State: CHHATTISGARH

Agriculture Contingency Plan for District: Raipur

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Sub Region (ICAR)	Moderately To Gently Sloping ChattisgarhMahanadi Basin, Hot Moist/Dry Subhumid Transitional ESR With Deep Loamy To Clayey Red And Yellow Soils, Medium AWC LGP 150 - 180 days (11.0)		
	Agro-Climatic Zone (Planning Commission)	Eastern Plateau And Hills Region (VII)		
	Agro Climatic Zone (NARP)	CAHTTISGARH PLAIN ZONE		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Raipur, Bilaspur, Korba, Raigarh, Janjgir-champa, Kabirdham, Rajnandgaon, Durg, Dhamtari, Mahasamund, Kanker (11 districts)		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		21°15’ N	81°41’ E	289 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Zonal Agricultural Research Station, Raipur, 492006 (C.G.)		
	Mention the KVK located in the district with address	Krishi Vigyan Kendra, DK Farm Bhatapara, Distt. - Raipur (C.G.)		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Department of Agrometeorology, College of Agriculture, IGKV, Raipur (C.G.)		

1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep)	1035.0	48	3rd Week of June	4th Week of September
	NE Monsoon(Oct-Dec)	73.9	4	Post monsoon (October-December)	-
	Winter (Jan- March)	42.3	4	Winter rains	-
	Summer (Apr-May)	45.9	3	-	-
	Annual	1197.1	59	-	-

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)	1344.628	34.06	119.83	93.27	94.11		0.140	42.76	18.413	28.025

Source: Agricultural Statistics, 2009, Commissioner of land records, Raipur, Govt. of Chhattisgarh

1. 4	Major Soils	Area (‘000 ha)	Percent (%) of total
	1. Inceptisol (Matasi-Sandyloam)	214.49	39
	2. Alfisols (Dorsa-clayloam)	148.49	27
	3. Vertisols (Kanhar-clayey)	113.78	21
	4. Entisol (Bhata-gravely)	65.99	12
	5. Bharri	7.21	1
	Total	549.96	

Source: Agricultural Statistics, 2010, Directorate of Agriculture, Govt. of Chhattisgarh

1.5	**Agricultural land use**	Area (‘000 ha)	Cropping intensity %
	Net sown area	549.96	123
	Area sown more than once	110.45	
	Gross cropped area	599.96	

Source: Directorate of Agriculture, Govt. of Chhattisgarh

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	300.494		
	Gross irrigated area	306.591		
	Rainfed area	361.730		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	103	241.452	78.8
	Tanks	8280	7.662	2.5
	Open wells	26399	3.126	1.0
	Bore wells	18955	42.658	13.9
	Lift irrigation schemes		-	
	Micro-irrigation			
	Other sources (please specify)		11.693	3.8
	Total Irrigated Area		306.591	100
	Pump sets	21250		
	No. of Tractors			
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	Nil		
	Critical	Nil		
	Semi- critical	Nil		
	Safe	15	100	
	Wastewater availability and use	Nil		
	Ground water quality	Potable and suitable for irrigation as well		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Source: Agricultural Statistics, 2009, Commissioner of land records, Govt. of Chhattisgarh

1.7 Area under major field crops & horticulture (as per latest figures) (2008-09)

1.7	**Major field crops**	**Area ('000 ha)**

	cultivated	*Kharif*			*Rabi*				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Rice	-	-	494.0	-	-	-	20.3	514.3
	Wheat	-	-	-	-	-	14.7		14.7
	Sorghum	-	-	0.1	-	-	-		0.1
	Maize	-	-	4.9	-	-	0.3		5.2
	Millets	-	-	2.0	-	-	-		2
	Total Cereals	-	-	**501.0**	-	-	**35.3**		**536.3**
	Pigeonpea	-	-	9.0	-	-	-		9
	Bengalgram	-	-	-	-	-	18.6		18.6
	Greengram	-	-	2.2	-	-	8.2		10.4
	Blackgram	-	-	5.9	-	-	1.2		7.1
	Horsegram	-	-	1.2	-	-	2.4		3.6
	Pea	-	-	-	-	-	7.3		7.3
	Lentil	-	-	-	-	-	4.6		4.6
	Lathyrus	-	-	-	-	-	85.5		85.5
	Total Pulses	-	-	**18.2**	-	-	**127.8**		**146.0**
	Rapeseed-mustard	-	-	-	-	-	4.7		4.7
	Linseed	-	-	-	-	-	5.1		5.1
	Groundnut	-	-	4.3	-	-	2.5		6.8
	Sesame	-	-	5.6	-	-	0.1		5.7
	Soybean	-	-	2.0	-	-	-		2
	Sunflower	-	-	-	-	-	0.5		0.5
	Safflower	-	-	-	-	-	1.1		1.1
	Total Oilseeds	-	-	**12.0**	-	-	**13.9**		**25.9**
	Vegetables	-	-	15.9	-	-	19.0		34.9
	Sugarcane	-	-	-	-	-	0.6		0.6
	All Crops	-	-	**547.0**	-	-	**196.5**		**743.5**

Source: Agricultural Statistics, 2009, Commissioner of land records, Govt. of Chhattisgarh

	Horticulture crops - Fruits	**Area (' 000 ha)**		
		Total	**Irrigated**	**Rainfed**
	Mango	2.863	-	-
	Banana	1.754	-	-
	Papaya	1.739	-	-

	Gauva	1.275	-	-
	Lemon	1.262	-	-
	Water melon	0.732	-	-
	Musk melon	0.342	-	-
	Ber	0.917	-	-
	Aonla	0.350	-	-
	Others	1.410	-	-
	All fruits	12.703		-
	Horticulture crops - Vegetables	**Total**	**Irrigated**	**Rainfed**
	Cauliflower	2.482	-	-
	Cabbage	1.498	-	-
	Brinjol	4.510	-	-
	Tomato	4.512	-	-
	Bhindi	3.908	-	-
	Potato	3.953	-	-
	Green Pea	1.362	-	-
	Leafy Vegetables	0.819	-	-
	Onion	0.823	-	-
	Cucumber	0.908	-	-
	Bottel guard	0.613	-	-
	Others	1.573	-	-
	Spices	4.657	-	-
	All vegetables	29.696	-	-
	Medicinal and Aromatic crops	**Total**	**Irrigated**	**Rainfed**
	Lemon grass	0.138	-	-
	Khush	0.100	-	-
	E-citridora	0.100	-	-
	Pam.+Jam.Rosa	0.154	-	-
	Total	0.546	-	-
	Plantation crops	**Total**	**Irrigated**	**Rainfed**
	Fodder crops	**Total**	**Irrigated**	**Rainfed**
	Total fodder crop area			
	Grazing land			
	Sericulture etc			

Source: Directorate of Horticulture, 2010, Govt. of Chhattisgarh

1.8	**Livestock**	**Male (‘000)**	**Female (‘000)**	**Total (‘000)**
	All kinds of cattle	-	-	1167.818
	Non descriptive Cattle (local low yielding)	-	-	-
	Improved cattle	-	-	-
	Crossbred cattle	-	-	-
	Non descriptive Buffaloes (local low yielding)	-	-	-
	Descript Buffaloes	-	-	173.747
	Goat	-	-	151.635
	Sheep	-	-	26.207
	Pig	-	-	13.307
	Commercial dairy farms (Number)			

1.9	**Poultry**	**No. of farms**	**Total No. of birds (‘000)**
	Commercial	-	1468.245
	Backyard	-	-

1.10 Fisheries (Data source: Chief Planning Officer)

A. Capture

i) Marine (Data Source: Fisheries Department)	**No. of fishermen**	**Boats**		**Nets**		**Storage facilities (Ice plants etc.)**
		Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	

ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**	**No. of Reservoirs**	**No. of village tanks**
	2364	177	7228

