

State: Bihar

Agriculture Contingency Plan for District: Jehanabad

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Sub Region (ICAR)	Northern Plain, Hot Subhumid (Dry) Eco-Region (9.2)		
	Agro-Climatic Zone (Planning Commission)	Middle Gangetic Plain Region (IV)		
	Agro Climatic Zone (NARP)	South Bihar Alluvial Plain Zone (BI-3)		
	List all the districts or part thereof falling under the NARP Zone	Patna, Nalanda, Nawada, Arwal, Aurangabad, Gaya, Jehanabad, Rohtas, Kaimur, Buxar, Bhojpur		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		25.2 ⁰ N	84.9 ⁰ E	55.8 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Agricultural Research Institute, Lohinagar, Patna		
	Mention the KVK located in the district	K.V.K., Gandhar, Jehanabad (Block : Modanganj)		
Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	BAC, Sabour , Bhagalpur			

1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset	Normal Cessation
	SW monsoon (June-Sep)	911	70	2 nd week of June	4 th week of September
	NE Monsoon(Oct-Dec)	98	22	4 th week of October	4 th week of December
	Winter (Jan- Feb)	24	8		
	Summer (Mar-May)	0	0		

	Annual	1033	100								
1.3	Land use pattern of the district (latest statistics)	Geographical Area	Cultivable area	Forest area	Land under non-agricultural use	Permanent Pastures & Current follow	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current Fallows	Other fallows
	Area (000 ha)	95.9	49.9	0.6	14.6	0.9				16.4	

1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	1. Old-alluvial clay soils	42.0	43.8
	2. Old-alluvial loamy soils	53.9	56.2

1.5	Agricultural land use	Area (000 ha)	Cropping intensity %
	Net sown area	49.9	126%
	Area sown more than once	13.3	
	Gross cropped area	63.2	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	33.3		
	Gross irrigated area	43.2		
	Rainfed area	16.6		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	596	8.4	19.4
	Tanks			
	Open wells	55956	29.9	67.8
	Bore wells			
	Lift irrigation schemes			

	Micro-irrigation			
	Other sources (please specify)	800	3.9	9.07
	Total Irrigated Area		43.2	
	Pump sets	6110		
	No. of Tractors	1833		
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water
	Over exploited			
	Critical			
	Semi- critical	Seven	90	Neutral
	Safe			
	Wastewater availability and use			
	Ground water quality			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

1.7 Area under major field crops & horticulture (as per latest figures)

1.7	Major field crops cultivated	Area ('000 ha)							
		<i>Kharif</i>			<i>Rabi</i>			Summer	Grand total
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
	Rice	57.7		57.7					57.7
	Wheat				3.09		3.09		3.09
	Maize		0.56	0.56	0.23		0.23		0.79
	Pigeonpea		1.7	1.7					1.7
	Greengram/Blackgram		1.02	1.02				1.02	2.05
	Lentil					0.96	0.96		0.96
	Chickpea					0.7	0.7		0.7
	Mustard/Toria					3.6	3.6		3.6

	Horticulture crops - Fruits	Area ('000 ha)		
		Total Area (000 ha)	Irrigated	Rainfed
	Mango	0.2		0.2
	Guava	0.2		0.2
	Banana	0.13	0.05	0.08
	Papaya	0.017	0.007	0.01
	Horticulture crops - Vegetables	Total Area (0000ha)	Irrigated	Rainfed
	Potato	0.4	0.4	
	Pumpkin	0.9	0.4	0.5
	Tomato	0.7	0.4	0.3
	Brinjal	0.6	0.4	0.2
	Onion	0.5	0.5	
	Medicinal and Aromatic crops	Total	Irrigated	Rainfed
	Plantation crops	Total	Irrigated	Rainfed
	Fodder crops	Total Area (000 ha)	Irrigated	Rainfed
	Maize	0.650	0.300	0.350
	Berseem	0.045	0.015	0.030
	Lucerne	0.030	0.010	0.020
	Total fodder crop area	0.725	0.325	0.400
	Grazing land			
	Sericulture etc			

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	163	142	305
	Crossbred cattle	0.2	0.98	1.18

	Non descriptive Buffaloes (local low yielding)	17	34	51		
	Graded Buffaloes					
	Goat			72		
	Sheep			5		
	Others (Camel, Pig, Yak etc.)			2		
	Commercial dairy farms (Number)			529		
1.9	Poultry	No. of farms	Total No. of birds ('000)			
	Commercial	24	120			
	Backyard	182	18			
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		
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs	No. of village tanks	
				275		
	B. Culture					
		Water Spread Area (000 ha)	Yield (t/ha)	Production ('000 tons)		
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)					
	ii) Fresh water (Data Source: Fisheries Department)	520.4	3.2	520.4		

1.11 Production and Productivity of major crops (Average of 5 years: 2003- 07)

1.11	Name of crop	Kharif	Rabi	Summer	Total	Crop
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		Production ('000 M.T)	Productivity (Kg/ha)	Production ('000 M.T)	Productivity (Kg/ha)	Production ('000 M.T)	Productivity (Kg/ha)	Production ('000 M.T)	Productivity (Kg/ha)	residue as fodder ('000 tons)
Major Field crops (Crops identified based on total acreage)										
	Rice	201.9	3500					201.9	3500	
	Wheat			66.2	2143			66.2	2143	
	Maize	1.9	3500	0.46	2000			2.36	5500	
	Lentil			0.96	1000			0.96	1000	
	Chickpea			0.84	1200			0.84	1200	
	Mustard			3.12	867			3.12	867	
Major Horticultural crops (Crops identified based on total acreage)										
	Mango							2169		
	Banana							4984		
	Guava							1988		
	Papaya							396		

