

State: Jharkhand

Agriculture Contingency Plan for District: Ramgarh

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 eco sub región (11.0)		
Agro-Climatic Zone (Planning Commission)	Eastern Plateau And Hills Region (VII)		
Agro Climatic Zone (NARP)	Central and North Eastern Plateau Zone (BI-4)		
List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Bokaro, Deoghar, Dhanbad, Dumka, Giridih, Godda, Hazaribagh, Jamtara, Khunti, Pakaur, Ramgarh, Ranchi, Sahebganj,Koderma		
Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
	23.35°N	85.33°E	2140 feet
Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	ZRS, Dumka (Birsa Agricultural University, Ranchi)		
Mention the KVK located in the district with address	KVK is not located in the district		
Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Birsa Agricultural University, Ranchi		

1.2	Rainfall	Normal RF(mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	1139	2 nd week of June	1 st week of October
	NE Monsoon(Oct-Dec):	80.64	2 nd week of October	3 rd week of December-
	Winter (Jan- March)	26.88	1 st week of January	4 th week of March
	Summer (Apr-May)	94.08	1 st week of April	4 th week of May
	Annual	1344	-	-

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)	137.6	20.66	14.8					9.62	3.3	

1.4	Major Soils (common names like red sandy loam deep soils (etc.))*	Area ('000 ha)	Percent (%) of total
	Red lateritic (Ultic Paleustalfs)		
	Loam soil (Haplustalfs)		
	Fine Loam (Rhodustlafs)		
	Fine mixed Loam (Paleustalfs)		

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	20.66	117%
	Area sown more than once	3.51	
	Gross cropped area	24.18	

1.6	Irrigation	Area ('000 ha)

Net irrigated area	7.51		
Gross irrigated area			
Rainfed area			
Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
Canals		--	
Tanks /Ponds	468	2.03	27.0
Open wells		4.39	58.5
Bore wells	13223		
Lift irrigation schemes			
Micro-irrigation	48	0.55	7.3
Other sources (Check Dam)	72	0.75	9.9
Total Irrigated Area			
Pump sets			
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			
Critical			
Semi- critical			
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

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			7.13					7.13	
Maize			8.09			0.07		8.16	
Pigeonpea			2.67					2.67	
Blackgram			0.23					0.23	
Greengram			0.02					0.02	
Groundnut			0.22					0.22	
Wheat						0.41		0.41	
Chick pea						0.05		0.05	
Pea						0.28		0.28	
Lentil						0.23		0.23	
Mustard						0.03		0.03	

	Horticulture crops - Fruits	Area (acre)		
		Total	Irrigated	Rainfed
	Horticulture crops - Vegetables	-	-	
	Spices	-	-	
	Medicinal and Aromatic crops	-	-	
	Plantation crops	-	-	
	Eg., industrial pulpwood crops etc.	-	-	
	Fodder crops	-	-	
	Total fodder crop area	-	-	
	Grazing land	-	-	
	Sericulture etc	-	-	
	Others (specify)	-	-	

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)			
	Non descriptive Cattle (local low yielding)						
	Improved cattle						
	Crossbred cattle						
	Non descriptive Buffaloes (local low yielding)						
	Descript Buffaloes						
	Goat						
	Sheep						
	Others (Camel, Pig, Yak etc.)						
	Duckery						
	Commercial dairy farms (Number)						
1.9	Poultry	No. of farms	Total No. of birds ('000)				
	Commercial						
	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	
	B. Culture						
			Water Spread Area (ha)		Yield (t/ha)	Production ('000 tons)	
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)						
	ii) Fresh water (Data Source: Fisheries Department)						

	Others			
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1.11 Production and Productivity of major crops

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder ('000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Rice	38.591	3611					38.591	3611	
	Maize	7.624	1232	0.366	1753			7.990	1493	
	Pigeonpea	1.409	870					1.409	870	
	Blackgram	0.192	423					0.192	423	
	Greengram	0.057	460					0.057	460	
	Groundnut	0.129	795					0.129	795	
	Wheat			2.313	1533			2.313	1533	
	Chick pea			1.207	972			1.207	972	
	Pea			0.549	914			0.549	914	
	Lentil			0.282	702			0.282	702	
	Mustard			0.832	444			0.832	444	
Major Horticultural crops (Crops to be identified based on total acreage)-										