B. Culture

	Water Spread Area (ha)	**Yield (t/ha)**	**Production (‘000 tons)**
i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	Nil	Nil	Nil

	ii) **Fresh water** (Data Source: Fisheries Department)	11552.00	3.803	35.848

Source: Agricultural Statistics, 2009, Commissioner of land records, Govt. of Chhattisgarh
Directorate of Fisheries, Govt. of Chhattisgarh
Directorate of vetenary science, 2006-07, Govt. of Chhattisgarh

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 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)	
Major Field crops (Crops to be identified based on total acreage)										
	Rice	811.8	1666.4	-	-	49.4	2356.0	861.2	2011.2	-
	Blackgram	2.3	384.4	--	-	-	-	2.3	384.4	-
	Maize	6.0	1152.6	-	-	-	-	6	1152.6	-
	Pigeonpea	4.5	454.0	-	-	-	-	4.5	454.0	-
	Sesame	1.5	244.4	-	-	-	-	1.5	244.4	-
	Wheat	-	-	15.8	1143.2	-	-	15.8	1143.2	-
	Lathyrus	-	-	38.5	442.6	-	-	38.5	442.6	-
	Linseed	-	-	1.4	274.8	-	-	1.4	274.8	-
	Bengalgram	-	-	14.7	821.8	-	-	14.7	821.8	-
	Greengram	-	-	0.9	179.8	-	-	0.9	179.8	-
	All crops	**834.5**	**1277.8**	**131.1**	**681.9**	**-**	**-**	**965.6**	**979.9**	
Major Horticultural crops (Crops to be identified based on total acreage) – Fruits & Vegetables										
	Papaya	-	-	-	-	-	-	37.833	21756	-
	Banana	-	-	-	-	-	-	37.711	21500	-
	Mango	-	-	-	-	-	-	18.752	6550	-
	Ber	-	-	-	-	-	-	17.056	18600	-
	Gauva	-	-	-	-	-	-	10.327	8100	-
	Lemon	-	-	-	-	-	-	9.49	7520	-
	Aonla	-	-	-	-	-	-	5.477	15649	-
	Brinjol	-	-	-	-	-	-	66.755	14802	-
	Tomato	-	-	-	-	-	-	48.729	10800	-

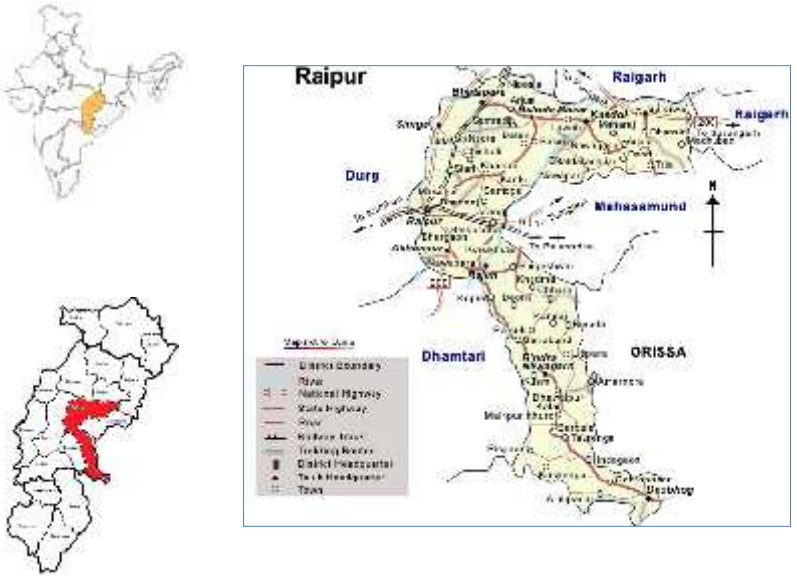
	Potato	-	-	-	-	-	-	44.273	11200	-
	Cauliflower	-	-	-	-	-	-	37.684	15183	-
	Bhindi	--	-	-	-	-	-	37.126	9500	-
	Spices	-	-	-	-	-	-	24.823	5330	-
	Cabbage	-	-	-	-	-	-	24.267	16200	-
	Onion	-	-	-	-	-	-	13.004	15801	-

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	Rice	Maize, Sesame, Blackgram, Greengram	Wheat	Pulses	Oilseeds
	Kharif- Rainfed	2nd week of June to 1st week of July	2nd week of June to 3rd week of July	-	-	-
	Kharif-Irrigated	2nd week of June to 2nd week of July	-	-	-	-
	Rabi- Rainfed	-	-	4th week of October to 2nd week of November	2nd week of October to 2nd week November	2nd week October to 2nd week November
	Rabi-Irrigated	-	-	1st week of November to 2nd week of December	1st week November to 4th week November	1st week November to 2nd week December

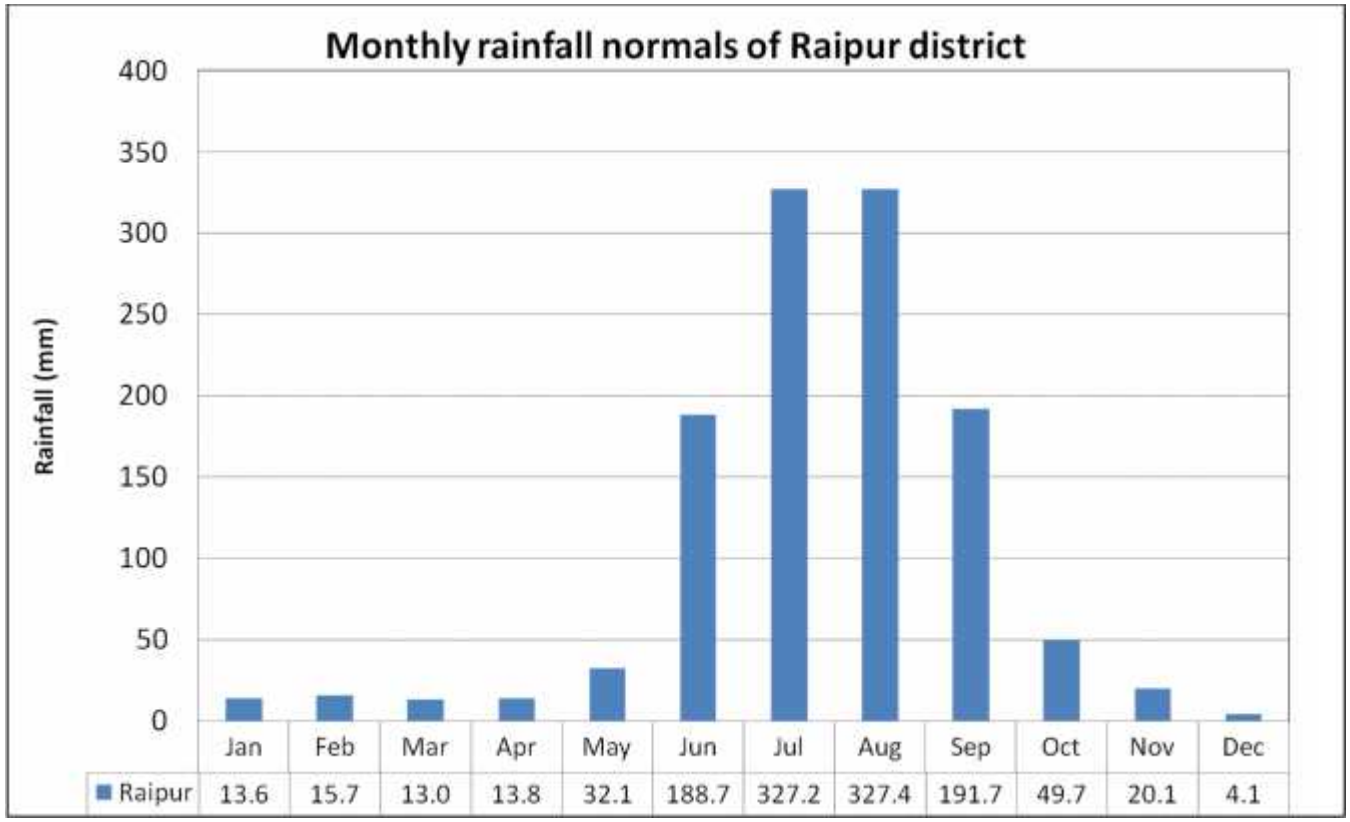
1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought	✓		
	Flood		✓	
	Cyclone			
	Hail storm		✓	
	Heat wave		✓	
	Cold wave		✓	
	Frost			
	Sea water intrusion			
	Pests and disease outbreak		✓	
	Rice		Stem borer, bacterial leaf blight	

