving irrigation	Seeds from RAU, Pusa, NSC, TDC, BRBN etc.
	2. Medium land	Rice - Wheat	Rice -Wheat Medium duration Rice **Rice:** Rajendra Bhagawati, Rajendra Suwasni, Rajshree, Prabhat **Wheat-** HD-2733, PBW-343, HP-1731	• Normal package of Practices • Direct seeding of rice can be done • Life saving irrigation	Seeds from RAU, Pusa, NSC, TDC , BRBN etc..

	3. Low land	Rice– Wheat Makhana (in ponds)	Rice– Wheat Medium to long duration **Rice**: Rajshree, Santosh , Sita Rajendra, Suwasni, Rajendra Sweta **Wheat**: HD-2733, PBW-343, HP-1731	• Normal package of Practices • Direct seeding of rice can be done • Life saving irrigation	Seeds from RAU, Pusa, NSC, TDC , BRBN etc..

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 **3rd week of July**	**Very deep, calcareous fine loamy, loamy surface texture**	Rice- Wheat Pigeonpea – Greengram **Greengram** : Pusa Bashaki, SML-668, PDM-44, T-44 **Rice**: Prabhat, Dhanlaxmi, Richharia, Rajendra , Bhagwati, Saroj **Pigeonpea**: Bahar, Pusa-9, Narendra, Arhar-I **Wheat**: HD-2733, PBW- 343, HP-1731	Short duration Rice-Wheat **Rice:** Prabhat, Dhanlaxmi, Richharia, Turanta Saroj **Wheat**: HD-2733, PBW- 343, HP-1731	▪ Normal seedling of rice can be used with adequate NPK ▪ Old age 30-35 days seedlings of early rice variety may also be used ▪ 20 days Dapog seedling can be used in rice ▪ Direct seeding of rice	Seeds from RAU, Pusa, NSC, TDC , BRBN etc.
	2 Medium land	Rice – Wheat	Rice-Wheat	• Full basal dose of NPK	Seeds from RAU,

		Rice : Rajendra Bhagawati, Rajendra Suwasni Rajshree, Prabhat **Wheat**: HD-2733, PBW-343, HP-1731	Mid duration Rice up to 125-130 days **Rice** : Rajendra Bhagawati, Rajendra Suwasni Rajshree, Prabhat,	• Life saving irrigation • Application of Potash	Pusa, NSC, TDC , BRBN etc.
	3. Low land	Rice – Wheat Makhana (in ponds) Var. local **Rice:** Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta **Wheat:** HD-2733, PBW- 343, HP-1731	No change in crop 130-140 days long duration variety should be selected **Rice**: Rajshree, Santosh , Sita Rajendra Suwasni, Rajendra Sweta	• Enhanced dose of nitrogen with full basal dose of NPK at transplanting • Old age rice seedling of 40-45 days may be used with three seedling per hill with close spacing	Seeds from RAU, Pusa, NSC, TDC , BRBN etc.

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 6 weeks **4th week of July**	**Scarce rainfall shallow red soils** **Very deep, calcareous fine loamy, loamy surface texture**	Rice-Wheat Pigeonpea- Greengram **Rice**: Prabhat, Dhanlaxmi, Richharia, Turanta Saroj , **Wheat:** HD-2733, PBW-343, HP-1731 **Pigeonpea:** Bahar, Pusa-9 Narendra Arhar-I **Greengram:** Pusa Baishakhi,	Early Rice – Wheat Blackgram/ Horsegram-Wheat **Blackgram:** T-9, Navin, Pant Moong-30 , Pant Moong -19 **Horsegram**: DB-7, BR-5, BR-10, Coimbatore-1 **Wheat**: HD-2733, PBW-343, HP-1731 **Rice**: Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj	• Direct seedling Rice • Dapog seedling can be used • Application of Potasic fertilizer at adjuvant vegetative stage • Zero tillage for Rice & wheat to makeup the time • Protective spray of pesticides with adjuvant against BLB & BLAST& Helmintho sporium leaf spot. • Transplanting of old age	Seeds from RAU, Pusa, NSC, TDC , BRBN etc.