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Rice	Maize	Pigeonpea	Wheat	Groundnut
	Kharif- Rainfed	4 th week of June - 4 th week of July	2 nd week of June- 2 nd week of July	1 st week of June- 4 th week of July		2 nd week of June – 2 nd week of July
	Kharif-Irrigated	4 th week of June - 4 th week of July				
	Rabi- Rainfed					
	Rabi-Irrigated		November-December		November-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 (specify)		✓	
	Others (specify)			

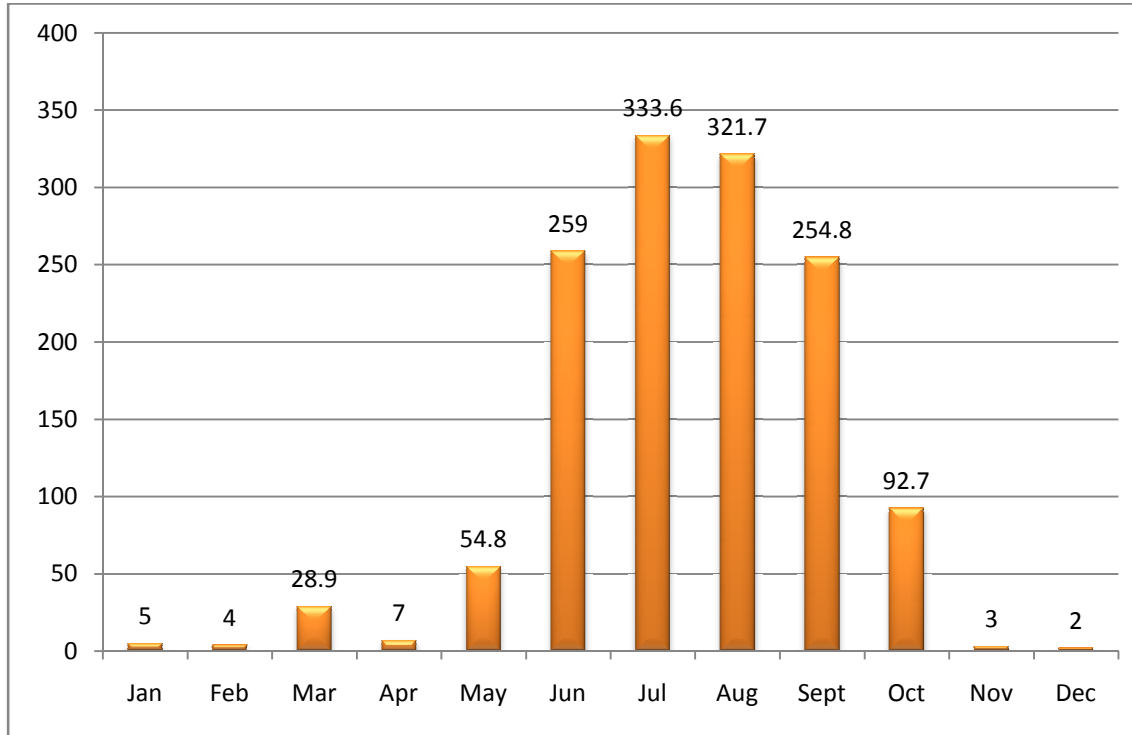
1.14	Include Digital maps of the district for		
		Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