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: No

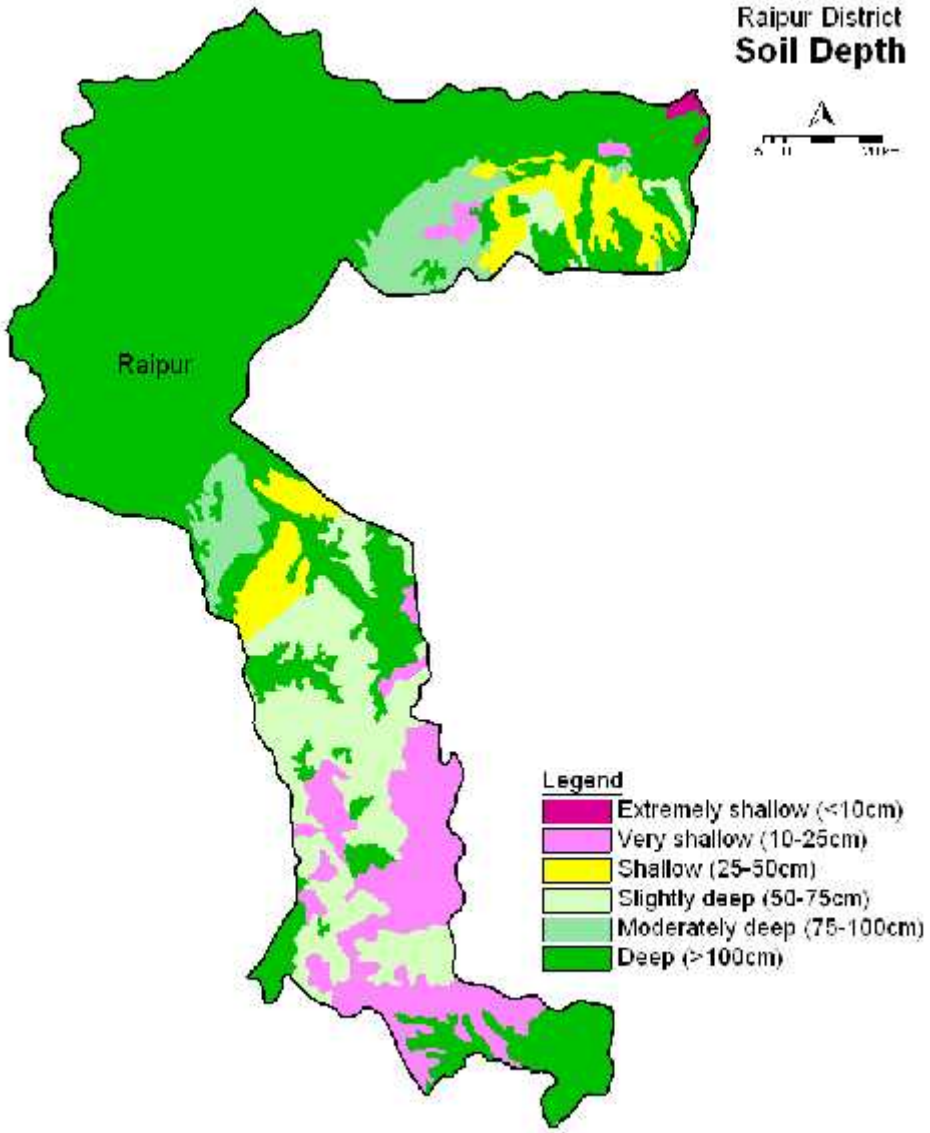
Annexure I



Annexure II


Monthly rainfall normals of Raipur district
Rainfall (mm)
400
350
300
250
200
150
100
50
0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Raipur 13.6 15.7 13.0 13.8 32.1 188.7 327.2 327.4 191.7 49.7 20.1 4.1

ANNEXURE-III



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**
		Kharif	***Rabi***	***Kharif***	***Rabi***		
Early season drought: Delay by 2 weeks (July 1st week)	Unbunded upland Bharri	Greengram		No change		Normal	
		Blackgram		No change		Normal	
		Greengram	Horsegram/ Niger	No change		Normal	
		Blackgram	Horsegram/ Niger	No change		Normal	
		Groundnut		No change		Normal	
		Sesame		No change		Normal	
		Maize		No change		Normal	
	Bunded upland Bharri	Rice-purnima		No change		Normal	
		Rice	Horsegram	No change		Normal	
		Rice	Niger	No change		Normal	
	Midland Inceptisol (Matasi-Sandy loam)	Rice-MTU1010		No change		1. Direct dry seeding in line technique suggested for better crop yield and double cropping 2. Line sowing to avoid mortality of germinating seed in case drought follows after scanty rainfall events 3. Promote application of post emergence herbicide for timely weed management and avoiding biasi operation	Linkage with RKVY for supply of tractor and animal drawn seed drill for line sowing
				No change			
	Shallow Lowland Alfisols (Dorsa-clayloam or Vertisols (Kanhar-clayey)	Rice-Mahamaya		No change			
		Rice	Lathyrus/ linseed/gram/ Greengram (relay)	No change			
		Rice	Lentil	No change			
		Rice	Gram	No change			
		Rice	Linseed	No change			
		Rice	Safflower	No change			
	Bahra lowland Vertisols (Kanhar-clayey)	Rice	Fallow	No change			
		Rice	Lathyrus/ Linseed/Chickpea / Greengram	No change			

			(relay)				
		Rice	Wheat	No change			
		Rice	Greengram	No change			
Early season drought: Delay by 4 weeks July 3rd week	Unbunded upland Bharri	Greengram				25 % higher seed rate	
		Blackgram				25 % higher seed rate	
		Greengram	Horsegram/ Niger			25 % higher seed rate	
		Blackgram	Horsegram/ Niger			25 % higher seed rate	
		Groundnut		Erect variety GG-5, G-20		25 % higher seed rate	
		Sesame				25 % higher seed rate	
	Bunded upland Bharri	Rice		Rice- Tulsi, Indira barani dhan-1, Annda			
		Rice	Horsegram	Groundnut			
		Rice	Niger	Sesame/ Soybean(Indira soy 9, JS93-05, JS335, JS80-21)			
	Midland Inceptisol (Matasi-Sandy loam)	Rice- MTU1010, IR64, Chandrahasni		Rice- MTU1010, Samleshwari, Danteshwari, Indira barani dhan-1		• Direct dry seeding in line technique suggested for better crop yield and double cropping • Line sowing to avoid mortality of germinating seed in case drought follows after scanty rainfall events • Promote application of post emergence herbicide for timely weed management and avoiding biasi operation	• Linkage with RKVY for supply of tractor and animal drawn seed drill for line sowing • Linkage with MNREGA for WC measures: Digging of shallow dug wells and renovation of existing WHSs
	Shallow Lowland Alfisols (Dorsa-clay loam) or Vertisols (Kanhar-clayey)	Rice- Mahamaya, swarna, Sampda		Rice- Chandrahasni IR64, Mahamaya, Bambleshwari, karma masuri			
		Rice	Lathyrus/ Linseed/Chick pea / Greengram (relay)	Rice- Chandrahasni IR64, Mahamaya, Bambleshwari, karma masuri	Coriander (leaf), Toria, Lathyrus/ Linseed/ Greengram (relay)		
		Rice	Lentil		Lentil		
		Rice	Chick pea		Chick pea		
		Rice	Linseed		Linseed		
		Rice	Safflower		Coriander (leaf), toria		