		SML- 668, PDM-44, T-44		seedling of 30-35 days	
	2 Medium land	Rice – Wheat **Rice** - Rajendra Bhagawati, Rajendra Suwasni Rajshree, Prabhat **Wheat-** HD-2733, PBW-343, HP-1731	Rice (Short duration)-Whet Blackgram/ Horsegram-Wheat Blackgram- T-9, Navin, Pant Mung-30 , Pant Mung-19 H**orsegram**- DB-7, BR-5, BR-10, Coimbatore-1 **Wheat-** HD-2733, PBW-343, HP-1731	• Enhanced basal dose of NPK to boost the early vegetative growth • Application of Potasic fertilizer with adjuvant • Direct seedling of Rice • Use of 20 days old dapog seedling for rice • Protective spray of pesticides with adjuvant against BLB & BLAST& Helminthosporium leaf spot.	Seeds from RAU, Pusa, NSC, TDC , BRBN etc.
	3 Low land	Rice-wheat-green gram (Moong)	Rice (Short Duration)-Wheat Rice -Vegetable Rice- Pulses Rice Oilseed **Rice**- Rajshree, Santosh , Sita Rajendra Suwasni, Rajendra Sweta **Wheat** - HD-2733, PBW-343, HP-1731, HD-2824 **Oilseeds**- 66-197-3, Rajendra Sarson-I	• Dapog Nursery raised 20 days old seedling should be used for Rice • Zero tillage for Rice and wheat to make up the time • Direct seeding Rice • Application of Potassic fertilizer at vegetative stage • Protective spray of pesticides • Enhanced basal dose of NPK	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 8 weeks **2nd week of**	**Very deep, calcareous fine loamy, loamy**	Rice-Wheat	Blackgram/Horsegram - Rabi maize Blackgram/Horsegram -Sep. Pigeonpea Blackgram/Horsegram -Late wheat Blackgram/Horsegram -vegetables	• Enhanced basal dose of NPK to boost the early vegetative growth.	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

August	**surface texture**		Blackgram/Horsegram -Lentil Blackgram/Horsegram -Potato Blackgram/Horsegram -Rai **Rai**- Varuna Kranti, Pusa Bold, Rajendra Rai Pichheti **Blackgram**- T-9, Navin, Pant Blackgram-30 , Pant Blackgram-19 **Rabi Maize**- Saktiman-1,2,3,4, Laxmi, Deoki, Rajendra Hybrid -1,2 **Late Wheat** – HUW-234, PBW-14, HP-1744, HD-2643 **Mustard**- 66-197-3, Rajendra Sarson-I **Potato** – PJ376, Rajendra Aloo-1,2,3, Kufri Jyoti **Pigeonpea –** Sharad, Pusa-9 **Lentil**- PL-406, Malika, Arun **Horsegram-** DB-7, BR-5, BR-10, Coimbatore-1	• Moisture conservation • Interculturing • Protective spray of pesticides	
	2) Medium land	Maize-Wheat Rice-Wheat	Sesame –Rabi maize Sesame-Late Wheat **Sesame** – Krishna, Pragati **Rabi Maize**- Saktiman-1,2,3,4, Laxmi, Deoki, Rajendra Hybrid-1,2 **Early Rice**-Prabhat, Dhanlaxmi, Richharia, Turanta **Late Wheat** –HUW-234, C-306, DBW-14,HP-1744, HD-2643	• Zero for wheat to make up the time • Spray of potassic fertilizer with adjuvant in Rice at vegetative stage • Life saving irrigation to Rice nursery raised • Use of 20 days old Dapog seedling in Rice • Direct seeding of rice • Enhanced basal dose of NPK in rice to boost early vegetative growth • Protective spray of pesticides with adjuvant against pest & disease • Application of organic manure and vermicompost initially for Rice and other	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