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Rice	Wheat	Lentil	Chickpea	Greengram	Pigeon pea
	Khariif- Rainfed	4 th week of June – 2 nd week of July	-	-	-	Summer- 2 nd week of March - 1 st week of April -	1 st week of July – 31 st July
	Khariif-Irrigated	4 th week of May – 4 th week of June	-	-	-	-	-
	Rabi- Rainfed	-	1 st week November – 3 rd week November	3 rd week of October - 2 nd week of November	3 rd week of October - 1 st week of March	-	-
	Rabi-Irrigated	-	2 nd week of November - 2 nd week of December	3 rd week of October – 2 nd 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 (Late Blight in potato, Aphids in mustard, leaf hopper in Rice, lose sworn in wheat etc)			√

1.14	Include Digital maps of the district for		
		Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

Annexure I

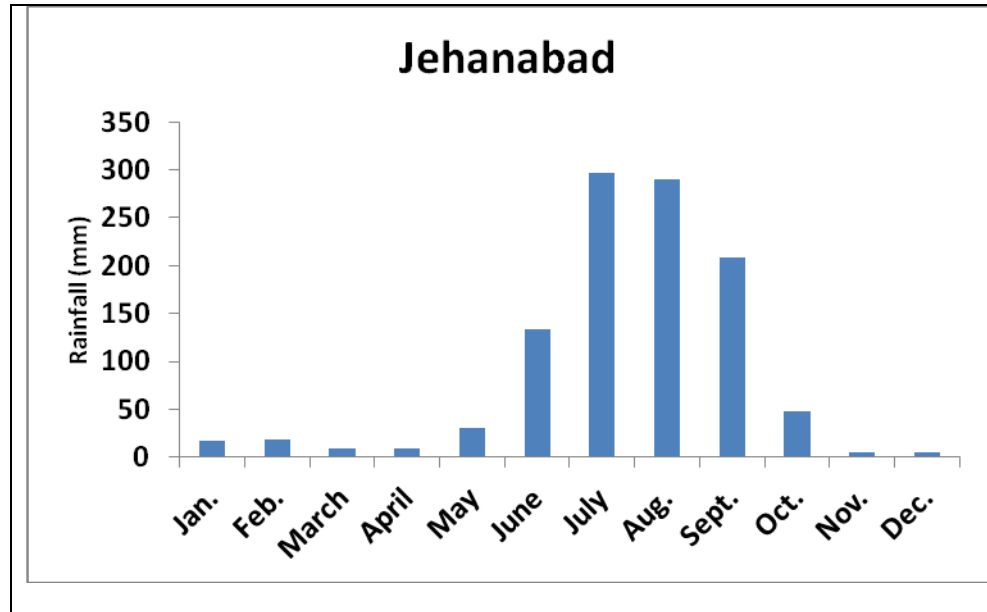
Agro climatic Zones of Bihar



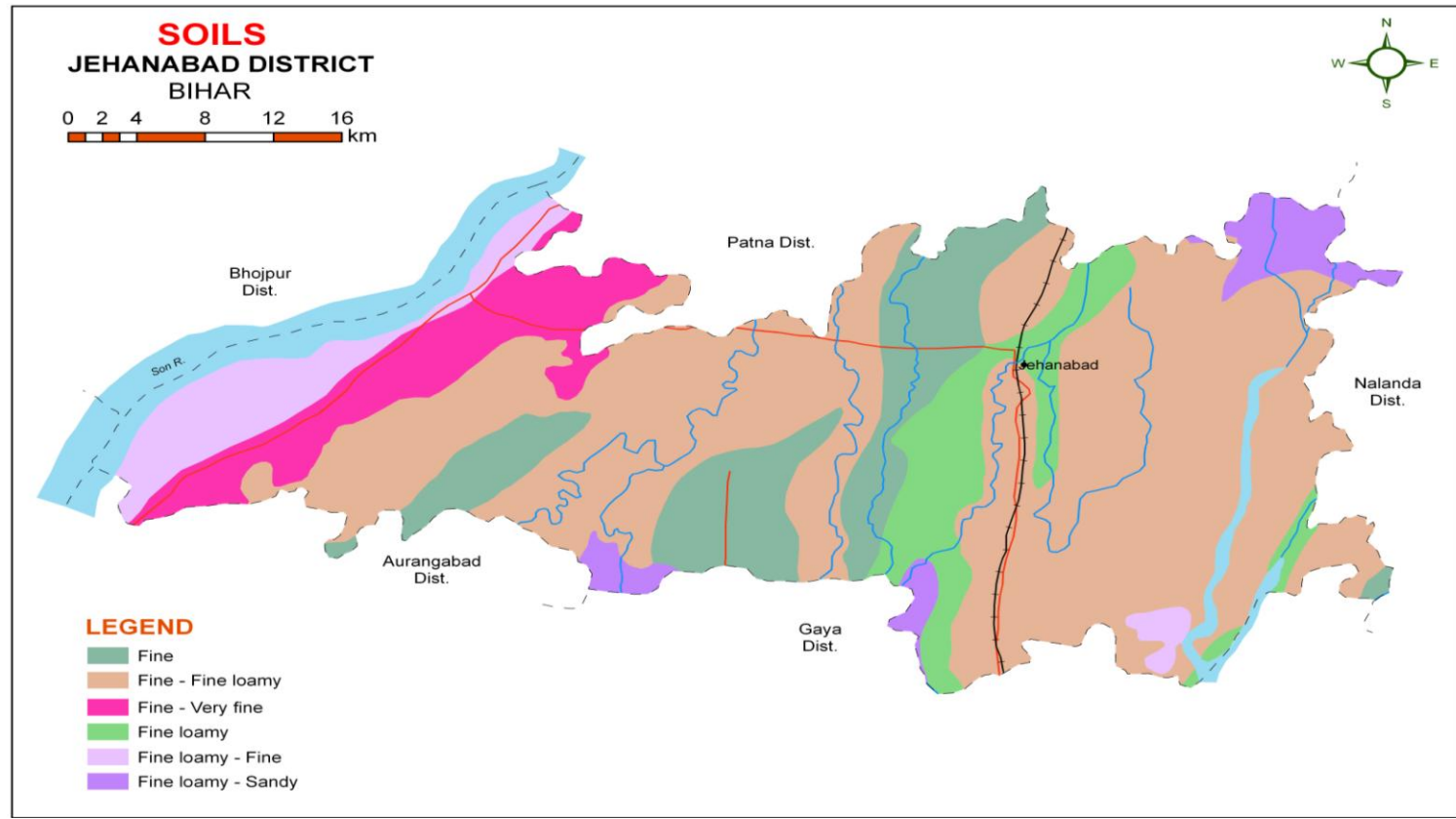
Source: krishi.bih.nic.in

Annexure II

Mean Monthly Rainfall (mm)