	Bahra lowland Vertisols (Kanhar-clayey)	Rice-Mahamaya, Swarna, Swarna sub1, Jaldubi, Indira sona	Fallow	Rice- Mahamaya, Swarna sub1, Jaldubi	Fallow		
			Lathyrus/ Linseed/ Chick pea / Greengram (relay)		Coriander (leaf), Toria, Lathyrus/ Linseed/ Greengram (relay)		
			Wheat		Wheat		
			Greengram		Greengram		
Early season drought**:** Delay by 6 weeks (August 1st week)	Unbunded upland Bharri	Greengram		Horsegram/ Niger		25 % higher seed rate	
		Blackgram		Horsegram/ Niger		25 % higher seed rate	
		Greengram	Horsegram/ Niger	Greengram / Blackgram		25 % higher seed rate	
		Blackgram	Horsegram/ Niger	Greengram		25 % higher seed rate	
		Groundnut		Blackgram(PTU4, TU94-2, pant-U31, KU96-3, TAU2)		25 % higher seed rate	
		Sesame		Greengram			
	Bunded upland Bharri	Rice-MTU1010, Purnima, Annda		Rice- Purnima, Tulsi, Indira barani dhan-1, Aditya		Sowing of sprouted seed (*lai-chaupa*)adopting lehi method of rice cultivation	
		Rice	Horsegram	Pigeonpea		Mixed or intercropping of pigeonpea and Greengram (4:2)	
		Rice	Niger	Sesame		Mixed or intercropping of Sesame and Greengram (4:2)	
				Groundnut		-do-	
	Midland Inceptisol (Matasi-Sandy	Rice-MTU1010, IR64,		Rice- Indira barani dhan-1, Samleshwari,		• Direct dry seeding in line technique	• Linkage with RKVY for

	loam)	Chandrahasni		Danteshwari, MTU1010, purnima		suggested for better crop yield and double cropping • Promote direct seeding or rice and discourage transplanting • Sowing of sprouted seed (*lai-chaupa*)adopting lehi method of rice cultivation • Line sowing to avoid mortality of germinating seed in case drought follows after scanty rainfall events • Promote application of post emergence herbicide for timely weed management and avoiding biasi operation • Increase 25percent seed rate of rabi crops. • Seed rate of wheat may be increased from one-and half to two times • Sowing of rabi crops adopting zero tillage technique	supply of tractor and animal drawn seed drill for line sowing • Linkage with MNREGA for WC measures: Digging of shallow dug wells and renovation of existing WHSs • Utilize harvested rain water of WHS in crop production by adopting drip system or sprinklers that may be converged from micro irrigation scheme of Agriculture Department
	Shallow Lowland Alfisols (Dorsa-clay loam) or Vertisols (Kanhar-clayey)	Rice-Mahamaya, Swarna, Sampda, Bambleshwari		Rice- IR64, Chandrahasni Bambleshwari, karma masuri			
		Rice	Lathyrus/ Linseed/ Chick pea / Greengram (relay)	Rice- IR64, Chandrahasni Bambleshwari, karma masuri	Coriander (leaf), Toria, Linseed/ Greengram (relay)		
		Rice	Lentil		Lentil		
		Rice	Chick pea		Chick pea		
		Rice	Linseed		Linseed		
		Rice	Safflower		Coriander (leaf), toria		
	Bahra lowland Vertisols (Kanhar-clayey)	Rice-Mahamaya, Swarna, Swarna sub1, Jaldubi, Indira sona,	Fallow	Rice- Mahamaya, Swarna sub1, Jaldubi, masuri	Fallow		
			Lathyrus/ linseed/ Chick pea / Greengram (relay)		Coriander (leaf), Toria, Lathyrus/ Linseed/ Greengram (relay)		
			Wheat		Wheat		
			Greengram		Greengram		
Early season drought: Delay by 8 weeks	Unbunded upland Bharri	Greengram			Horsegram/ Niger	Sowing in line or broadcasting in September	
		Blackgram			Horsegram/ Niger	Sowing in line or broadcasting in	

August 3rd week)						September	
		Greengram	Horsegram/ Niger	Greengram		25 % higher seed rate	
		Blackgram	Horsegram/ Niger	Greengram		25 % higher seed rate	
		Groundnut		Greengram		25 % higher seed rate	
		Sesame		Greengram		25 % higher seed rate	
	Bundeded upland Bharri	Rice- MTU1010, purnima, Annda		Greengram(pusa vishal, pragya, Hum1, pairimung) Pigeonpea(ICPL87, Rajivlochan. Maruti)		Mixed or intercropping of pigeonpea and Greengram (4:2) or Sesame and Greengram (4:2)	
		Rice	Horsegram		Horsegram	Sowing in line or broadcasting in September	
		Rice	Niger		Niger/Greengram	Sowing in line or broadcasting in September	
	Midland Inceptisol (Matasi-Sandy loam)	Rice- MTU1010, IR64, Chandrahasni		Rice- Indira barani dhan-1, Samleshwari, Danteshwari, purnima		• Promote direct Line seeding of rice and discourage transplanting • Sowing of sprouted seed (*lai-chaupa*)adopting lehi method of rice cultivation • Promote application of post emergence herbicide for timely weed management and avoiding biasi operation • Increase 25percent	• Linkage with RKVY for supply of tractor and animal drawn seed drill for line sowing • Linkage with MNREGA for WC measures: Digging of shallow dug wells and renovation of existing WHSs • Utilize harvested rain
	Shallow Lowland Alfisols (Dorsa-clay loam) or Vertisols (Kanhar-clayey)	Rice- Mahamaya, Swarna, Sampda, Bambleshwari		Rice- IR64, Chandrahasni Bambleshwari, karma masuri			
		Rice	Lathyrus/ linseed/ Chick pea / Greengram (relay)	Rice- IR64, Chandrahasni Bambleshwari, karma masuri			
		Rice	Lentil		Lentil		
		Rice	Chick pea		Chick pea		
		Rice	Linseed		Linseed		

		Rice	Safflower		Fieldpea/ Coriander (leaf)/ toria	seed rate of rabi crops. • Seed rate of wheat increased from one-and half to two times • Sowing of rabi crops adopting zero tillage technique	water of WHS in crop production by adopting drip system or sprinklers that may be converged from micro irrigation scheme of Agriculture Department
	Bahra lowland Vertisols (Kanhar-clayey)	Rice-Mahamaya, Swarna, Swarna sub1, Jaldubi, Indira sona,	Fallow	Rice- Mahamaya, Swarna sub1, Jaldubi, masuri	Fallow		
			Lathyrus/Llinseed/ Chick pea / Greengram (relay)				
			Wheat		Wheat		
			Greengram		Greengram / Fieldpea /Coriander (leaf)/ toria		

