

AGRICULTURE CONTINGENCY PLAN FOR DISTRICT: IMPHAL WEST
STATE: MANIPUR
 KVK, IMPHAL WEST DISTRICT, ICAR RESEARCH COMPLEX FOR NEH REGION
 LAMPHELPAT, IMPHAL, 795004
18th June, 2013
ICAR Research Complex for NEH Region
Umroi Road, Umiam, Meghalaya

1.0 District Agriculture profile			
	Agro climatic /ecological zone		
	Agro Ecological Sub Region (ICAR)	North-Eastern Hills (Purvachal), Warm Perhumid Eco-sub region (17.2)	
	Agro-climatic Region (Planning Commission)	Eastern Himalayan Region (II)	
	Agro Climatic Zone (NARP)	Sub-Tropical Zone (NEH-4)	
	List all the districts or part thereof falling under the NARP Zone	Imphal West, Imphal East, Thoubal, Bishnupur and foothills of Senapati	
	Geographic coordinates of district	Latitude	Longitude
		24 45' N	93 54' E,
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	ICAR Research Complex for NEH Region, Manipur Centre, Lamphelpat-795 004	
	Mention the KVK located in the district	Imphal West District , Manipur	

1.2	Rainfall	Normal rainfall (mm)	Normal rainy days (nos.)	Normal onset	Normal cessation
	Pre monsoon	830.2	55	1 st week of April	
	SW monsoon (June-Sep)			1 st week of June	-
	NE Monsoon (Oct-Dec)	200.8	15	-	-
	Winter (Jan-March)	122.4	9	-	-
	Summer (Apr-May)	316.3	21	-	-
	Annual	1469.7	100	-	-

1.3	Land use pattern of the district (latest statistics)	Geographical area	Cultivable area	Forest area	Land under agril. use	Permanent pastures	Cultivable waste land	Land under Misc tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area (000' ha)	51.9	21.23	2.13	28.25	-	0.24	-	0.22	0.14	-

1.4	Major Soils (common names like shallow red soils etc.)	Area ('000 ha)	Per cent of total
	Alluvial soils	-	-
	Black soils	-	-
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	21.24 (21236.40 ha)	132.99
	Area under more than once	7.01	
	Gross cropped area	28.24	

1.6	Irrigation	Area ('000 ha)	Percent (%)	
	Net irrigated area	2.73	12.85	
	Gross irrigated area	3.15	14.83	
	Rainfed area	25.51	-	
	Sources of Irrigation	Number	Area (000' ha)	% area
	Canal	-	2.03	74.36
	Tanks			
	Open wells			
	Bore wells			

	Lift irrigation		0.70	25.64
	Micro-irrigation			
	Other sources			
	Total Irrigated Area	2.73		
	Pump sets	685		
	No. of Tractors	249		
	Ground water availability and use	No of blocks	% area	Quality of water
	Over exploited			
	Critical			
	Semi-critical			
	Safe			
	Ground water quality			
	Wastewater availability and use			

1.7 Area under major field crops & horticulture etc

1.7	Major Field Crops cultivated	Area ('000 ha)*					
		Kharif		Rabi		Summer	Total
		Irrigated	Rainfed	Irrigated	Rainfed		
	Rice	8.97	13.57	-	-	-	22.54
	Pea			0.09	0.20	-	0.29
	Potato			0.25		-	0.25
	Rapeseed-mustard	-	-	0.10	0.54	-	0.64
	Maize	-	0.10	-	-	-	0.10

	Other					1.63	1.63
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1.7	Horticulture crops-Fruits	Total area ('000 ha)*	Irrigated *	Rainfed *
	Pineapple	0.5		
	Banana	0.53		
	Passion fruit	0.09		
	Lime/lemon	0.08		
	Mango	0.48		
	Other crops	0.74		

*For Horticulture crops, only total area need to be given

1.7	Horticultural crops -Vegetables	Total area ('000 ha) (2008-09)	Irrigated ('000 ha)	Rainfed
	Cauliflower ; Variety: Snow Crown, White Flash, White Shot, Sweta	0.30	0.30	
	Cabbage; Variety: Green Hero, Rare Ball, Wonder Ball, Green Express	0.35	0.35	
	Tomato; Variety: rc Mani khamenasinba-1, Hybrids from private seed company	0.15	0.15	
	Onion Variety: Nasik Red, Prema, Local (Small)	0.1	0.1	
	Other	0.29	0.20	0.09