Annexure III



Source: NBSS&LUP, Kolkata

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 2 weeks 4 th week of June	Upland Medium deep, Sandy to Sandy loam soils	Pigeonpea Maize - Vegetables	Pigeonpea Pigeonpea – Bahar, Pusa-9 Narendra Arhar-I , ICPL 88039	<ul style="list-style-type: none"> • Normal package of Practices • Balanced use of fertilizers • Application of balanced use of fertilizers and manures • 	-
			Pigeonpea –Finger millet Pigeonpea – Bahar, Pusa-9 Narendra Arhar-I , ICPL 88039 Finger millet– Local		
			Maize – Vegetables Maize – Deoki . Ganga -2		
	Medium land Deep Sandy loam to Clay loam soils	Rice- Wheat- Greengram Rice –Vegetables Rice-Wheat	Medium duration Rice-Wheat – Greengram Rice - Rajendra Bhagawati, Rajendra Suwasni,Prabhat	<ul style="list-style-type: none"> • Normal package of Practices • Direct seeding of rice can be done • Drum seedling • Raise staggered community nursery preferably with medium duration varieties in mid and lowlands • Application of fertilizers especially phosphorous and potash to be ensured under late transplanted conditions in severely affected districts. 	
			Rice – Vegetables Rice - Rajendra Bhagawati, Rajendra Suwasni,Prabhat , early , Kuwan		
	Low land Deep Sandy loam	Rice – Wheat Rice – Wheat – Greengram	Rice – Wheat Rice- Sita , RM -1 Rajendra Suwasni, Rajendra Sweta		

	to Clay loam soils	Rice – Lentil/Chickpea Fallow – Lentil / Chickpea	Rice – Wheat – Chickpea Rice- Sita , RM -1, Rajendra Suwasni, Rajendra Sweta	<ul style="list-style-type: none"> • Interculture for timely weed control in direct seeded rice • Life saving irrigation 	
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Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 4 weeks 2 nd week of July	Upland	Pigeonpea- Pigeonpea Maize - Vegetables	Pigeonpea Pigeonpea – Bahar, Pusa-9 Narendra Arhar-I , ICPL 88039	<ul style="list-style-type: none"> • Normal package of Practices <ul style="list-style-type: none"> ▪ 	Seeds from RAU, Pusa, NSC, TDC , BRBN , KVKetc.
	Medium deep, Sandy to Sandy loam soils		Maize – Vegetables Maize – Dewki . Ganga -2		
	Medium land Deep Sandy loam to Clay loam soils	Rice- Wheat- Greengram Rice –Vegetables Rice-Wheat	Rice-Wheat – Greengram Rice - Rajendra Bhagawati, Rajendra Suwasni, Prabhat	<ul style="list-style-type: none"> • Where field is moist, direct seeding of medium duration varieties (125 days) can be done during second fortnight of July in midlands. Post-emergence herbicide 	
			Rice – Vegetables Rice - Rajendra Bhagawati, Rajendra Suwasni Prabhat		

	3 Low land Deep Sandy loam to Clay loam soils	Rice – Wheat Rice – Wheat – Greengram Rice – Lentil/ Chickpea Fallow – Lentil/ Chickpea	Rice – Wheat Rice – Lentil / Chickpea Rice – Wheat/ Chickpea Rice- Direct/ dapog seedlings with Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta, Swarna sub-1	<p>application use is essential</p> <ul style="list-style-type: none"> • Use mat nursery/ dapog nursery , mat nursery (dapog method) can be raised for quick availability of young seedlings for transplanting of medium duration varieties by first fortnight of August in mid and low lands • Raise staggered community nursery preferably with short duration varieties in mid and lowlands • Transplant with 30-35 days old seedling may be used with 3-4 seedling per hill with close spacing. • Enhanced dose of nitrogen with full basal dose of NPK at the time of transplanting to boost the early vegetative growth in late plantings under sufficient moisture • Timely interculture for weed control in direct seeded rice • Life saving irrigation 	
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Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					

Delay by 6 weeks 4 th week of July	Upland Medium deep, Sandy to Sandy loam soils	Pigeonpea- Pigeonpea Maize - Vegetables	Pigeonpea Pigeonpea – Bahar, Pusa-9 Narendra Arhar-I, ICPL 88039	<ul style="list-style-type: none"> • Normal package of Practices 	Seeds from RAU, Pusa, NSC, TDC, BRBN, KVK etc.
			Blackgram/ Finger millet-Wheat Blackgram- T-9, Navin, Pant Blackgram-30 , Pant Blackgram-19 Finger millet- DB-7, BR-5, BR-10, Coimbatore-1		
	Medium land Deep Sandy loam to Clay loam soils	Rice- Wheat Rice –Toria Rice-Vegetables	Blackgram/ Finger millet-Wheat Blackgram- T-9, Navin, Pant urd-30 , 19 Finger millet- DB-7, BR-5, BR-10, Coimbatore-1		
Low land Sandy loam to Clay loam soils	Rice – Wheat Rice – Lentil/ Chickpea Fallow – Lentil / Chickpea	Rice – Wheat Rice- Sita , RM -1 Rajendra Suwasni, Rajendra Sweta Rice (Short Duration)-Wheat			