Normal onset of monsoon, mid season-vegetative stage and terminal drought

Condition	Major Farming situation[a]	**Normal Crop / Cropping system[b]**	**Suggested Contingency measures**		
			Crop management	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation[e]**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Unbunded upland Bharri	Greengram/Blackgram	▪ Gap filling ▪ Resowing in line when very poor population	• Inter tilling for soil mulch • Mulching with paddy straw or use plastic mulch or other locally available material • Compartmental bunding, Ridge and Furrows, Tied ridges to conserve rainwater during kharif for regular sowing of rabi crops and rice	• Linkage with RKVY / NFSM / state seed corporation for timely supply of seed of suitable varieties of upland
		/Blackgram and *rabi* Horsegram/ Niger			
		Groundnut /Sesame			
	Bundeded upland Bharri	Rice- MTU1010, purnima, Annda			
		Rice and rabi Horsegram/ Niger			
		Greengram (pusa vishal, Pragya, Hum1, PairiMung) Pigeonpea(ICPL87, Rajivlochan. Maruti)			
	Midland Inceptisol (Matasi-Sandy loam)	Rice- MTU1010, IR64, Chandrahasni	• Gap filling or • Resowing of dry seed		

Condition	Major Farming situation[a]	**Normal Crop / Cropping system[b]**	**Suggested Contingency measures**		
			Crop management	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation[e]**
	Shallow Lowland Alfisols (Dorsa-clay loam) or Vertisols (Kanhar-clayey)	Rice-Mahamaya, Swarna, Sampda, Bambleshwari	• Gap filling • Sowing of sprouted seed (*lai-chaupa*)adopting lehi method of rice cultivation • Sowing of relatively early varieties like IR64, Chandrahasni Bambleshwari, karma masuri		
		Greengram			
		Rice- lentil/Chickpea /Linseed/ Safflower/ Fieldpea			
	Bahra lowland Vertisols (Kanhar-clayey)	Rice- Swarna, Swarna sub1, Jaldubi, Mahamaya, Indira sona,	• Gap filling • Sowing of sprouted seed (*lai-chaupa*)adopting lehi method of rice cultivation • Sowing of relatively early varieties like Mahamaya, Swarna sub1, Jaldubi, Masuri		
		Rice- Lathyrus/ Linseed/Chickpea / Greengram (relay)			
		Rice-wheat/ Greengram			
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period): **At vegetative stage**	Unbunded upland Bharri	Greengram /Blackgram	Weeding and protection against sucking pests	• Inter tilling for soil mulch • Mulching with paddy straw or use plastic mulch or other locally available material	• Linkage with Agriculture Department /RKVY for supply of interculture implements for interculture in upland crops
		Greengram /Blackgram and rabi Horsegram/ Niger	Weeding and protection against sucking pests		
		Groundnut /Sesame	Avoid top dressing of urea		
	Bundeded upland Bharri	Rice- MTU1010, purnima, Annda			
		Rice and rabi Horsegram/ Niger			
		Greengram (pusa vishal, Pragya, Hum1, Pairi Mung) /Pigeonpea(ICPL87, Rajivlochan. Maruti)	Weeding and protection against insect and pests		
	Midland Inceptisol	Rice- MTU1010, IR64, Chandrahasni, Indira barani dhan-1,	• Weeding and	• Compartmental bunding,	• Linkage with

Condition	Major Farming situation[a]	Normal Crop / Cropping system[b]	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measues[d]	Remarks on Implementation[e]
	(Matasi-Sandy loam)	Samleshwari, Danteshwari,	protection against insect and pests • Avoid top dressing of urea	Ridge and Furrows, Tied ridges to conserve rainwater during kharif for regular sowing of rabi crops • Sowing of rabi crops adopting zero tillage technique • Supplemental irrigation from water harvesting structures using micro irrigation i.e. drip and sprinklers	micro irrigation scheme of Agriculture Department for supply of drip system and sprinklers
	Shallow Lowland Alfisols (Dorsa-clay loam) or Vertisols (Kanhar-clayey)	Rice-Mahamaya, Swarna, Sampda, Bambleshwari, Chandrahasni Bambleshwari, karma masuri			
		Rice- Lathyrus/ Linseed/Chickpea / fieldpea Greengram (relay)			
		Rice-lentil/ Chickpea / Linseed/ safflower			
	Bahra lowland Vertisols (Kanhar-clayey)	Rice- Mahamaya, Swarna, Swarna sub1, Jaldubi, Indira sona, masuri			
		Rice- Lathyrus/ Linseed/Chickpea / Greengram (relay)			
		Rice- wheat/ Greengram			
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period): At flowering/ fruiting stage	Unbunded upland Bharri	Greengram /Blackgram	Weeding and protection against insect and pests	Mulching Inter tilling	• Linkage with Agriculture Department /RKVY for supply of interculture implements for interculture in upland crops
		Greengram /Blackgram and rabi Horsegram/ Niger			
		Groundnut /Sesame			
	Bunded upland Bharri	Rice- MTU1010, Purnima, Annda			
		Rice and rabi Horsegram/ Niger			
		Greengram(Pusa vishal, Pragya, Hum1, Pairi Mung) /Pigeonpea(ICPL87, Rajivlochan. Maruti)			
	Midland Inceptisol (Matasi-Sandy loam)	Rice- MTU1010, IR64, Chandrahasni, Indira barani dhan-1, Samleshwari, Danteshwari,	• Weeding and protection against insect and pests • Supplemental irrigation from water harvesting structures using micro irrigation i.e. drip and sprinklers • Increase 25percent seed	Compartmental bunding, Ridge and Furrows, Tied ridges to conserve rainwater during kharif for regular sowing of rabi crops • Sowing of rabi crops adopting zero tillage technique	• Linkage with micro irrigation scheme of Agriculture Department for supply of drip system and sprinklers
	Shallow Lowland Alfisols (Dorsa-clay loam) or Vertisols	Rice-Mahamaya, swarna, Sampda, Bambleshwari, Chandrahasni Bambleshwari, karma masuri			
		Rice- Lathyrus/ linseed/ Chickpea / fieldpea			

Condition	Major Farming situation[a]	Normal Crop / Cropping system[b]	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measues[d]	Remarks on Implementation[e]
	(Kanhar-clayey)	Greengram (relay)	rate of rabi crops. • Seed rate of wheat increased from one-and half to two times		
		Rice-lentil/Chickpea / Linseed/ Safflower			
	Bahra lowland Vertisols (Kanhar-clayey)	Rice- Mahamaya, Swarna, Swarna sub1, Jaldubi, Indira sona, masuri			
		Rice- Lathyrus/ linseed/gram/ Greengram (relay)			
		Rice- wheat/ Greengram			
Terminal drought (Early withdrawal of monsoon)	Unbunded upland Bharri	Greengram /Blackgram	Harvest mature plants Thin out plant population	Mulching Inter tilling	• Linkage with Agriculture Department /RKVY for supply of interculture implements for interculture in upland crops
		Greengram /Blackgram and rabi Horsegram/ Niger			
		Groundnut /Sesame			
	Bundeded upland Bharri	Rice- MTU1010, purnima, Annda	Life saving irrigation if available		
		Rice and rabi Horsegram/ Niger			
		Greengram(pusa vishal, pragya, Hum1, pairi Mung) /Pigeonpea(ICPL87, Rajivlochan. Maruti)	Harvest mature plants Thin out plant population		
	Midland Inceptisol (Matasi-Sandy loam)	Rice- MTU1010, IR64, Chandrahasni, Indira barani dhan-1, Samleshwari, Danteshwari,	• Weeding and protection against insect and pests • Supplemental irrigation from water harvesting structures using micro irrigation i.e. drip and sprinklers • Seed rate of wheat increased from one-and half to two times	• Compartmental bunding, Ridge and Furrows, Tied ridges to conserve rainwater during kharif for regular sowing of rabi crops • Sowing of rabi crops adopting zero tillage technique • Supplemental irrigation from water harvesting structures using micro irrigation i.e. drip and sprinklers	• Linkage with micro irrigation scheme of Agriculture Department for supply of drip system and sprinklers
	Shallow Lowland Alfisols (Dorsa-clay loam) to Vertisols (Kanhar-clayey)	Rice-Mahamaya, swarna, Sampda, Bambleshwari, Chandrahasni Bambleshwari, karma masuri			
		Rice- Lathyrus/ Linseed/Chickpea / Fieldpea Greengram (relay)			
		Rice-lentil/Chickpea / Linseed/ safflower			
	Bahra lowland Vertisols (Kanhar-clayey)	Rice- Mahamaya, Swarna, Swarna sub1, Jaldubi, Indira sona, masuri			
		Rice- Lathyrus/ linseed/Chickpea / Greengram (relay)			