Annexure I

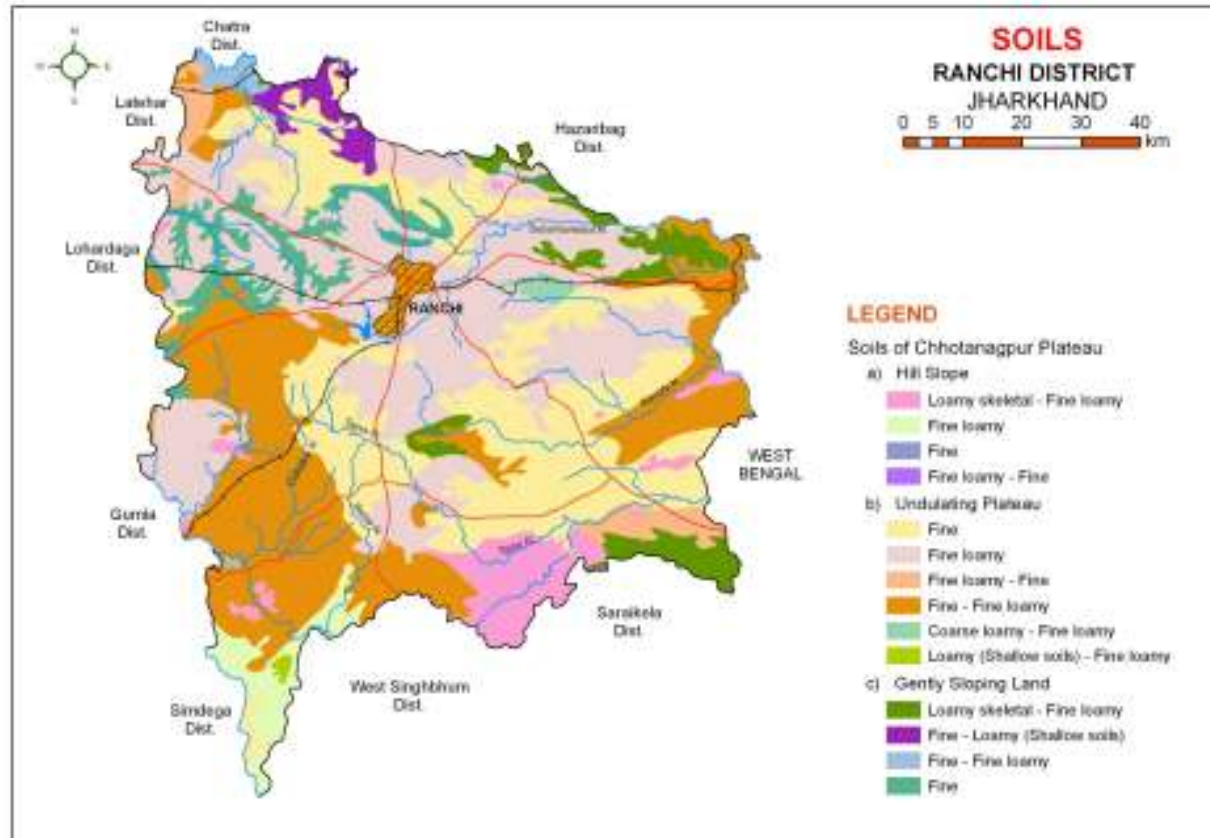


The district of Ramgarh was carved out of Ranchi district on 12 September 2007

ANNEXTURE-II



ANNEXTURE-III



SOURCE: NBSSLUP, Kolkata

Note: Ramgarh district is a newly formed district, earlier it was carved out from Ranchi

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 June 4th week	Uplands	Upland rice, Maize, Finger millet Pigeonpea, , soybean, Groundnut, Pigeonpea + maize Pigeonpea+ groundnut Vegetables- Brinjal,tomato, spongegourd	No change	-	
	Midlands	Rice sowing in dry method Var- Naveen, IR-64, Lalat, Sahbhagi, Birsa Dhan 201, Birsa Vikash Dhan 203 Nursery raising of medium duration rice variety	Nursery raising of medium duration rice variety Nursery raising of Hybrid rice varieties Var- Arize Tez, PAC 801, 27P31	-	
	Lowlands	Seedling of rice with dry method Var- MTU- 7029, BPT 5204, Birsamati	No change	Seedlings with sprouted seed	

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 4 weeks July 2 nd week	Uplands	Upland rice, Maize, Pigeonpea, Groundnut, , Green gram, Soybean , Finger millet Vegetables- Califlower, Cabagge, Brinjal, tomato,	Do not prefer soybean after 2 nd week of July and instead of soybean prefer blackgram, greengram, Finger millet Upland rice/ Pigeonpea/ Groundnut: Prefer early maturing varieties	Intercropping in standing crop like maize, Pigeonpea Adopt sowing on ridges Mulching in between the rows	
	Midlands	Seedling raising	1. Seedling raising Medium duration rice Var- IR- 64, Lalat, Navin, Birsa Dhan 201, Birsa Vikas Dhan 203, Arize Tez, PAC 801 2. Direct dry sowing of rice	In direct dry sowing may be sown behind the plough with 50-60 kg seed/ha To save nursery provide life saving irrigation of raised seedlings	
	Lowlands	Nursery raising of MTU-7029, BPT 5204, Birsamati and Arize 6444	Transplanting will be done with available seedlings Seedling raising of IR 64, Naveen, Sahbhagi	Transplanting in rows with proper spacing	