			<p>Rice- Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj</p> <p>If dry spell continues, direct seeding of short duration rice varieties (100 days) can be done in midlands by first fortnight of August and extra short duration (70-75 days) up to 25th August</p>	
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Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		Remarks on Implementation
			Change in crop/cropping system	Agronomic measures	
Delay by 8 weeks 2 nd week of August	Upland Medium deep, Sandy to Sandy loam soils	Pigeonpea- Pigeonpea Maize - Vegetables	<p>Pigeonpea Pigeonpea – Bahar, Pusa-9 Narendra Arhar-I , ICPL 88039</p> <p>Maize – Toria Maize – Dewki . Ganga -2 Toria – panchali , Bhavani</p>	<ul style="list-style-type: none"> • Moisture conservation • Inter cultivation • Sowing of <i>rabi</i> crops such as Wheat, Lentil, Chickpea, Pea, Mustard (Pusa Mahak, RAU TS17), Linseed (Garima) and Vegetables 	Seeds from RAU, Pusa, NSC, TDC , BRBN KVK etc
	2. Medium land Deep Sandy loam to Clay loam soils	Rice- Wheat Rice –Toria Maize – Wheat Maize – Vegetables	<p>Rice – Wheat Rice - Rajendra Bhagawati, Rajendra Suwasni,Turanta, PR113, 115 , Prabhat , Susksh Samrat</p> <p>Pigeonpea Sept.Pigeonpea–Pusa-9, Sharad Narendra Arhar-I</p> <p>Rice - Toria Rice - Rajendra Bhagawati, Rajendra Suwasni,Turanta, PR113, 115 , Prabhat , Susksh Samrat</p>	<ul style="list-style-type: none"> • Direct seeding of rice • Mat nursery (dapog method)/ Community nursery can be raised for quick availability of young seedlings for transplanting of medium duration varieties by first fortnight of August • Use of 20 days old dapog seedling in rice. • Enhanced basal dose of NPK in rice to boost early vegetative growth • Supply of contingency crop seeds 	

			<p>Direct seeded rice (DSR) with short duration (80-90 days) varieties (Turanta dhan, Prabhat, Anjali, Vandana, CR-Dhan-40 etc.) can be taken up in midlands till the end of August subject to availability of at least one assured irrigation</p> <p>Early Rice-Prabhat, Dhanlaxmi, Richharia, Turanta</p>	<p>of Toria, Maize (QPM varieties, Swann composite-65-70 days; HM-4 hybrid baby corn), Arhar (Bahar, NDA1, Pusa 9), Urd (Navin and T9), Cowpea and Horsegram need to be ensured for taking up of sowing in September in midlands</p> <ul style="list-style-type: none"> • Fodder varieties of Jowar, Maize, Bajra in combination with legumes (cowpea and horsegram) can be taken up wherever feasible to meet the fodder requirements in deficit rainfall districts • Direct seeding of rice • Mat nursery (dapog method)/ Community nursery can be raised for quick availability of young seedlings for transplanting of medium duration varieties by first fortnight of August • Use of 20 days old dapog seedling in rice. • Enhanced basal dose of NPK in rice to boost early vegetative growth • Supply of contingency crop seeds of Toria, Maize (QPM varieties, Swann composite-65-70 days; HM-4 hybrid baby corn), Arhar (Bahar, NDA1, Pusa 9), Urd (Navin and T9), Cowpea and Horsegram need to be ensured for taking up of sowing in September in midlands • Fodder varieties of Jowar, Maize, Bajra in combination with legumes (cowpea and horsegram) can be taken up wherever feasible to meet the fodder requirements in deficit 	
			<p>Maize – Toria Maize - Dewki . Ganga -3</p>		