Condition	Major Farming situation[a]	Normal Crop / Cropping system[b]	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measues[d]	Remarks on Implementation[e]
		Rice- wheat/ Greengram			

2.1.2 Drought - Irrigated situation

Condition	Major Farming situation[a]	Normal Crop / Cropping system[b]	Suggested Contingency measures		
			Change in crop/cropping system[h]	Agronomic measures[i]	Remarks on Implementation[e]
Delayed release of water in canals due to low rainfall	Unbunded upland Bharri	Greengram /Blackgram	No change		• Linkage with RKVY / NFSM / IWMP/ micro irrigation schemes for construction of shallow tube wells and WHS including farm ponds for conjunctive use of water in canal command
		Greengram /Blackgram and rabi Horsegram/ Niger	No change		
		Groundnut /Sesame	No change		
	Bunded upland Bharri	Rice- MTU1010, Purnima, Annda, Tulsi, Indira barani dhan-1, Aditya	Greengram(pusa vishal, pragya, Hum1, pairiGreengram) Pigeonpea(ICPL87, Rajivlochan. Maruti)		
		Rice and rabi Horsegram/ Niger			
	Midland Inceptisol (Matasi-Sandy loam)	Rice- MTU1010, IR64, Chandrahasni		• Direct seeding of rice preferably in line • In case of failure of crop or poor crop stand then Sowing of sprouted seed (*lai-chaupa*)adopting lehi method of rice cultivation • If seedlings raised for transplanting then it should be done with rainwater or from other sources of water • Weed control by herbicide and avoid biasi operation	
	Shallow Lowland Alfisols (Dorsa-clay loam) or Vertisols (Kanhar-clayey)	Rice-Mahamaya, swarna, Sampda, Bambleshwari , Chandrahasni Bambleshwari, karma masuri			
		Rice- Lathyrus/ linseed/gram/ Greengram (relay)			
		Rice- lentil/gram/linseed/ safflower/ fieldpea			
	Bahra lowland Vertisols (Kanhar-clayey)	Rice- swarna, swarna sub1, Jaldubi, Mahamaya, Indira sona, masuri			
		Rice- Lathyrus/ linseed/gram/ Greengram (relay)			
		Rice-wheat/ Greengram			
Limited release of water in canals due	Unbunded upland Bharri	Greengram /Blackgram	No change		• Linkage with RKVY / NFSM /
		Greengram /Blackgram and rabi	No change		

Condition	Major Farming situation[a]	**Normal Crop / Cropping system[b]**	**Suggested Contingency measures**		
			Change in crop/cropping system[h]	**Agronomic measures[i]**	**Remarks on Implementation[e]**
to low rainfall		Horsegram/ Niger			IWMP/ micro irrigation schemes for construction of shallow tube wells and WHS including farm ponds for conjunctive use of water in canal command • Linkage with RKVY / NFSM / IWMP/ micro irrigation schemes for supply of micro irrigation systems
		Groundnut /Sesame	No change		
	Bundeded upland Bharri	Rice- MTU1010, purnima, Annda, Tulsi, Indira barani dhan-1, Aditya	Greengram(pusa vishal, pragya, Hum1, pairiGreengram) Pigeonpea(ICPL87, Rajivlochan. Maruti)		
		Rice and rabi Horsegram/ Niger			
	Midland Inceptisol (Matasi-Sandy loam)	Rice- MTU1010, IR64, Chandrahasni	Rice- Indira barani dhan-1, Samleshwari, Danteshwari, purnima	• Direct seeding of rice preferably dry seeding in line • In case of failure of crop or poor crop stand then Sowing of sprouted seed (*lai-chaupa*)adopting lehi method of rice cultivation • Avoid transplanting of rice • Weed control by herbicide and avoid biasi operation	
	Shallow Lowland Alfisols (Dorsa-clay loam) or Vertisols (Kanhar-clayey)	Rice-Mahamaya, Swarna, Sampda, Bambleshwari , Chandrahasni Bambleshwari, karma masuri	Rice- IR64, Chandrahasni Bambleshwari, karma masuri		
		Rice- Lathyrus/ Linseed/Chickpea / Greengram (relay)			
		Rice- lentil/ Chickpea /Linseed/ Safflower/ Fieldpea			
	Bahra lowland Vertisols (Kanhar-clayey)	Rice- Swarna, Swarna sub1, Jaldubi, Mahamaya, Indira sona, masuri	Rice- Mahamaya, Swarna sub1, Jaldubi, Masuri		
		Rice- Lathyrus/ Linseed/Chickpea / Greengram (relay)			
		Rice-wheat/ Greengram			
Non release of water in canals under delayed onset of monsoon in catchment	Unbunded upland Bharri	Greengram /Blackgram	No change		• Linkage with RKVY / NFSM / IWMP/ micro irrigation schemes for construction of shallow tube wells and WHS including farm ponds for conjunctive use of
		Greengram /Blackgram and rabi Horsegram/ Niger	No change		
		Groundnut /Sesame	No change		
	Bunded upland Bharri	Rice- MTU1010, purnima, Annda, Tulsi, Indira barani dhan-1, Aditya	Greengram(pusa vishal, pragya, Hum1, pairiGreengram) Pigeonpea(ICPL87, Rajivlochan. Maruti)		
		Rice and rabi Horsegram/ Niger			

Condition	Major Farming situation[a]	Normal Crop / Cropping system[b]	Suggested Contingency measures		
			Change in crop/cropping system[h]	Agronomic measures[i]	Remarks on Implementation[e]
	Midland Inceptisol (Matasi-Sandy loam)	Rice- MTU1010, IR64, Chandrahasni	Rice- Indira barani dhan-1, Samleshwari, Danteshwari, purnima	• Direct seeding of rice preferably dry seeding in line • Avoid transplanting of rice • Weed control by herbicide and avoid biasi operation • Supplemental irrigation from WHS using drip and sprinklers • Adopt zero tillage technique for sowing of rabi crops	water in canal command • Linkage with RKVY / NFSM / IWMP/ micro irrigation schemes for supply of micro irrigation systems
	Shallow Lowland Alfisols (Dorsa-clay loam) or Vertisols (Kanhar-clayey)	Rice-Mahamaya, swarna, Sampda, Bambleshwari , Chandrahasni Bambleshwari, karma masuri	Rice- IR64, Chandrahasni Bambleshwari, karma masuri		
		Rice- Lathyrus/ Linseed/Chickpea / Greengram (relay)			
		Rice- lentil/Chickpea /Linseed/ safflower/ fieldpea			
	Bahra lowland Vertisols (Kanhar-clayey)	Rice- Swarna, Swarna sub1, Jaldubi, Mahamaya, Indira sona, Masuri	Rice- Mahamaya, Swarna sub1, Jaldubi, Masuri		
		Rice- Lathyrus/ Linseed/ Chickpea / Greengram (relay)			
		Rice-wheat/ Greengram			
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Unbunded upland Bharri	Greengram /Blackgram	No change		• Linkage with RKVY / NFSM / IWMP/ micro irrigation schemes for construction of shallow tube wells and WHS including farm ponds for conjunctive use of water in canal command • Linkage with RKVY / NFSM / IWMP/ micro irrigation schemes for supply of micro irrigation systems
		Greengram /Blackgram and rabi Horsegram/ Niger	No change		
	Bunded upland Bharri	Rice- MTU1010, Purnima, Annda, Tulsi, Indira barani dhan-1, Aditya	Greengram(pusa vishal, pragya, Hum1, pairiMung) Pigeonpea(ICPL87, Rajivlochan. Maruti)		
		Rice and rabi Horsegram/ Niger			
	Midland Inceptisol (Matasi-Sandy loam)	Rice- MTU1010, IR64, Chandrahasni	Rice- Indira barani dhan-1, Samleshwari, Danteshwari, purnima	• Direct seeding of rice preferably dry seeding in line • Avoid transplanting of rice • Weed control by herbicide and avoid biasi operation • Supplemental	
	Shallow Lowland Alfisols (Dorsa-clay loam) or Vertisols (Kanhar-clayey)	Rice-Mahamaya, Swarna, Sampda, Bambleshwari , Chandrahasni Bambleshwari, karma masuri	Rice- IR64, Chandrahasni Bambleshwari, karma masuri		
		Rice- Lathyrus/ linseed/ Chickpea /			