1.7	Flowers	Total area	Irrigated	Rainfed
1.7	Medicinal and Aromatic crops	-	-	-
1.7	Spice & Plantation crops (000' ha)	1.26		

1.7	Fodder crops	Total area ('000 ha)	Irrigated	Rainfed
	Sericulture etc	0.10		0.10
	Others (specify)			

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	27.08	16.64	43.72
	Crossbred cattle	2.8	7.52	10.41
	Non descriptive Buffaloes (local low yielding)	1.02	0.93	1.95
	Graded Buffaloes	NA	NA	NA
	Goat	1.08	1.50	2.58
	Sheep	0.57	0.54	1.11
	Others (Pig)	4.37	6.12	10.49
	Commercial dairy farms (number)	-	-	-

1.9	Poultry	No. of farm ('000)	Total No. of birds
	Commercial		171.49
	Backyard		211.51

1.10	Fisheries (Data source : Chief Planning Officer)
	A. Capture

	i) Marine (Data source: Fisheries Department) – Not available	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc)
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake& trap nets)	
	ii) Inland (Data source: Fisheries Department)	No. of farmer owned ponds		No. of reservoirs		No. of village tanks	
		C 4500	1no. (Singda Dam)		C-70		

	B. Culture			
		Water Spread Area (ha)	Yield (t/ha)	Production ('000 tons)
	i) Brackish water (Data source: MPEDA/ Fisheries Dept)	-	-	-
	ii) Fresh water (Data source: Fisheries Dept)	1355.6	2.5	3.39
	Others	-	-	-

1.11 Production and productivity of major crops

1.11	Name of the crop	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)						
	Major Field crops								
	Rice	57.5	3045.53	-	-	-	-	57.5	3045.53
	Rapeseed-	-	-	0.51	800.0	-	-	0.5	800.0

	mustard								
	Pea	-	-	1.61	1900	-	-	1.6	1900.0
	Cabbage	-	-	6.19	11050	-	-	3.6	3115.2
	Cauliflower	-	-	3.59	9960	-	-	2.3	2247.5
	Potato	-	-	2.04	8160	-	-	2.0	8160
	Chilli	8.49	7510	-	-	-	-	8.4	7510
	Banana	8.79	12930	-	-	-	-	8.7	12930
	Tomato	2.59	12639	-	-	-	-	-	-
	Others	-	-	-	-	5.91	10622	5.9	10622

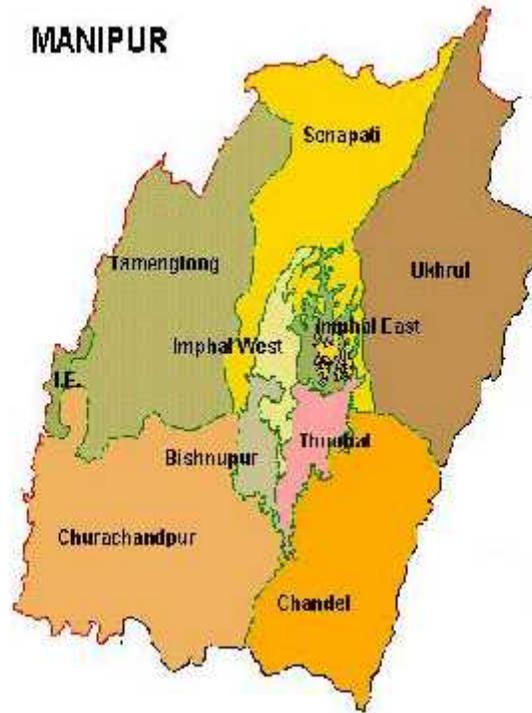
1.12	Sowing window for 5 major crops (start and end of sowing period)	Rice	Maize	Pea	Mustard	Cabbage	Cauliflower
	Kharif –Rainfed	June to July	June to July	-	-	-	July –Sep (off season)
	Kharif- Irrigated	June to July		-	-	-	-
	Rabi- Rainfed	-		October- November	October- November	October- November	October-November
	Rabi-Irrigated	-		-	October	November	October-November