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 6 weeks	Uplands	Upland rice, Groundnut, , Green gram, Soybean , Finger millet	Do not prefer soybean after 2 nd week of July and instead of soybean prefer blackgram, greengram,	Increase seed rate by 20% Adopt line sowing	-

July 4 th week			Finger millet Upland rice/ Pigeonpea/ Groundnut: Prefer early maturing varieties	Adopt sowing on ridges Mulching in between the rows	
		Maize, Pigeonpea,	Sorghum, Pearl millet		
		French bean, bhindi, tomato, brinjal	French bean, bhendi, tomato, brinjal, chilli, cow pea		
	Midlands	Nursery raising with dry method Var- IR-64, Lalat, Birsa Dhan 201, Birsa Vikash Dhan 203	Direct sowing of rice- Anjali, Vandana, Abhisekh, Birsa Vikas Dhan-109,110 & 111	Direct sowing at 50- 60 kg/ha behind the plough	
Lowlands	Transplanting of rice	Transplanting with medium duration rice variety Sahbhagi, Naveen, IR-64	Transplanting with closer spacing 15x10 cm Reduce RDF fertilizer dose by 20 %NPK/ha		

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 8 weeks 2 nd week of August	Uplands	Upland rice, Maize, Pigeonpea, Groundnut, , Green gram, Soybean , Finger millet Vegetables- Califlower, Cabagge, Brinjal, tomato,	Prefer to sow Niger, Horse gram, Kharif Potato, Toria and Vegetable pea	Adopt line sowing Mulching in between the rows	

	Midlands	Transplanting of rice	Transplanting of rice if seedling is available Sowing of early Toria Var—T-9, PT- 303, Niger, Horse gram	Transplanting rice with 5-6 seedling/hill if age of seedling is more than 30 days	
	Lowlands	Transplanting if seedling of medium variety Sahbhagi, BVD 109, 110, 111 is available	Transplanting if seeding is available of mid early variety Anjali, BVD 109,110,111	Reduce RDF fertilizer dose by 20 %NPK/ha Increase the no. of seedling (5-6 seedling/hill) Transplanting with closer spacing 15x10 cm	

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.	Uplands	Upland rice Pigeonpea + Groundnut Maize Pigeonpea + Maize Pigeonpea + Bhindi Maize + Bhindi Pigeonpea- Aghani (local) Vegetables- Brinjal,tomato, spongegourd, cucurbits, cow pea, bean, bhindi, chilli	Interculture in standing crop with thinning & gap filling Resowing if complete failure of previous crop Pigeonpea - UPAS- 120, Asha, ICPH-2671 Maize- Suwan- 1, HQPM-1 BVM-2, Kanchan Groundnut- TG-22,	Interculture	1. Supply of weeding machine 2. Supply of seeds on subsidized rate

			Birsa GN-2 Sesame- Kanke safed, TC-25 Upland rice + Pigeonpea (1:3) Pigeonpea+ Black gram (1:2) Resowing of brnjal, tomato , cucurbits		
	Mid lands	Rice Var- IR- 36, IR- 64, Lalat	Rice: Var- Lalat, Navin, MTU- 1010, Abhishek ,Hybrid var- Arize Tez, RH257 Life saving irrigation Direct sowing of rice	Weeding Split application of Nitrogen	Increase water harvesting structures like ponds, check dams & open well
	Lowlands	Rice MTU- 7029, 1001, Kanak, BPT 5204, Birsamati, Rajshree, Arize 6444,	Rice :MTU- 7029, BPT- 5204, Rajendra Hybrid- Arize- 6444	Supplemental irrigation to the rice nursery	Ponds check dam through water shed management & MNREGA scheme