Condition	Major Farming situation[a]	Normal Crop / Cropping system[b]	Suggested Contingency measures		
			Change in crop/cropping system[h]	Agronomic measures[i]	Remarks on Implementation[e]
		Greengram (relay)		irrigation from WHS using drip and sprinklers • Adopt zero tillage technique for sowing of rabi crops	
	Bahra lowland Vertisols (Kanhar-clayey)	Rice- Swarna, Swarna sub1, Jaldubi, Mahamaya, Indira sona, Masuri	Rice- Mahamaya, Swarna sub1, Jaldubi, Masuri		
		Rice- Lathyrus/ linseed/ Chickpea / Greengram (relay)			
Insufficient groundwater recharge due to low rainfall	Unbunded upland Bharri	Greengram /Blackgram	No change		• Linkage with RKVY / NFSM / IWMP/ micro irrigation schemes for construction of shallow tube wells and WHS including farm ponds for conjunctive use of water in canal command • Linkage with RKVY / NFSM / IWMP/ micro irrigation schemes for supply of micro irrigation systems
		Greengram /Blackgram and rabi Horsegram/ Niger	No change		
		Groundnut /Sesame	No change		
	Bunded upland Bharri	Rice- MTU1010, purnima, Annda, Tulsi, Indira barani dhan-1, Aditya	Pigeonpea(ICPL87, Rajivlochan. Maruti)		
		Rice and rabi Horsegram/ Niger			
	Midland Inceptisol (Matasi-Sandy loam)	Rice- MTU1010, IR64, Chandrahasni		• Direct seeding of rice preferably dry seeding in line • Avoid transplanting • Weed control by herbicide and avoid biasi operation • Supplemental irrigation from WHS using drip and sprinklers	
	Shallow Lowland Alfisols (Dorsa-clay loam) or Vertisols (Kanhar-clayey)	Rice-Mahamaya, Swarna, Sampda, Bambleshwari , Chandrahasni Bambleshwari, karma masuri			
		Rice- Lathyrus/ Linseed/ Chickpea / Greengram (relay)			
		Rice- lentil/ Chickpea /Linseed/ Safflower/ Fieldpea			
	Bahra lowland Vertisols (Kanhar-clayey)	Rice- Swarna, Swarna sub1, Jaldubi, Mahamaya, Indira sona, Masuri			
		Rice- Lathyrus/ linseed/gram/ Greengram (relay)			
		Rice-wheat/ Greengram/ potato			

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 or heavy rainfall coupled with high speed winds in a short span*				
Blackgram/ Greengram/ maize	Drain out excess water	Earthing up in maize	Picking of matured pods, Harvesting and drying of cobs	To cover produce with plastic sheet or shift produces to farm shed
Groundnut/ Sesame/pigeon pea	Drain out excess water	Earthing in groundnut Drain out excess water	Drain out excess water, Harvesting and drying of plants	To cover produce with plastic sheet or shift produces to farm shed
Rice	Drain excess water	Drain excess water	Drain excess water Harvest the crop and put on bunds	To cover produce with plastic sheet or shift produces to farm shed
Rabi oilseeds and pulses	Drain excess water	Drain excess water	Drain excess water Harvest the crop and put on bunds	To cover produce with plastic sheet or shift produces to farm shed
Wheat	Surface drainage	Surface drainage	Surface drainage	To cover produce with plastic sheet or shift produces to farm shed To supply tarpaulin to farmers through RKVY/NFSM
Horticulture				
Tomato/ brinjal	Surface drainage, earthing and fertilizer application after water drain out	Surface drainage, earthing and fertilizer application after water drain out	Surface drainage, picking up matured fruits	
Coriander	Surface drainage	Surface drainage	Surface drainage	To cover produce with plastic sheet or shift produces to farm shed To supply tarpaulin to farmers through RKVY/NFSM
Garlic/ Onion	Surface drainage	Surface drainage	Surface drainage	To cover produce with plastic sheet or shift produces to farm shed To supply tarpaulin to farmers through RKVY/NFSM
Outbreak of pests and diseases due to unseasonal rains				
Blackgram/ Greengram/ maize	Spraying of contact insecticide for control of caterpillar/ color rot	Spraying of contact insecticide for control of pest		
Groundnut/ Sesame/pigeon pea	Spraying of contact insecticide for control of caterpillar/ color rot	Spraying of contact insecticide for control of pest		
Rice	Spraying of insecticide for control of stem borer	Spraying of insecticide for control of pest like gundhibug		
Rabi oilseed and pulses	Spraying of insecticide for control of aphid	Spraying of insecticide for control of insect		

Wheat	Spraying of insecticide for control of stem borer			
Horticulture				
Tomato/ brinjal	Spraying of contact insecticide for control of caterpillar Stacking for protecting fungal diseases	Spraying of contact insecticide for control of caterpillar/ fruit borer Stacking for protecting fungal diseases	Harvest the fruit	
Coriander	Harvest the leaves	Harvest the leaves		
Garlic/ Onion				
Mango	-	Spray 0.2% wettable sulphur for protection against PM	Harvest at pre maturity stage	Unripe fruit may be used for pickles.
Citrus	Control citrus canker by Copper Oxy chloride 0.5 % & streptocycline 100 ppm	Control citrus canker by Copper Oxy chloride 0.5 % & streptocycline 100 ppm	Control citrus canker by Copper Oxy chloride 0.5 % & streptocycline 100 ppm, collect mature fruits	

2.3 Floods

Condition	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Transient water logging/ partial inundation[1]				
Blackgram/ Greengram/ Maize	Surface drainage	Surface drainage	Surface drainage	
Groundnut/ Sesame/pigeon pea	Surface drainage	Surface drainage	Surface drainage	
Rice	Surface drainage	After draining apply urea	Drain excess water	
Rabi oilseeds and pulses	Surface drainage	Surface drainage	Surface drainage	
Wheat	Surface drainage	Surface drainage	Surface drainage	
Horticulture				
Tomato/ brinjal	Surface drainage	Surface drainage	Surface drainage	
Coriander	Surface drainage	Surface drainage	Surface drainage	
Garlic/ Onion	Surface drainage	Surface drainage	Surface drainage	
Mango	Surface drainage	Surface drainage	Surface drainage	
Citrus	Surface drainage	Surface drainage	Surface drainage	
Continuous submergence for more than 2 days[2]				
Blackgram/ Greengram/ Maize	Surface drainage	Surface drainage	Surface drainage	
Groundnut/ Sesame/pigeon pea	Surface drainage	Surface drainage	Surface drainage	

Rice	Surface drainage	After draining apply urea	Drain excess water	
Rabi oilseedS and pulses	Surface drainage	Surface drainage	Surface drainage	
Wheat	Surface drainage	Surface drainage	Surface drainage	
Horticulture				
Tomato/ brinjal	Surface drainage	Surface drainage	Surface drainage	
Coriander	Surface drainage	Surface drainage	Surface drainage	
Garlic/ Onion	Surface drainage	Surface drainage	Surface drainage	
Mango	Surface drainage	Surface drainage	Surface drainage	
Citrus	Surface drainage	Surface drainage	Surface drainage	

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

Extreme event type	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave	Not applicable			
Cold wave				
Frost				
Hailstorm				
Cyclone				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event[s]	**During the event**	**After the event**
Drought			
Feed and fodder availability	Preservation of surplus fodder, encourage fodder cultivation and tree plantation and also encourage Supply of molasses to cattle feed plants.	Arrangement of feeds and fodder from adjoining areas, exploitation of non conventional feed resources, use of area treated straw and feed blocks.	Promotion of fodder seed production, cultivation and storage establishment of fodder block making machines in fodder surplus areas.
Drinking water	Repairs of tube wells, clear of the sludge in the canals and local water catchments and clean the water tanks, large ponds and lakes	Harvesting water through the existing reservoirs and exploitation of groundwater.	To strengthen reservoirs by promoting recharging of water and rain water harvesting during rainy season.