				crops	
		Pigeonpea – Greengram	September Pigeonpea- Greengram **Greengram** : Samrat, Pusa Vishal, SML 668, PDM-44, T-44 Sept.**Pigeonpea**: Pusa-9, Sharad Narendra Arhar-I	• Application of organic manure and vermicompost initially for Rice and other crops	Seeds from RAU, Pusa, NSC, TDC , BRBN etc
	3) Low land	Rice- Potato	Rice-Potato Rice-wheat **Rice**- Rajshree, Santosh , Sita Rajendra Suwasni, Rajendra Sweta **Wheat-** HD-2733, PBW-343, HP-1731, HD-2824 **Potato** – PJ376, Rajendra Aloo-1,2,3, Kufri Jyoti	• Application of organic manure and vermicompost initially for Rice and other crops	Seeds from RAU, Pusa, NSC, TDC , BRBN etc
		Rice-wheat-green gram	Sept. Pigeonpea- Greengram Sesame-Rabi maize **Pigeonpea** – Bahar, Pusa-9 Narendra Arhar-I **Rabi Maize** - Saktiman-1,2,3,4, Laxmi, Deoki, Rajendra Hybrid – 1,2 **Greengram**– Samrat, Pusa Vishal, SML 668, **Sesame** – Krishna, Pragati	• Normal practices for sesame, Pigeonpea	Seeds from RAU, Pusa, NSC, TDC , BRBN etc
		Sugarcane (Feb. and Oct. Planting) **Sugarcane** – BO	No change	▪ Weeding ▪ Interculturing ▪ Life saving irrigation ▪ Fertizer, Pesticides application, propping etc.	Seeds from RAU, Pusa,

		141, BO 147, BO 136, BO91			

Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc. **1st week of July**	**Very deep, calcareous fine loamy, loamy surface texture**	Rice-Wheat **Rice-** Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj **Wheat-** HD-2733, PBW 343, HP-1731, HD-2824	• Life saving irrigation • Gap filling of existing crop • Thinning	• Application of potash • Inter culturing • Mulching through mechanical weeding for moisture conservation • Conservation tillage • Inter culturing • Protective spray of pesticides with adjuvant against Pesticides and disease	Seeds from RAU, Pusa, NSC, TDC , BRBN etc
	Medium land	Maize-wheat **Maize** - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3 **Wheat-** HD-2733, PBW-343, HP-1731, HD-2824	• Life saving irrigation • Gap filling	• Application of potash • Inter culturing • Mulching through weeds for moisture conservation • Conservation tillage • Inter culturing • Protective spray of pesticides with adjuvant against Pesticides and disease	Seeds from RAU, Pusa, NSC, TDC , BRBN etc
		Pigeonpea-Greengram Pigeonpea – Bahar, Pusa-9 Narendra Arhar-I Greengram – Samrat, Pusa Vishal, SML 668,	• Pre sowing irrigation • higher seed rate • Gap filling	• Application of potash must at final land preparation • Inter culturing • Mulching through weeds for moisture conservation • Conservation tillage • Inter culturing • Spray potassic fertilizer with adjuvant at vegetative stage • Protective spray of	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

				pesticides with adjuvant against Pesticides and disease	
	Low land	Rice-wheat-green gram **Rice**- Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta **Wheat**- HD-2733, PBW-343, HP-1731, HD-2824 **Green Gram**- SML-6-68, Pusa Vishal, Samarat	• Life saving irrigation • Gap filling through Dapog nursery	• Application of potash must at final land preparation • Inter culturing • Mulching through weeds for moisture conservation • Conservation tillage • Inter culturing • Spray potassic fertilizer with adjuvant at vegetative stage • Protective spray of pesticides with adjuvant against Pesticides and disease	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Very deep, calcareous fine loamy, loamy surface texture	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	• Gap filling of existing crop • Postponement of top dressing • Protective spray of pesticides with adjuvant against BLB, BLAST & Helmintho sporium leaf spot	• Inter culturing • Mulching through weeds, • Conservation tillage • Life saving irrigation • Spray of potassic fertilizer with adjuvant • Spray (1%) Urea on the crops •	Seeds from RAU, Pusa, NSC, TDC , BRBN etc
		Pigeonpea(Arhar)-Greengram **Pigeonpea** – Bahar, Pusa-9 Narendra Arhar-I			Seeds from RAU, Pusa, NSC, TDC , BRBN etc