				rainfall districts	
	Low land Deep Sandy loam to Clay loam soils	Rice – Wheat Rice – Late Wheat Rice – Lentil/Chickpea Fallow – Lentil / Chickpea	Rice – Wheat / Rice – Late Wheat/ Rice – Potato Rice- Sita , RM -1Rajendra Suwasni, Rajendra Sweta Rice short duration (Direct seeded)- Wheat Rice- Prabhat, Dhanlaxmi, Richharia, Turanta	<ul style="list-style-type: none"> • Direct seeding of rice • Mat nursery (dapog method)/ Community nursery can be raised for quick availability of young seedlings for transplanting of medium duration varieties by first fortnight of August • Use of 20 days old dapog seedling in rice. • Enhanced basal dose of NPK in rice to boost early vegetative growth • Supply of contingency crop seeds of Toria, Maize (QPM varieties, Swann composite-65-70 days; HM-4 hybrid baby corn), Arhar (Bahar, NDA1, Pusa 9), Urd (Navin and T9), Cowpea and Horsegram need to be ensured for taking up of sowing in September in midlands • Fodder varieties of Jowar, Maize, Bajra in combination with legumes (cowpea and horsegram) can be taken up wherever feasible to meet the fodder requirements in deficit rainfall districts 	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Early season drought (Normal onset)					
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Upland Medium deep, Sandy to Sandy loam soils	Pigeonpea- Pigeonpea Pigeonpea – Bahar, Pusa-9 Narendra Arhar-I	<ul style="list-style-type: none"> Life saving irrigation Gap filling of existing crop 	<ul style="list-style-type: none"> Inter cultivation Mulching for moisture conservation Conservation tillage 	Seeds from RAU, Pusa, NSC, TDC , BRBN KVK etc
		Maize – Toria Maize - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deoki, Pusa early hybrid Macca-3			
	Medium land Sandy loam – Clay Loam soils	Maize-Wheat – Vegetables Maize - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deoki Pusa early hybrid Macca-3			
		Rice –Wheat – Vegetables			
		Pigeonpea- Pigeonpea Pigeonpea – Bahar, Pusa-9 Narendra Arhar-	<ul style="list-style-type: none"> Pre sowing irrigation higher seed rate Gap filling 		
	Low land Sandy loam to Clay loam soils	Rice-Wheat-Green gram Rice – Vegetables Rice – Lentil /Chickpea Fallow – Lentil / Chickpea Rice-Rajendra Bhagawati, Saroj, Rajendra Suwasni, Santosh, R. Kasturi, Sita	<ul style="list-style-type: none"> Life saving irrigation Gap filling 		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)					
At vegetative stage	Upland Medium deep, Sandy to Sandy loam soils	Pigeonpea- Pigeonpea Pigeonpea – Bahar, Pusa-9 Narendra Arhar-I	<ul style="list-style-type: none"> • Gap filling of existing crop • Postponement of top dressing 	<ul style="list-style-type: none"> • Inter culturing • Mulching through weeds, • Conservation tillage • Life saving irrigation • Foliar application (1%) MOP • Foliar application (1%) Urea on the crops and Zinc sulphate 	
		Maize - Vegetables Maize - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deoki, Pusa early hybrid Macca-3			
		Maize – Toria Maize - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deoki Pusa early hybrid Macca-3			
	Medium land Sandy loam – Clay Loam soils	Rice-Wheat-Greengram Rice-Rajendra Bhagawati, Saroj, Rajendra Suwasini Santosh, R. Kasturi, Sita,			
		Rice- Lentil / Chickpea/ Vegetables			
		Maize – Wheat – Vegetables Maize - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deoki Pusa early hybrid Macca-3			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell)	Up land	Pigeonpea Pigeonpea – Bahar, Pusa-9	<ul style="list-style-type: none"> • Postponement of top dressing of nutrients • Life saving irrigation 	<ul style="list-style-type: none"> • Interculture • Foliar application with 2% MOP • Mulching • Conservation tillage • Life saving irrigation 	
		Maize – vegetables Maize - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deoki,Pusa early hybrid Macca-3			
		Maize – Toria Maize - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deoki Pusa early hybrid Macca-3			
	Medium land	Rice-Wheat-Greengram Rice-Rajendra Bhagawati, Saroj, Rajendra Suwasini Santosh, R. Kasturi, Sita,			
		Rice- Wheat			
		Rice – Lentil / Chickpea			
		Rice – Vegetables			
		Maize – Wheat – Vegetables			
	Low land	Rice-Wheat-Greengram Rice-Rajendra Bhagawati, Saroj, Rajendra Suwasini Santosh, R. Kasturi, Sita,			
		Rice- Lentil / Chickpea/ Vegetables Rice– Wheat Fallow – Lentil / Chickpea			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Terminal drought (Early withdrawal of monsoon)	Up land	Pigeonpea Pigeonpea – Bahar, Pusa-9	<ul style="list-style-type: none"> • Foliar application with 2% Urea to boost up the vegetative growth • Mulching • Life saving irrigation 	<ul style="list-style-type: none"> • 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 of LSI • Clean irrigation channel for preventing loss of moisture through seepage • Zero tillage sowing of wheat 	
		Maize – vegetables Maize - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deoki,Pusa early hybrid Macca-3			
		Maize – Toria Maize - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deoki Pusa early hybrid Macca-3			
	Medium land	Rice-Wheat-Greengram Rice-Rajendra Bhagawati, Saroj, Rajendra Suwasini Santosh, R. Kasturi, Sita,			
		Rice- Wheat			
		Rice – Lentil / Chickpea			
		Rice – Vegetables			
		Maize – Wheat – Vegetables			
	Low land	Rice-Wheat-Greengram Rice-Rajendra Bhagawati, Saroj, Rajendra Suwasini Santosh, R. Kasturi, Sita,			
		Rice- Lentil / Chickpea/ Vegetables Rice– Wheat Fallow – Lentil / Chickpea			

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	Not Applicable				
Limited release of water in canals due to low rainfall	Not Applicable				
Non release of water in canals under delayed onset of monsoon in catchment	Not Applicable				

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Medium deep, Sandy to Sandy loam	Pigeonpea- Pigeonpea Maize - Vegetables	Pigeonpea – Pigeonpea Pigeonpea – Bahar, Pusa-9 Narendra Arhar-I , ICPL 88039	<ul style="list-style-type: none"> • Foliar application with 2% MOP in standing crops • Mulching • Application of organic manure and vermicompost • Life saving irrigation 	Seeds from RAU, Pusa, NSC, TDC , BRBN , KVK etc
			Maize – Toria/ Vegetables / Finger millet Maize – Deoki . Ganga		
	Medium land Deep Sandy loam to Clay loam soils	Rice- Wheat- Green gram Rice –Vegetables Rice – Wheat	Rice-Wheat – Greengram Rice - Rajendra Bhagawati, Rajendra Suwasni Prabhat , Turanta , Shusk Samrat		
			Rice – Vegetables/ Wheat		

Condition	Suggested Contingency measures			
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures
Low land Deep Sandy loam to Clay loam soils	Rice – Wheat Rice – Wheat – Greengram Rice – Lentil/Chickpea Fallow – Lentil / Chickpea	Rice – Wheat Rice – Wheat – Greengram Rice – Lentil / Chickpea Rice- Sita , RM -1, Rajendra Suwasni, Rajendra Sweta	<ul style="list-style-type: none"> • Transplant with 40-45 days seedlings may be used with four seedling per hill with close spacing • Enhanced dose of nitrogen with full basal dose of NPK at transplanting 	

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Medium deep, Sandy to Sandy loam	Pigeonpea- Pigeonpea Maize - Vegetables	Pigeonpea – Pigeonpea Pigeonpea – Bahar, Pusa-9 Maize – Toria/ Vegetables / Finger millet Maize – Deoki . Ganga Narendra Arhar-I , ICPL 88039 Blackgram- T-9, Navin, Pant urd-30 , 19 Finger millet- DB-7, BR-5, BR-10, Coimbatore-1	<ul style="list-style-type: none"> • Application of organic manure and vermi compost during land preparation • Foliar application of 2% MOP in standing crops • Mulching • Life saving irrigation 	Seeds from RAU, Pusa, NSC, TDC , BRBN , KVK etc
	Medium land Deep Sandy loam to Clay loam soils	Rice- Wheat- Green gram Rice –Vegetables Rice – Wheat	Rice-Wheat – Greengram Rice - Rajendra Bhagawati, Rajendra Suwasni Prabhat , Turanta , Shusk Samrat Rice – Vegetables/ Wheat	<ul style="list-style-type: none"> ▪ Full basal dose of NPK ▪ Life saving irrigation 	