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	Uplands	Upland rice variety Birsa Dhan108,BVD 109,110,111, Vandana Pigeonpea + Groundnut Maize Pigeonpea + Maize Maize + Bhindi Vegetable: Cow pea	1. Interculturing in standing crop 2. Thinning 3. Life saving irrigation to vegetable crops	-	Rain water harvesting structure should made through watershed programme / MNREGA
	Mid lands	Rice IR- 64, IR – 36, Lalat	Foliar spray of Urea (2%)	Weeding Provide life saving irrigation	Farm ponds Check dams Rain water harvesting
	Lowlands	Rice MTU- 7029, 1001, Kanak			Ponds check dam through water shed management & MNREGA scheme

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
At flowering/ fruiting stage	Uplands	Upland rice Groundnut+ Pigeonpea Maize Maize + Pigeonpea Bhindi + Maize Vegetable Cow pea Maize- Local (Sathi, Kanchan) Upland rice- Brown Goda Pigeonpea- Aghani (local)	Interculture	Provide life saving irrigation at critical stage of crop growth	Rain water harvesting structure should made through watershed programme / MNREGA

	Mid lands	Rice IR- 64, IR – 36, Lalat	Foliar application with Urea (2%)	Weeding Life saving irrigation through well, ponds check dams	Farm ponds Check dams Rain water harvesting
	Lowlands	Rice MTU- 7029, 1001, Kanak			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop planning	Remarks on Implementation
Terminal drought (Early withdrawal of monsoon)					
Reproductive stage	Uplands	Upland rice Groundnut+ Pigeonpea Maize Maize + Pigeonpea Bhindi + Maize Vegetable Cow pea Maize- Local (Sathi, Kanchan) Upland rice- Brown Goda Pigeonpea- Aghani (local)	1. Life saving irrigation to vegetables 2. Upland rice harvested for straw purpose 3. Harvest groundnut at physiological maturity stage	Prefer to sow Niger/ Horse gram/ Toria/ potato	1. Farm ponds through watershed management programme 2-5 % modul for rain water harvesting through watershed management & NNREGA programme
	Mid lands	Rice IR- 64, IR – 36, Lalat	Life saving irrigation Crop harvested at Physiological maturity for fodder and animals	Sowing of Toria Field preparation with early rabi pulses like chick pea (P- 256,PL- 406)/ Lentil / mustard (Shicani, Pusa Agrani)/ Linseed (Shubhra, T- 397)	Farm ponds Check dams Rain water harvesting

	Lowlands	Rice MTU- 7029, 1001, Kanak	Life saving irrigation Crop harvested at physiological maturity	Plan for early rabi sowing with wheat/ mustard Pulses like chick pea Intercropping Wheat+ Mustard	
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2.1.2 Drought - Irrigated situation- Not applicable

Condition	Suggested Contingency measures				
	Major Farming situation ^f	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed/ 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					
Lack of inflows into tanks due to insufficient /delayed onset of monsoon					
Insufficient groundwater recharge due to low rainfall					

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				
Pigeonpea	Ridge making	Draining		
Black gram	Ridge making	Draining		
Rice	Bund making	Draining	Draining	
Horticulture				
Cucurbits	Staking	Draining	Draining	

Vegetables	Sowing on ridge			
Outbreak of pests and diseases due to unseasonal rains				
Pulses	Leaf hoper/Caterpillar Control- Monocrotophos @ 1 ml/lit			
Maize	Stem borer Control- Phorate 10G@ 20 kg/ha	Sheath blight Control- Hexaconazole 1.0 lit in 500 lit water/ha		
Rice		Blast diseases Control- Tricyclazole (0.05 %)	False Smut Control- Propiconazole 0.1 % or Copper oxy chloride -50 (2 kg/ha)	
Bhendi		Yellow mosaic virus Control- Carbofuran 3G @ 3 gm/m ²		
Horticulture				
French bean	Rust disease Control- Mancozeb 2.5 kg/ ha			

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			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Hailstorm	Not applicable			
Heat Wave				