		Greengram – Samrat, Pusa Vishal, SML 668, PDM-44, T-44			
	Medium land	Rice-wheat-green gram **Rice-** - Rajendra Bhagawati, Rajendra Suwasni Rajshree, Prabhat **Wheat**- HD-2733, PBW-343, HP-1731, HD-2824 **Greengram-** SML-6-68, Pusa Vishal, Samarat	• Gap filling of existing crop • Postponement of top dressing • Protective spray of pesticides with adjuvant against BLB, BLAST & Helmintho sporium leaf spot	• Inter culturing • Mulching through weeds, • Conservation tillage • Life saving irrigation • Spray of potassic fertilizer with adjuvant • Spray (1%) Urea on the crops	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
At flowering/ fruiting stage	Up land	Rice-Wheat Vegetable – Wheat **Rice**-Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj **Wheat**- HD-2733, PBW-343, HP-1731, HD-2824	• IPM practices • Spray of pesticides with spreader	• Inter culturing • Mulching through weeds • Conservation tillage • Life saving irrigation • Spray of potassic fertilizer with adjuvant	Seeds from RAU, Pusa, NSC, TDC , BRBN etc
	Medium land	Maize-wheat **Maize** - Shaktiman-1,2,3,4 Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3 **Wheat**- HD-2733, PBW-343, HP-1731, HD-282	• IPM practices • Clipping of maize leaves • Spray of pesticides with spreader	• Inter culturing • Mulching through weeds • Conservation tillage • Life saving irrigation • Spray of potash and nitrogen fertilizer with adjuvant	Seeds from RAU, Pusa, NSC, TDC , BRBN etc
		Redgram (Arhar)-Greengram Var. Bahar, Narendra Arhar-1	• If Rice crop withers & gets damaged Black gram/Sesame-Wheat should be followed • IPM practices • Clipping of maize leaves • Spray of pesticides with	• Inter culturing, mulching through weeds • Life saving irrigation • Conservation tillage • Spray of potassic fertilizer with adjuvant	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

			spreader		
	Low land	Rice-wheat-green gram **Rice**- Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta **Wheat**- HD-2733, PBW-343 HP-1731, HD-2824 **Greengram**- SML-6-68, Pusa Vishal, Samarat	• IPM practice	• Inter culturing • Mulching through weeds • Life saving irrigation • Conservation tillage • Spray of potassic fertilizer with adjuvant,	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

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**
	Very deep, calcareous fine loamy, loamy surface texture	Rice-Wheat **Rice**-Prabhat, Dhanlaxmi, Richharia, Turanta , Saroj **Wheat**- HD-2733, PBW-343, HP-1731, HD-2824	• Spray of potassic fertilizer with adjuvant • IPM practices • Life saving irrigation • Mulching • Thinning • Clipping of leaves in maize	• 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 RAU, Pusa, NSC, TDC , BRBN etc
	Medium land	Maize-wheat **Maize** - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3 **Wheat-** HD-2733, PBW-343, HP-1731, HD-2824		• 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 RAU, Pusa, NSC, TDC , BRBN etc

		Redgram (Arhar) Var. Bahar, Narendra Arhar-1		• 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 RAU, Pusa, NSC, TDC , BRBN etc
	Low land	Rice-wheat-Greengram **Rice**- Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta **Wheat**- HD-2733, PBW-343, HP-1731, HD-2824 **Greengram**- SML-6-68, Pusa Vishal, Samarat		• 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 RAU, Pusa, NSC, TDC , 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	**Tankfed medium deep black soils**	Not applicable			

Condition			**Suggested Contingency measures**

	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system[h]	Agronomic measures[i]	Remarks on Implementation
Limited release of water in canals due to low rainfall	**Tankfed medium deep black soils**	Not applicable			

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**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	**Tankfed medium deep black soils**	Not applicable			

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping syste**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Upland	Rice-Wheat/ Oilseeds / Pulses/ Rabi maize/ Blackgram / Sesame **Rice**-Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj **Pigeonpea** – Bahar, Pusa-9 Narendra Arhar-I **Sesame-** Krishna Pragati **Blackgram**- T-9, Navin, Pant Blackgram-30 , Pant	Short duration of rice –pigeonpea Blackgram sesame **Rice**-Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj **Pigeonpea** – Bahar, Pusa-9 Narendra Arhar-I **Sesame**- Krishna Pragati **Blackgram**- T-9, Navin, Pant Mung-30 , Pant Mung -19	• 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 RAU, Pusa, NSC, TDC , BRBN etc