Condition	Suggested Contingency measures			
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures
Low land Deep Sandy loam to Clay loam soils	Rice – Wheat Rice – Wheat – Rice- Greengram Rice – Lentil/Chickpea Fallow – Lentil / Chickpea	Rice – Wheat Rice – Wheat – Greengram Rice – Lentil / Chickpea Rice- Sita , RM -1 Rajendra Suwasni, Rajendra Sweta	<ul style="list-style-type: none"> Enhanced dose of nitrogen with full basal dose of NPK at transplanting Transplant with 40-45 days seedlings may be used with four seedling per hill with close spacing 	

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Rice	<ul style="list-style-type: none"> Drainage management Re transplanting through Dapog nursery if needed Gap filling Resowing through drum seeder Life Saving irrigation 	<ul style="list-style-type: none"> Subsequent crop if totally damaged i.e. Toria Life Saving Irrigation Drainage management 	<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 safe place

Pigeonpea	<ul style="list-style-type: none"> • Drainage management • September sowing if Kharif Pigeonpea is completely damaged • Gap filling if needed 	<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 safe 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 	
Lichi	<ul style="list-style-type: none"> • Drainage management • Replanting if completely damaged • Gap filling 			
Banana	<ul style="list-style-type: none"> • Drainage management • Replanting, if completely damaged 	<ul style="list-style-type: none"> • Drainage management 	<ul style="list-style-type: none"> • Drainage management • Spray and pasting of trunk 	
Papaya	<ul style="list-style-type: none"> • Drainage management • Replanting, if completely damaged 	<ul style="list-style-type: none"> • Drainage management 	<ul style="list-style-type: none"> • Drainage management • Spray and pasting of trunk 	
Vegetables	<ul style="list-style-type: none"> • Re sowing , if required • Replanting 	<ul style="list-style-type: none"> • Drainage management 	<ul style="list-style-type: none"> • Drainage management 	Storage at safe place
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 safe 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 safe place
Pigeonpea	<ul style="list-style-type: none"> • Resowing If completely damaged 	<ul style="list-style-type: none"> • Drainage management • Alternative crop if totally damaged 	<ul style="list-style-type: none"> • Drainage management • Alternative crop if totally damaged 	Storage at safe place

	<ul style="list-style-type: none"> • Gap filling if needed • Drainage management 			
Vegetables	<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 	Storage at safe place
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 	
Guava	<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 	
Outbreak of pests and diseases due to unseasonal rains				
Rice	<ul style="list-style-type: none"> ❖ Seedling treatment with granular insecticide – Cartap hydrochloride or phorate 10G or carbofuran 3G. <ul style="list-style-type: none"> ❖ Maintain shallow water in nursery beds ❖ Providing good drainage. 	<ul style="list-style-type: none"> ❖ Use copper fungicides against Bacterial leaf blight. ❖ Split application of N fertilizer (3-4 times) 	<ul style="list-style-type: none"> ❖ Harvest at physiological maturity 	Proper drying and safe storage
Maize	<ul style="list-style-type: none"> ❖ Drainage, and yellowing mainly due to nitrogen deficiency apply N split doses ❖ Application of granular insecticides viz. Thimet 10g, or Carbofuran 3g. in whorl of maize 	<ul style="list-style-type: none"> ❖ Foliar blight control through Mancozeb @ 2.5g/l or Zineb/ Maneb @ 2.5-4 g/lit of water (2-4 applications at 8-10 days interval) 	<ul style="list-style-type: none"> ❖ Cob harvesting from standing crop ❖ Harvest at physiological maturity 	<ul style="list-style-type: none"> ❖ Storage in safe places like farmer warehouse/tent covering of produce ❖ Ensure 10-12% moisture in grains before storage ❖ Proper drying
Pigeonpea	<ul style="list-style-type: none"> ❖ Provide drainage 	Provide drainage	Provide drainage	<ul style="list-style-type: none"> ❖ Proper drying • Storage at safe place

	❖ Seed treatment with 1 g carbendizim +2g thiram/kg seed.			and transportation
Horticulture				
Vegetables	• Drainage management	• Drainage management	• Drainage management	
Mango	<p>Anthracnose:- The foliar infection can be controlled by spraying of copper oxychloride (0.3%)</p> <p>Use bio control agent viz <i>Streptosporangium pseudovulgare</i></p> <p>Bacterial canker: Regular inspection of orchards, sanitation and seedling certification are recommended as preventive measures. Mango stones for raising seedlings (root stock) should always be taken from healthy fruits. Use of wind-breaks helps in reducing brushing/ wounding and thus reduces the chance of infection.</p>	<p>Anthracnose:- Apply Carbendazim/ Thiophanate methyl (1g/lit) to control of Anthracnose. Blossom infection can be controlled effectively by spraying of Bavistin (0.1%) at 15 days interval.</p> <p>Mango powdery mildew: Spray wettable sulphur(0.2%) & calixin or karathane (0.1%) during second week of December</p>	<p>Mango powdery mildew: Prune diseased leaves and malformed panicles harbouring the pathogen to reduce primary inoculum load.</p> <p>Spray wettable sulphur (0.2%) when panicles are 3-4" in size</p> <p>Spray dinocap (0.1%) 15-20 days after first spray. Spray tridemorph (0.1%) 15-20 days after second spray.</p> <p>Spraying at full bloom needs to be avoided.</p> <p>Mango bacterial canker: Three sprays of Streptocycline (200 ppm) at 10 days intervals reduce fruit infection.</p> <p>In severe infection, spraying of Streptocycline (300 ppm) or copper oxychloride (0.3%) is more effective.</p>	<p>Harvest at proper time</p> <p>Anthracnose:- Pre-harvest sprays of hexaconazole (0.01%) or Carbendazim (0.1%) at 15 days interval should be done in such a way that the last spray falls 15 days prior to harvest.</p> <p>Diseased leaves, twigs, and fruits, should be collected and burnt to avoid the spread for next season</p>
Litchi	<p>Fruit Fly: Monitor adult fruit flies emergence by using methyl eugenol or sex pheromone traps.</p>	<p>Fruit Fly: First Spray delta menthrin 0.0025% plus molasses 0.1% . after 10-12 days spray fenthion 0.05% + molasses 0.1% followed by dimethoate 0.045%</p>	Harvest at proper time	<p>Fruit Fly: Collect all fallen infested fruits and put in a drum covered with fine wire mesh.</p>