Wheat	Life saving irrigation	Life saving irrigation	Life saving irrigation (Terminal heat)	
Cold wave				
Wheat	Irrigation Balanced fertilizer application Foliar spray of nutrients	Light irrigation Mulching with crop residue \ weeds Fertilizer application	Irrigation, fertilizer application	
Vegetables	Raising of seedling in Poly house, re sowing if damaged	Light irrigation Mulching with crop residue \ weeds Disease and pest control, care for chilling injury or replanting	Quick harvesting	Grading, quick disposal for marketing
Pigeonpea		Light irrigation Mulching with crop residue \ weeds		
Frost				
Wheat		Light irrigation Mulching with crop residue \ weeds		
Pigeonpea	Exposure of crop to smoke by burning waste material during night time	Exposure of crop to smoke by burning waste material during night time, Light sprinkler irrigation	Exposure of crop to smoke by burning waste material during night time, Light sprinkler irrigation	Exposure of crop to smoke by burning waste material during night time
Tomato & Potato		Earthing up, Irrigation,		Harvest in dry weather
Horticultural crops (fruit crops)	Light frequent irrigation may be practiced wherever irrigation facilities are available, mulching, thatching and creating smoke screens and lighting of fire is also practiced where irrigation facilities are not available			
Cyclone	Not applicable			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and Fodder availability	<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>Rice/ wheat straw: 250 t</p> <p>Urea molasses mineral bricks (UMMB): and complete feed block (CFB) 50-100 t</p> <p>Dried grass collected from forest: 20-25 t</p> <p>Concentrates: 20-50 t</p> <p>Minerals and vitamin supplements mixture: 1-5 t</p> <p>2. Preparation and storage of straw</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, Sal, Jamun, Mango, Jackfruit, Bamboo etc) and unconventional feeds resources like banana plants, babool pods, Mahua seed cake etc for use as feed/ fodder for livestock (LS). Fallen leaves from forest may also be used as fodder.</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/ forest and stall fed in order to reduce the energy requirements of the animals</p> <p>Mild drought : Hay/straw should be transported to the needy areas</p> <p>Moderate drought: Hay/ straw 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</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 Jowar/Cowpea/ Maize in September-October.</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</p>

<p>and dried grass/ grass hay/ fallen leaves at household level</p> <p>Preserve the fodder in the form of hay from Berseem, cowpea, oat & other grasses.</p> <p>Large farmers may prepare 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>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>Cnidoacolus aconitifolius</i>) has been introduced in IGFRI, Jhansi which has high protein value, may be introduced in drought prone regions.</p>	<p>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 (where canal exists).</p> <p>Herd should be split and supplementation should be given only to the highly productive and breeding animals (pregnant and lactating 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</p>	<p>October as multi cut fodder to ensure the fodder availability for longer period.</p> <p>Concentrates supplementation should be provided to all lactating indigenous, crossbred and buffaloes</p> <p>In highly affected areas, where animals have died, soft loan or subsidy may be given for purchase of dairy animals. Backyard poultry, pig, goat may be distributed among resource poor farmers for immediate income generation.</p>
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<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. Feeding management</p> <p>Chopping of fodder should be made as mandatory in every village through supply and establishment of good quality crop 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 wastage of maize stover.</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, bailing and densification</p>	<p>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> <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>	
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	of harvested grass.		
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>In case of EFW, shift the animals to safer places.</p> <p>Identification of animals may be done.</p> <p>Keep animals untied in the shed in case of EFW.</p>	<p>Treatment of the sick, injured and affected animals through arrangement of mobile emergency veterinary hospitals / rescue animal health workers.</p> <p>Diarrhea out break may happen, arrangement should be made to mitigate the problem</p> <p>Protect the animals from heavy rains and thunder storms</p> <p>In severe cases un-tether or let loose the animals</p> <p>Arrange transportation of highly productive animals to safer place</p> <p>Spraying of fly repellants in animal sheds</p>	<p>Repair of animal shed</p> <p>Deworm the animals through mass camps</p> <p>Vaccinate against possible out breaks</p> <p>Proper disposal of the dead animals / carcasses by burning / burying with lime/ bleaching powder in pit</p> <p>Bleach / chlorinate (0.1%) drinking water or water resources</p> <p>Collect drowned crop material, dry it and store for future use</p> <p>Sowing of above mention short duration fodder crops in unsown and water logged areas</p> <p>Application of urea (20-25kg/ha) in the CPR's to enhance the bio mass production.</p> <p>After cyclone, for livelihood improvement of highly affected areas, backyard poultry, pig, goat etc may be distributed for immediate income generation.</p>
Floods	NA	NA	NA
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 or frequent washing</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</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>