Health and disease management	Mass vaccination and deworming	Provide shades to animals and water as much as possible. treatment of diseased animals and proper disposal of carcasses.	Treatment of diseased animals and provide vitamin and mineral supplement to regain strength and vigour.
Floods			
Feed and fodder availability	Conservation of the fodder in the form of hay and silage.	Feeding of feed blocks and silages	Provide treated feed and fodder to animals against moulds and fungi.
Drinking water	Regular inspection of ponds and canals for any obstruction.	Provide drinking water in small through and plastic bucket.	Disinfection of contaminated water especially for drinking purpose.
Health and disease management	Storage of medicines	Treatment of injured animals	Disposal of dead animals.
Cyclone			
Feed and fodder availability			
Drinking water			
Health and disease management			
Heat wave and cold wave			
Shelter/environment management	Construction of wind breaks, shed should have sufficient over hangs, fixing of sprinklers, provide thatch on the roof. Construction of wind breaks, keep curtains ready, arrange for heating devices.	Construct wind breaks keep animals under shade during hot hours of the day, provide cooling fans in shades and also sprinkle water at regular intervals. Construction wind breaks, put gunny bags on all openings of shed.	
Health and disease management		Grazing should be allowed during night and early hours of the day, vaccination and veterinary checkup time to time.	

[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				
Shortage of feed ingredients	Storage of feed	Provide non conventional feed,		

		supplement anti oxidant and anti stress		
Drinking water	Storage of water in tanks	Add Vit-C and other anti stress ingredient with water		
Health and disease management	Regular vaccination	Vaccination and treatment of diseased one	Disposal of dead birds	
Floods				
Shortage of feed ingredients	Storage of feed in safe storage bins to avoid mould and fungi	Use pellet feeding		
Drinking water	Safe storage of water in tanks	Provide treated water		
Health and disease management	Regular vaccination	Vaccination and treatment of diseased one, proper litter management and addition of lime as per need	Disposal of dead birds	
Cyclone				
Shortage of feed ingredients	Storage of feed	Use stored feed carefully avoiding dampness		
Drinking water	Safe storage of water in tanks	Provide treated water		
Health and disease management		Vaccination and treatment of diseased one, proper litter management	Disposal of dead birds	
Heat wave and cold wave				
Shelter/environment management	Construction of wind breaks, poultry shed should have sufficient over hangs fixing of sprinklers on the roofs, provide thatch on the roof, decrease stocking density, decrease litter depth. Construction of wind breaks, keep curtains ready, arrange for heating devices, increase stocking density, decrease litter depth.	Provide cooling fans in shades and also sprinkle water on the roof at regular intervals. Use of wind breaks, put gunny bags on all openings of shed , use heating devices.		
Health and disease management	Routine health care	Reduce energy content and increase		

		protein content in feed, add anti stress factors, provide cool drinking water. Increase energy content in food		

[a] based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine			
Inland			
(i) Shallow water depth due to insufficient rains/inflow	1. Harvest all the large fish except the brood stock. 2. Move other fish into pens or small confined waters. 3. Provision for Rainwater harvesting 4. Deepening/Desilting of existing water bodies.	1. Harvest all the fish. 2. Stock water bodies with desirable species for culture. 3. Shallow derelict waters can stocked with stunted fish seed for culture. 4. Pens of 0.2 to 0.5 ha may facilitate easy operation of culture.	1. Stocking and management of grow out water bodies to improve growth of stock
(ii) Changes in water quality	1.Monitor water quality 2. Avoid polluting materials entry into water body.	1. Monitor water quality as small water bodies have less tolerance to environmental changes leading to algal blooms and fish mortality.	1. Advent of monsoon will mitigate the water shortage and normal stocking and culture practice may be adopted.
(iii) Any other			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	1. Harvest all the large fish except the brood stock. 2. Move other fish into pens or small confined waters with at least one meter depth.	1. Harvest all the fish. 2. Stock ponds with desirable species for culture. 3. Transfer the brood stock to deep water ponds if the existing ponds	1. Start breeding operation with full preparations. 2. Undertake nursery and rearing operations. 3. Stocking and management of grow

	3. Go for low stocking density. 4. Provision for Rainwater harvesting 5. Deepening/Desilting of existing water bodies. 6. Removal of debris and compaction of pond bunds.	cannot be filled with bore well water. 4. Postpone breeding operations till the first heavy rains or 5. Start breeding if sufficient bore well water is available. 6. Start pond preparations, like deweeding, desilting & repair of dykes.	out ponds to improve growth of stock.
(ii) Impact of salt load build up in ponds / change in water quality	1. Add bore well water and if available, canal-water	1. Add bore well/ canal water if available or else harvest the stock. 2. Implement standard water conservation management practices.	1. Exchange pond water with fresh surface runoff water.
2) Floods			
A. Capture			
Marine			
Inland			
(i) No. of boats / nets/damaged			
(ii) No. of houses damaged			
(iii) Loss of stock			
(iv) Changes in water quality		1. Drainage of excess water need to be done. 2. Erect pens to protect the stock 3. Harvest big fish	1. Repair the embankments. 2. Restock with fish
(v) Health and diseases			1.Treat symptomatically
B. Aquaculture			
(i) Inundation with flood water	1. Dyke level shall be 0.5 m higher than highest flood level. Dyke walls should be checked for its strength specially compactness. 2. Inlets & outlets with proper sieves need to be maintained properly. 3. Pens may be erected to check fish stock loss in the periphery of small	1. Round the clock watch in is necessary. 2. Hapas should be installed in ponds to take care of spawn in case sudden or natural breeding occurs.	1. Check the brood stock condition. 2. Segregate male & female and various fish sizes. 3. Application of bleaching powder or liming must be done to avoid decaying of various organisms.

	ponds.		
(ii) Water contamination and changes in water quality	-	1. Turbidity need to be controlled	1. Application of lime/ bleaching powder be done to avoid rotting and decaying of organisms.
(iii) Health and diseases	-	1. Apply lime/ bleaching powder as a prophylactic measure.	1. Apply bleaching powder. 2. Remove severely diseased & injured fishes. 3. Treat the remaining fishes as per symptoms.
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, huts etc)			
3. Cyclone / Tsunami	NA		
4. Heat wave and cold wave			
A. Capture			
Marine			
Inland	-	1. Harvest the stock.	1. Stock with fingerlings with the advent of rains.
B. Aquaculture			
(i) Changes in pond environment (water quality)	-	1. Add bore well water and if available, canal-water.	1. Exchange pond water with fresh surface runoff water.
(ii) Health and Disease management	-	1. Provide shelter (weeds) in a small area of the pond to prevent sun burn.	1. Remove weeds. 2. Liming or bleaching powder need to be added.

[a] based on forewarning wherever available