1.13	What is the major contingency the district is prone to? (Tick mark)*	Regular	Occasional	None
	Drought		√	
	Flood	√		
	Cyclone			
	Hail storm		√	
	Heat wave			√
	Cold wave		√	
	Frost	√		
	Sea water intrusion			√
	Pests and diseases others(specify)	√		
	Rice	Blast, Stem borer, gall midge, case worm	Hopper	
	Potato	Late/early blight, rust	Scab	
	Tomato	Blight, fruit Borer, bacterial wilt	Leaf Curl	

1.14	Include Digital maps of the district for	Location map of district with in State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure II	Enclosed: Yes
		Soil map as Annexure III	Enclosed: Yes

Annexure I

MANIPUR

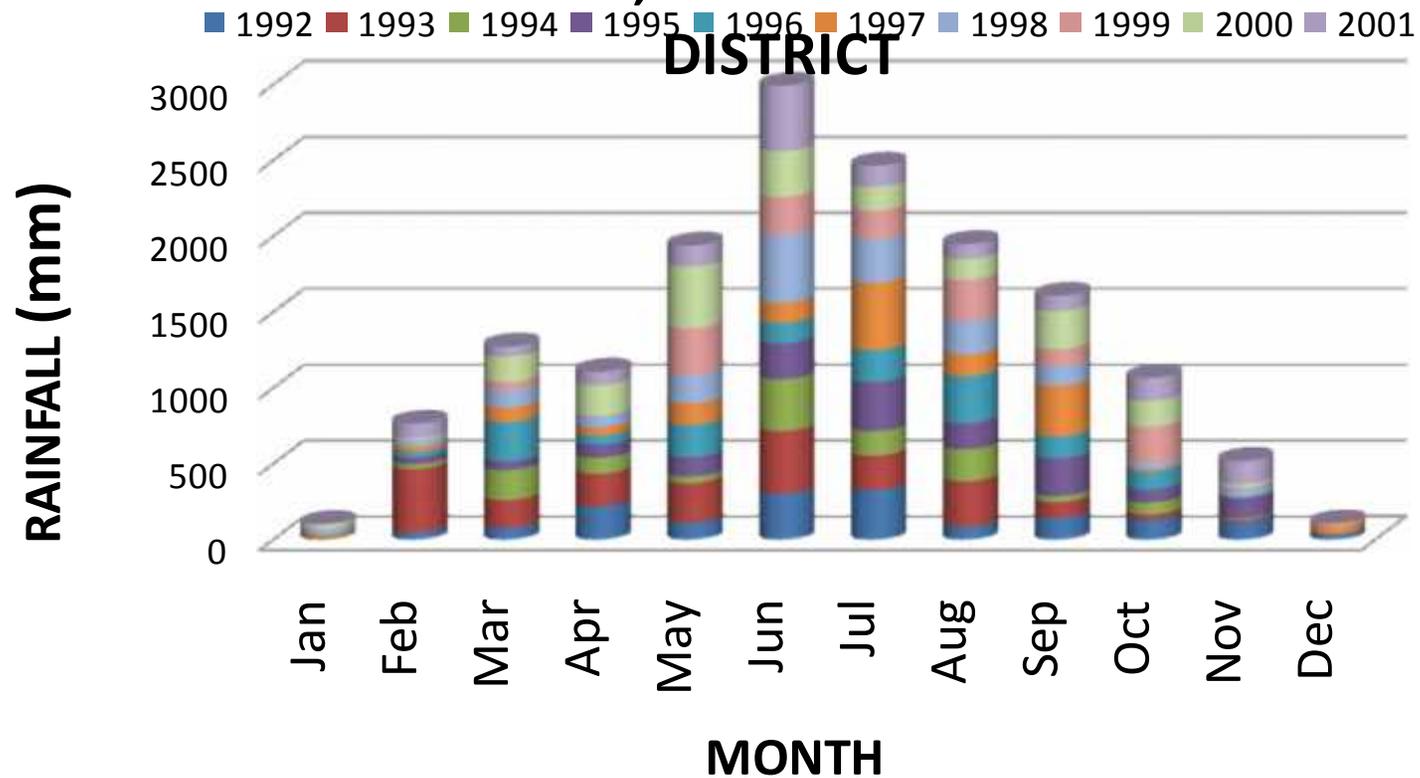


Annexure II

NORMAL ANNUAL RAINFALL DATA (1992-2001)