	<p>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>time and roughages / hay during night time in case of heat waves</p> <p>Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves. Molasses may be added in the concentrate feed during heat waves.</p> <p>Put on the foggers / sprinklers and frequent washing of animals during heat waves and heaters during cold waves</p> <p>In severe cases, vitamin 'C' and electrolytes should be added in H₂O during heat waves.</p> <p>Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation</p>	
<p>Health and Disease management</p>	<p>Specify the endemic diseases (species wise) in that region.</p> <p>Identification of veterinary staff and animal health workers.</p> <p>Constitution of Rapid Action Veterinary Force</p> <p>Storage of emergency medicines and medical kits</p> <p>Timely vaccination (as per enclosed vaccination schedule) against all endemic diseases</p> <p>Surveillance and disease monitoring network establishment</p> <p>Provision for mobile ambulatory van.</p>	<p>Rescue of sick and injured animals and their treatment</p> <p>Conducting mass animal health camps</p> <p>Animals may be checked for any external injury and illness, Pregnant animals may be checked for any discomfort and uneasiness.</p> <p>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>Conducting psahu sibir, mass animal health camps, fertility camps and deworming camps.</p> <p>Conducting fertility camps.</p> <p>Disposal of carcass by above means.</p> <p>Pregnancy toxemia may occur due to prolonged under-feeding. 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>

Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	Submission for insurance claim and availing insurance benefit Purchase of new productive animals
Drinking water	Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) Identification of water resources	Restrict wallowing of animals in water bodies/resources	Specify the options (place and area) for establishment of drinking water reserves.

Vaccination schedule in small ruminants (Sheep & Goat)

Disease	Season
Foot and mouth disease (FMD)	Before rainy season and in winter / autumn
PPR	All seasons, preferably in June-July
Black quarter (BQ)	May / June
Enterotoxaemia (ET)	May
Haemorrhagic septicaemia (HS)	March / June
Sheep pox (SP)	December / March

Vaccination programme for cattle and buffalo:

Disease	Age and season at vaccination
Anthrax	In endemic areas only, Feb to May

HS	May to June
BQ	May to June
FMD	November to December

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	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	Mixing of Vit. A,D,E, K and B-complex including	Hygienic and sanitation of poultry house Disposal of dead birds	

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

	Culling of weak birds	thunder storms		
Drinking water	Provide clean drinking water	Sanitation of drinking water	Sanitation of drinking water	
Health and disease management	In case of EFW, add antibiotic powder in drinking water to prevent any disease outbreak	Sanitation of poultry house Treatment of affected birds Prevent water logging surrounding the sheds Assure supply of electricity Sprinkle lime powder to prevent ammonia accumulation due to dampness	Disposal of dead birds by burning / burying with lime powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD	
Heat wave and cold wave				
Heat wave				
Shelter/environment management	Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting	Routine practices are followed	

		<p>of hanged gunny bags should be arranged</p> <p>Don't allow for scavenging during mid day</p>		
Health and disease management	Deworming and vaccination against RD and fowl pox	<p>Supplementation of house hold grain</p> <p>Provide cool and clean drinking water with electrolytes and vit. C</p> <p>In hot summer, add anti-stress probiotics in drinking water or feed.</p> <p>Increase energy and vitamin concentration in feed (supplementation with grain).</p>	Routine practices are followed	
Cold wave				
Shelter/environment management	Provision of proper shelter	Close all openings with polythene	Routine practices are followed	

	Arrangement for brooding Assure supply of continuous electricity	sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening		
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			
Marine			
Inland			
(i) Shallow water depth due to insufficient rains/inflow			
(ii) Changes in water quality			
(iii) Any other			
B. Aquaculture			