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping syste**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
		Blackgram-19			
	Medium Land	Rice-Wheat/ Oilseeds / Pulses/ Rabi maize/ **Rice- -** Rajendra Bhagawati, Rajendra Suwasni Rajshree, Prabhat **Wheat**- HD-2733, PBW-343, HP-1731, HD-2824 **Rabi Maize**-Saktiman-1,2, 3,4, Laxmi, Deoki, Rajendra Hybrid -1,2	Short duration of rice Pigeonpea- Greengram/ Blackgram-Wheat / Sesame –Wheat **Rice**- Rajendra Bhagawati, Rajendra Suwasni Rajshree, Prabhat **Pigeonpea** – Bahar, Pusa-9 Narendra Arhar-I **Sesame-** Krishna Pragati **Blackgram-** T-9, Navin, Pant Blackgram-30 , Pant Blackgram-19 **Greengram** – Samrat, Pusa Vishal, SML 668, PDM-44, T-44		Seeds from RAU, Pusa, NSC, TDC , BRBN etc
	Low land	Rice-Wheat/ OilseedS/ Pulses Makhana (in ponds) Var. local **Rice**- Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta **Mustard-** 66-197-3, Rajendra Sarson-I	Short duration Rice-Wheat / Lentil/ Mustard/ Linseed **Rice**- Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta **Mustard**- 66-197-3, Rajendra Sarson-I **Lentil**- PL-406, Malika, Arun **Linseed**- Shubra, Garima, Sweta		Seeds from RAU, Pusa, NSC, TDC , BRBN etc

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping syste**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Insufficient groundwater recharge due to low rainfall	Upland	Rice-Wheat/ Oilseeds/ Pulses/ Rabi maize	Short duration of Rice- Wheat/ Pigeonpea/ Blackgram/ sesame **Rice**-Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj **Pigeonpea** – Bahar, Pusa-9 Narendra Arhar-I **Wheat**- HD-2733, PBW-343, HP-1731, HD-2824 **Sesame-** Krishna Pragati Blackgram- T-9, Navin, Pant Mung-30 , Pant Mung -19	• 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 RAU, Pusa, NSC, TDC , BRBN etc
Any other condition (specify)	Medium Land	Rice-Wheat/ Oilseeds/ Pulses/ Maize **Rice**- Rajendra Bhagawati, Saroj, Rajendra Suwasni, Santosh, R. Kasturi, Sita, Jaya	Short duration of Rice- Pigeonpea/ Blackgram/ Sesame **Rice**- - Rajendra Bhagawati, Rajendra Suwasni Rajshree, Prabhat **Pigeonpea** - Pusa-9 Narendra		Seeds from RAU, Pusa, NSC, TDC , BRBN etc

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
		Wheat- HD-2733, PBW-343, HP-1731, HD-2824 **Mustard**- 66-197-3, Rajendra Sarson-I	Arhar-I **Rabi Maize**- Saktiman-1,2,3,4, Laxmi, Deoki, Rajendra Hybrid 1,2 **Sesame**- Krishna Pragati **Blackgram**- T-9, Navin, Pant Blackgram-30 , Pant Blackgram-19		
	Low land	Rice-Wheat/ Oilseeds / Pulses Makhana (in ponds) Var. local **Rice-** Rajendra Bhagawati, Saroj, Rajendra Suwasni, Santosh, R. Kasturi, Sita, Jaya **Wheat**- HD-2733, PBW-343, HP-1731, HD-2824 **Mustard-** 66-197-3, Rajendra Sarson-I	Short duration Rice-Wheat/Lentil/Mustard/Linseed **Rice-** Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta **Mustard**- 66-197-3, Rajendra Sarson-I **Lentil**- PL-406, Malika, Arun **Linseed**- Shubra, Garima, Sweta		Seeds from RAU, Pusa, NSC, TDC , BRBN etc

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 • Re transplanting through Dapog nursery if needed	• Drainage management • Subsequently crop if totally damaged i.e.	• Drainage management • Subsequent crop if totally damaged	Storage at safer place

	• Gap filling • Re sowing through drum seeder	Toria	• Harvest at physiological maturity	
Maize	• Drainage management • Gap filling • Re sowing, 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 Kharif Arhar 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	• Re sowing , 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	
Litchi	• Drainage management • Replanting, if completely damaged	• Drainage management	• Drainage management • Spray and pasting of trunk • Drenching with copper fungicide	
Banana	• Drainage management • Replanting, if completely damaged	• Drainage management	• Drainage management • Spray and pasting of trunk	
Papaya	• Drainage management • Replanting, if completely damaged	• Drainage management	• Drainage management • Spray and pasting of trunk	• Safe storage and transportation
Heavy rainfall with high speed winds in a short span				
Rice	• 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	
Litchi	▪ Drainage management ▪ Gap filling	Drainage management	• Drainage management • Drenching with copper fungicide	
Banana	• Drainage management • Replanting if substantially damaged	• Drainage management • Staking	• 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				
Rice	• Seedling treatment with Carbendazin + Emidachloroprid • 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	• Spray of specific pesticides with adjuvant	Storage at safer place