KVK, IMPHAL WEST

DISTRICT



2.0 Strategies for weather related contingencies

2.1 Drought – Pre- monsoon (Last week of March to First week of April) Normal

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Delay by 2 weeks (2 nd to 3 rd week of April)	Gently slopping valley plains. Deep fine soils.	Pre kharif rice <i>Short duration var. RC Maniphou-4/5/12</i>	No change	Apply FYM to nurseries and prefer to plan near pond or river Adopt Dapog method	-
		Turmeric <i>Var. Megha turmeric & Lakadong, local</i>	No change	Sowing on ridge and furrow & Mulching	
		Ginger <i>Var. Nadia, Thinglaidum, Thingria & Thingpui</i>	No change		
		Sponge gourd <i>Var. Utsav and local</i>	No change		
		Cucumber <i>Sedona, chiatai-380, Alangir, CT-280</i>	No change		
		Bhindi <i>Tulsi, Arka Anamika, US-205</i>	No change	Sowing in lines	
	Moderately slopping, side slope of hills-deep fine silting soils	Pre-kharif Rice var. RC Maniphou-6/SARS-1/2/5/6 & Bhalum-III	No change	Adopt line sowing in direct seeding method	
		Pre-kharif maize <i>Var. Pusa composite-3, Vijay composite & VL-9</i>	No change	Contour bunding and line sowing across the slope Intercropping with soybean /Ground nut. Mulching is required just immediately after sowing	
		Ginger <i>Var. Nadia, Thinglaidum, Thingria, Thingpui & local</i>	No change	Sowing in ridge and furrow / Mulching	

		Turmeric Var. Megha Turmeric, Lakadong, local	No change	Sowing in ridge and furrow / Mulching	
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2.1.2 Rainfed situation – South west monsoon - normal (1st week of June)

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 3 rd week	Gently slopping valley plains. Deep fine soils.	Main kharif Rice Var. <i>RC Maniphou-7/10/11 & IET-16313</i>	No change	Adopt SRI method , (Land should be leveled) Nursery should be prepared near pond or river	
		Cauliflower Var. <i>White Shot, Early Himlata</i>	No change	Line sowing, seed bed should be protected from direct sunlight	
		Tomato : Var. <i>Suraksha, Manikhamenasinba-1, Maharaja-3004, Amitabh-004</i>	No change		
		Chilli <i>Local (75 days) and hybrid Barnali, KingChilli</i>	No change	Planting when seedling is 6-8 weeks old	
	Moderately slopping, side slope of hills- deep fine silting soils	Main kharif rice Var. <i>RC Maniphou-6/10/7/11 & IET-16313</i>	No change	Adopt SRI/ICM/Improved methods Direct seeded rice	
		Maize <i>Vijay composite /P. composite-3/HQPM/VL-9</i>	Intercropping with soybean/Black gram/Green gram /Groundnut.	Ridge and furrow method of sowing	
		Ginger Var. <i>Nadia, local</i>	No change	Mulching and top dressing	
		Turmeric Var. <i>Megha Turmeric, Lakadong, local</i>	No change		
		Onion (Multiplier)	No change		

		French bean <i>Aanupam, (Devgiri)</i>	No change	Sowing in ridge and furrow , mulching with dried biomass & application of FYM	
		Ash gourd <i>Var. Local</i>	No change	Sowing in pits, incorporated with FYM. Mulching with dried biomass	
		Bitter gourd Agriseed US-205	-	-	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system^c including variety	Agronomic measures	Remarks on Implementation
Delay by 4 weeks July 1 st week	Gently slopping valley plains. Deep fine soils.	Main kharif Rice <i>Var. RC Maniphou-7/10/6 & IET - 16313</i>	No change	Transplanting at 4 th week of July SRI transplanting at 2 nd week of June /ICM	
		Black gram/Green gram/potato <i>Var. T-9/SG-1/SG-21-5/T-122</i>	No change	Broadcasting or line sowing based on crop requirement	
		Brinjal / Chilli <i>Var. Local and Hybrid Silpa, Saya, Pusa Purple long</i>	No change	Intercultural operation	
		Capsicum <i>Thaiwonder, California</i>	No change	Planting in protected condition	
		Early Cauliflower <i>Var. Himlata, Sweta, White Gems</i>	No change	Line sowing, seed bed should be protected from direct sunlight	
		Cabbage <i>Var. Wonder Ball, Green Hero, Green Express, Rare Ball</i>	No change		
			Cowpea : <i>Var. Pusa Komal , Rainy Royal</i>		