(i) Shallow water in ponds due to insufficient rains/inflow	(i) Thinning of fish density (ii) Arrangement of water supply from external resource (iii) Deepening of ponds to accommodate more water	(i) Partial harvesting (ii) Addition of water in ponds (iii) Stocking of air breathing fishes (Singhi, Magur or Murrel)	(i) Maintenances of remaining stock till onset of favorable conditions or otherwise. (ii) Harvesting or transfer of fish stock to other place. (ii) Preparation of ponds for next crop.
(ii) Impact of salt load build up in ponds / change in water quality	(i) Regular monitoring of water quality parameters. (ii) Arrangement for water from external source. (iii) Arrangement for aeration.	(i) Addition of required water. (ii) Arrangement of aeration. (iii) Continuous monitoring of water quality parameters. (iv) Reduction in manuring.	(i) Exchange and addition of water. (ii) Manuring if required.
(iii) Any other	Laying of Polythene lining in ponds having water seepage problem.		
2) Floods			
A. Capture			
Marine			
Inland			
(i) No. of boats / nets/damaged			
(ii) No.of houses damaged			
(iii) Loss of stock			
(iv) Changes in water quality			
(v) Health and diseases			
B. Aquaculture			
(i) Inundation with flood water	(i) Elevation and renovation dykes of ponds. (ii) Construction of ponds in upland areas (ii) Arrangement for shifting of	(i) Collection of naturally bred fish seed from flood water. (ii) Stocking of seed in nursery ponds constructed in upland area. (iii) Further raising of dykes by	(i) Repairing of damaged pond dykes. (ii) Removal of unwanted fishes from ponds. (iii)Sale large sized fishes.

	inputs, crafts and gears.	putting sand bags/fencing dykes with nylon nets.	
(ii) Water contamination and changes in water quality	(i) Arrangement for monitoring of water quality parameters.		(I) Use of lime/Pott. Permanganate.
(iii) Health and diseases	(i) Arrangement of Pott. Permanganate and lime. (ii) Arrangement for CIFAX/ or other medicines.	Use of Pott. Permanganate and lime.	(i) Sampling of water and diseased fish for pathological analyses. (ii) Use of Pott. Permanganate and lime. (iii) Treatment with medicines/ CIFAX.
(iv) Loss of stock and inputs (feed, chemicals etc)	(i) Shifting of inputs to safer place. (ii) Raising height of pond dykes by fencing with nylonnet/bamboo mats.	(i) Arrangement of fish seed/inputs	(i) Fertilization of ponds, stocking with fish fingerlings and restoring supplementary feeding. (ii) Harvesting and sale of produce.
(v) Infrastructure damage (pumps, aerators, huts etc)	Arrangement, repairing and shifting of equipments, crafts and gears to safer place.		Restoration of infrastuctural facility to its original.
(vi) Any other			
3. Cyclone / Tsunami			
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives			
(ii) Avg. no. of boats / nets/damaged			
(iii) Avg. no. of houses damaged			

Inland			
B. Aquaculture			
(i) Overflow / flooding of ponds			
(ii) Changes in water quality (fresh water / brackish water ratio)			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)			
(vi) Any other			
4. Heat wave and cold wave			
A. Capture			
Marine			
Inland			
B. Aquaculture			
(i) Changes in pond environment (water quality)			
(ii) Health and Disease management			
(iii) Any other			
	Suggested contingency measures		
	Before the event^a	During the event	After the event
1) Drought			
A. Capture			

Marine			
Inland			
(i) Shallow water depth due to insufficient rains/inflow			
(ii) Changes in water quality			
(iii) Any other			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow			
(ii) Impact of salt load build up in ponds / change in water quality			
(iii) Any other			
2) Floods			
A. Capture			
Marine			
Inland			
(i) No. of boats / nets/damaged			
(ii) No.of houses damaged			
(iii) Loss of stock			
(iv) Changes in water quality			
(v) Health and diseases			
B. Aquaculture			
(i) Inundation with flood water			
(ii) Water contamination and changes in water quality			
(iii) Health and diseases			

(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, huts etc)			
(vi) Any other			
3. Cyclone / Tsunami			
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives			
(ii) Avg. no. of boats / nets/damaged			
(iii) Avg. no. of houses damaged			
Inland			
B. Aquaculture			
(i) Overflow / flooding of ponds			
(ii) Changes in water quality (fresh water / brackish water ratio)			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)			
(vi) Any other			
4. Heat wave and cold wave			
A. Capture			
Marine			

Inland			
B. Aquaculture			
(i) Changes in pond environment (water quality)			
(ii) Health and Disease management			
(iii) Any other			

^a based on forewarning wherever available