		• Drainage management	• Drainage management	
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	
Litchi	• Spray of pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	
Banana	• 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[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Water logging/Partial inundation	Seedling/ Nursery stage	Vegetative stage	Reproductive stage	At harvest
Rice 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	• Drainage management • Alternative crops if totally damaged like maize or	• Drainage management • Harvest at physiological maturity	Storage at safer place

	• Gap filling, if needed	subsequent crop i.e. Toria		
Pigeonpea	• 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 • Drainage management	• Drenching with copper fungicides • Drainage management	• Drenching with copper fungicides • Drainage management	Judicious harvesting
Litchi	• Gap filling • Replanting if substantially damaged • Drainage management	• Drenching with copper fungicides • Drainage management	• Drenching with copper fungicides • Drainage management	Judicious harvest
Banana	• Replanting if substantially damaged • Gap filling • Drainage management	• Drenching with copper fungicides • Drainage management	• Drenching with copper fungicides • Drainage management	Judicious harvesting
Guava	• Replanting if substantially damaged • Gap filling • Drainage management	• Drenching with copper fungicides • Drainage management	• Drenching with copper fungicides • Drainage management	Judicious harvesting
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	• Re planting 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	• Re sowing or gap filling as the case may be	• Toria/Late wheat if completely damaged	Storage at safer place
Horticulture				
Mango	• Drainage management			
Guava	• Drainage management			
Banana	• Drainage management			
Sea water intrusion[3]	Not applicable			

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

Extreme event type	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**

Heat Wave				
Rice	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	
Pigeonpea	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	
Litchi	Life saving irrigation	Life saving irrigation	Life saving irrigation	
Papaya	Life saving irrigation	Life saving irrigation	Life saving irrigation	
Cold wave				
Wheat		Irrigation, inter culturing, mulching by weeds		
Maize		Irrigation, inter culturing, mulching by weeds		
Mustard		Irrigation, inter culturing, mulching by weeds		
Potato		Irrigation, inter culturing, mulching by weeds		
Pulses		Irrigation, inter culturing, mulching by weeds		
Horticulture				
bhendi		Irrigation, inter culturing, mulching by weeds		
Brinjal		Irrigation, inter culturing, mulching by weeds		
chili		Irrigation, inter culturing, mulching by weeds		
tomato		Irrigation, inter culturing, mulching by weeds		

lauki		Irrigation, inter culturing, mulching by weeds		
Frost				
wheat		Irrigation, inter culturing, mulching by weeds		
Gram		Irrigation inter culturing, mulching by weeds		
Pigeonpea		Irrigation, inter culturing, mulching by weeds		
Lentil		Irrigation, inter culturing, mulching by weeds		
Horticulture				
Bhendi	Treat the seeds in 0.2% soln of Dithane M-45	Irrigation, inter culturing, mulching by weeds		
Brinjal		Irrigation, inter culturing, mulching by weeds		
Chilli		Irrigation, inter culturing, mulching by weeds		
Tomato & Potato	Treat the seeds in 0.2% soln of Dithane M-45	Earth up to 15cm ht. Irrigation, inter culturing, 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				

Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event[s]	**During the event**	**After the event**
Drought			
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 Rice 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. Sesame 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.** Sorghum/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. This will be helpful not only to check epidemic in animals, but also to reduce the probability of	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. The people should be made conscious through announcement with the help of mikes or other means of	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 temporary sheds with the help of bleaching powder, phenol, carbolic acid etc. In no case the

	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.	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 Diarrhoeal diseases outbreaks can occur after drinking contaminated water. Diseases that can occur during flood should be given special attention and	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. 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

		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 and Poultry shed Disinfection of livestock premises and the temporary sheds should be done with the help of bleaching powder, phenol, carbolic acid etc	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.
Cyclone			

Heat wave and cold wave			

[s] based on forewarning wherever available

2.5.2 Poultry

	suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	**During the event**	**After the event**	
Drought				
Floods				
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 • **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				
Heat wave and cold wave				

[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			
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			
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			
B. Aquaculture			
4. Heat wave and cold wave			
A. Capture			
B. Aquaculture			

[a] based on forewarning wherever available