		+ molasses 0.1% if required		Harvest fully matured fruits one week earlier to escape egg laying
Banana	Provide drainage	Provide drainage	Harvest at proper time	
Guava	Provide drainage	Provide drainage	Harvest at proper time	

2.3 Floods :

Condition	Suggested contingency measure ^o			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation ¹				
Continuous submergence for more than 2 days ²	Not Applicable			
Sea water intrusion ³				

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^p				
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	Life saving irrigation (Terminal heat)	
Horticulture				
Mango	Life saving irrigation	Life saving irrigation	Life saving irrigation	
Papaya	Life saving irrigation	Life saving irrigation	Life saving irrigation	
Cold wave				
Wheat		Light irrigation, Mulching		
Maize		Light irrigation, Mulching		
Mustard		Light irrigation, Mulching		
Potato		Light irrigation, Mulching		
Pulses		Light irrigation, Mulching		

Horticulture				
Bhendi		Light irrigation, Mulching		
Brinjal		Light irrigation, Mulching		
Chili		Light irrigation, Mulching		
Tomato		Light irrigation, Mulching		
Bottle guord		Light irrigation, Mulching		
Frost				
Wheat		Light irrigation, Mulching		
Chickpea		Light irrigation, Mulching		
Pigeonpea		Light irrigation, Mulching		
Lentil		Light irrigation, Mulching		
Horticulture				
Bhendi		Light irrigation, Mulching		
Brinjal		Light irrigation, Mulching		
Chilli		Light irrigation, Mulching		
Tomato & Potato		Earth up to 15cm ht. Light irrigation, Mulching		Harvest in dry weather
Hailstorm	Not Applicable			
Cyclone	Not Applicable			

Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

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

<p>Feed and Fodder availability</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. Checking of feed availability may be made at 3 months interval, particularly before onset of summer.</p> <p style="padding-left: 40px;">Silage:20-50 t</p> <p style="padding-left: 40px;">Urea molasses mineral bricks (UMMB): and complete feed block (CFB) 50-100 t</p> <p style="padding-left: 40px;">Hay:100-250 t</p> <p style="padding-left: 40px;">Concentrates: 20-50 t</p> <p style="padding-left: 40px;">Minerals and vitamin supplements mixture:1-5 t</p> <p>2. Preparation and storage of silage and hay at household level</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) Jowar - 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>Bales of hay and other dry fodder should be stored and covered with asbestos sheet or polythene sheet.</p>	<p>Harvest and use all the failed crop (Maize, Rice, Wheat, Horse gram etc) material as fodder.</p> <p>Harvest the top fodder (Neem, Subabul, Acasia, Pipol, Gular, Sessame, Bamboo etc) and unconventional feeds resources like banana plants, babool pods etc for use as fodder for livestock (LS).</p> <p>Sugarcane tops or whole sugarcane plant may be fed to livestock.</p> <p>Aquatic plants like lotus, water hyacinth, duckweed may be fed to livestock mixing with straw.</p> <p>During drought, sorghum may accumulate HCN, which is toxic to livestock. Care may be taken in feeding of stunted grown Sorghum fodder.</p> <p>Available feed and fodder should be collected from CPRs and stall fed in order to reduce the energy requirements of the animals</p> <p>Mild drought : hay should be transported to the needy areas</p> <p>Moderate drought: hay, silage and vitamin & minerals mixture should be transported to the needy areas</p> <p>Severe drought: UMMB, hay, concentrates and vitamin & mineral mixture should be transported to the needy areas. All the hay should be enriched with 2% Urea molasses solution or 1% common salt solution and fed to LS. In acute drought affected areas, animal camp may be organized along nearby canals or water sources. Farmers along with canal may be persuaded to cultivate fodder crops.</p> <p>Herd should be split and supplementation should be given only to the highly productive and breeding animals</p>	<p>Short duration fodder crops of Sorghum / Bajra / Maize (UP Chari, Pusa Chari, HC-136, HD-2/Rajkoo, Gaint Bajra, L-74, K-6677, Ananand / African tall, Kissan composite, Moti, Manjari, BI-7) and cowpea should be sown in unsown and crop failed areas. Cultivation of fodder Rabi maize if water stagnated upto Nov/ December. Cultivation of Jowar/CowpeaMaize in September.</p> <p>Rapeseed, mustard, Chinese cabbage etc and maize may be grown as fodder where feasible. These crops will be harvested in November to facilitate the sowing of wheat, pulses etc. Under irrigated conditions sowing of barseem with Chinese cabbage in last week of September may be taken up for early availability of green fodder. Oats may be grown in October as multi cut fodder to ensure the fodder availability for longer period.</p> <p>Concentrates supplementation should be provided to all the animals.</p>
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	<p>3, Creation of permanent fodder seed banks in all drought prone areas.</p> <p>2. Establishment of silvi-pastoral system and cultivation of fodder tress</p> <p>Establishment of silvi-pastoral system in CPRs with <i>Stylosanthus hamata</i> and <i>Cenchrus ciliaris</i> as grass with <i>Leucaena leucocephala</i> as tree component. Fodder trees may be planted around the house, wasteland etc. Recently, Chaya tree (<i>Cnidoaculus aconitifolius</i>) has been introduced in IGFRI, Jhansi which has high protein value, may be introduced in drought prone regions.</p> <p>3. Management of CPRs</p> <p>Top dressing of N in 2-3 split doses @ 20-25 kg N/ha in CPRs with the monsoon pattern for higher biomass production</p> <p>4. Short duration and low water requiring fodder cultivation</p> <p>Increase area under short duration fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAIN T BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti) and cowpea.</p> <p>5. Feeing management</p> <p>Chopping of fodder should be made as mandatory in every village through supply and establishment of good quality crop</p>	<p>(pregnant animals). Due to prolonged under-feeding, there is a chance of abortion in pregnant animals and lactating cows may show the symptoms of hypoglycemia. Comparatively good quality feed may be offered to milch and pregnant animals. Dry and non-productive animals may be reared on dry roughages sprayed with 10% molasses or crude jaggery solution and 2% urea for maintenance of animals.</p> <p>Available kitchen waste should be mixed with dry fodder while feeding.</p> <p>Livestock should be kept in shelter or under shed during daytime. In case of hot weather condition, grazing may be done in morning and afternoon. Livestock should not be traveled long distance for grazing to save energy and drinking water intake. Animals should not be watered immediately after return from grazing.</p> <p>Washing of animals may be done at least twice a day.</p> <p>40-50 g of salt and 30-40 g mineral mixture per adult animal and 10-20 g for small ruminants and calves to be provided daily through feed to reduce the imbalances of minerals.</p> <p>Livestock may be provided with drinking water from wells, hand pumps or from pond. In case of bad water quality, bleaching powder or chlorine or lime may be applied to water.</p>	
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	<p>cutters.</p> <p>Establishment of backyard production of Azolla for feeding dairy animals.</p> <p>Establishment of back yard cultivation of para grass/ hybrid Napier with drain water from bath room/washing area</p> <p>Avoid feed wastage by offering chaffed fodder and less quantity feed for 4 times a day.</p> <p>Avoid burning of wheat straw and maize stover. The big farmers may allow smallholders to collect residual straw after using combine harvester.</p> <p>Harvesting and collection of perennial vegetation particularly grasses which grow during monsoon. If excess grasses are collected, dried grass may be stored.</p> <p>Proper drying, baling and densification of harvested grass.</p>	<p>Arrangements should be made for mobilization of small ruminants across the districts where no drought exits</p> <p>Unproductive livestock should to be culled during severe drought</p> <p>Create transportation and marketing facilities for the culled and unproductive animals (10000-20000 animals)</p> <p>Subsidized loans (5-10 crores) should be provided to the livestock keepers.</p>	
Cyclone	<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 fore warning (EFW)</p> <p>Incase of EFW, shift the animals to safer</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 disposable 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>places.</p> <p>Identification of animals may be done.</p> <p>Keep animals untied in the shed in case of EFW.</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>
Floods	Not Applicable		
Heat & Cold wave	<p>Arrangement for protection from heat wave</p> <p>i) Plantation around the shed</p> <p>ii) Water sprinklers / foggers in the shed ot frequent washing of animals.</p> <p>iii) Application of white reflector paint on the roof or putting rice straw on the roof of the shed.</p> <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 / sprinklerlers and frequent washing of animals during heat weaves 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>
Health and Disease managem	<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</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,</p>	<p>Conducting psahu sibir, mass animal health camps, fertility camps and deworming camps.</p> <p>Conducting fertility camps.</p>

<p>ent</p>	<p>Force</p> <p>Storage of emergency medicines and medical kits</p> <p>Timely vaccination (as per enclosed vaccination schedule) against all endemic diseases</p> <p>Surveillance and disease monitoring network establishment</p> <p>Provision for mobile ambulatory van.</p>	<p>Pregnant animals may be checked for any discomfort and uneasiness.</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>Disposal of carcass by above means.</p> <p>Pregnancy toxemia may occur due to prolonged under-feeding. Hypoglycemia is also observed. Treatment may be provided to 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. Escherichia coli Giardiasis Amoebiasis Rotavirus Leptospirosis 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 Snake bite.
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
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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			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice, wheat etc, Culling of weak birds	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds	Supplementation to all
Drinking water	Rain water harvesting	Sanitation of drinking water	Give sufficient water as per the bird's requirement
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and fowl pox	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
Floods	Not Applicable		
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			
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 Provide cool and clean drinking water with electrolytes and vit. C In hot summer, add anti-stress probiotics in drinking water or feed. Increase energy and vitamin concentration in feed (supplementation with grain).	Routine practices are followed
Cold wave			
Shelter/environment management	Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity	Close all openings with polythene sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening	Routine practices are followed
Health and disease management	Arrangement for protection from chilled air	Supplementation of grains Antibiotics in drinking water to protect birds from pneumonia	Routine practices are followed

^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 (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 (del) (iii) Addition of water from external resource	(i) Arrangement of aeration. (ii) Addition of water • Monitoring of water quality • Reduction of manuring according to water level.	(i) 10 to 15% exchange of water
2) Floods			
A. Capture			
B. Aquaculture			
(i) Inundation with flood water	(i) Elevation/ Renovation of pond dyke. (ii) Sale of table size /marketable size (del) 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 Enhancement of dykes by sand bags	-Retain the water in pond immediately after flood through repairing of damaged dyke etc. -Netting of pond -Removal of unwanted, predatory/weed fishes

			- Sale of large size fishes
(ii) Water contamination and changes in water quality	Arrangement of regular water quality monitoring		Use of Kmno4 as prophylactics
(iii) Health and diseases	i Use lime@ 200 kg/ ha / Potassium permanganate @ 2% ii Arrangement of CIFAX and medicines & chemical stock	Use of Potassium permanganate as prophylactics	-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.
3. Cyclone / Tsunami	Not Applicable		
4. Heat wave and cold wave	Not Applicable		

^a based on forewarning wherever available