	Moderately slopping, side slope of hills- deep fine silting soils	Main kharif Rice <i>Var. RC Maniphou-7/10/6</i>	No change	1. Direct seeding 2. SRI transplanting at 2 nd week/ICM
		Black gram <i>Var. T-9</i> Red gram <i>Var. ICPL-86/HY-10</i> Cowpea : <i>Var. Pusa Komal , Rainy Royal</i>	Black gram: Broadcasting or line sowing Red gram: Sowing immediately by dibbling method Cowpea : sowing and mulching with FYM and Biomass	
		Soybean <i>Var. JS-335/MAUS-71</i>	Sowing till 1 st week of July Soybean (<i>Var. JS-335, MAUS-71, JS-9560</i>)	-
		Chilli <i>Var. Local and Hybrid Branali</i>	No change	Intercultural operation
		Cabbage <i>Var. Wonder Ball, Green Hero, Green Express</i>	No change	Line sowing, seed bed should be protected from direct sunlight
		Ash gourd - <i>Var. local</i>	No change	Sowing in pits, addition of FYM and mulching
		Chow- Chow <i>Var. Local var. White, Green Ovale, Green Round</i>	No change	
Delay by 6 weeks July 3 rd week	Not applicable			
Delay by 8 weeks August 1 st week				

Pre monsoon- Normal

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Gently sloping valley plains. Deep fine soils.	Soybean (Var. JS-335, MAUS-71, JS-9560) / Blackgram (Var. T-9)/ Red Gram (Var. ICPL-87, HY-10)	i. If there is poor germination (Less than 30%) re-sowing ii. Gap filling iii. lifesaving irrigation if possible	<i>In-situ</i> moisture conservation, Mulching with locally available dried grass and lifesaving irrigation if possible Mulching with uprooted weeds Incorporate the plant parts after harvest	
		Turmeric , Var. Megha Turmeric	-	Mulching	
		Ginger , var.Nadia			
		Sponge gourd Var. <i>Utsav</i>	Gap filling and staking	Application of FYM and mulching the pits	
	Moderately sloping, side slope of hills-deep fine silting soils	Soybean (Var. JS-335, Pusa-16, MACS-13) / Blackgram (Var. T-9, UG-310, TAU-1)	If there is poor germination (Less than 30%) re-sowing Gap filling	<i>In-situ</i> moisture conservation. Mulching with locally available biomass and lifesaving irrigation if possible	
		Maize Var. <i>Vijay composite /P. composite-3/HQPM</i>	i. If there is poor germination (Less than 30%) re-sowing ii. Gap filling		
		Ginger var. Var. Nadia	-	Mulching	
		Turmeric Var. Megha Turmeric	-		

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))	Gently sloping valley plains. Deep fine soils.	Rice (Var.RC Maniphou-6 & 7) Maize (Var.VL-9) Pulse (Red gram var. ICAPL-87, HY-10) Vegetables (Okra Var. Arka Anamika, Prabhani Kranti)	Lifesaving irrigation if possible	Foliar spray of 2% Urea in rice Top dressing (or foliar application with 2% Potash)	
			Weeding	Mulching in vegetables. Use FYM @ 5 t/ha. Intercropping	
Vegetative stage	Moderately slopping, side slope of hills-deep fine silting soils	Rice (Var.RC Maniphou-6 & 7) Maize (Var.VL-9) Pulse (Red gram var. ICAPL-87, HY-10) Vegetables (Okra Var. Arka Anamika, Prabhani Kranti)	Lifesaving irrigation if possible	Foliar spray of 2% Urea in rice Top dressing (or foliar application with 2% Potash)	
			Weeding/intercultural operations etc.	Mulching Use FYM @ 5 t/ha.	
			Weeding and earthing up	Mulching	
		Ginger (Var. Nadia, Local)			
		Turmeric (Var. Megha turmeric, Lakadong, Local)			

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 long dry)	Gently sloping valley plains. Deep fine soils.	Rice (Var.RC Maniphou-6) Maize (Var.VL-9) Pulse (Var. HY-10) Vegetables (Var. Okra Var. Arka Anamika, Prabhani Kranti)	i. Weeding/ intercultural operations etc. ii. Lifesaving irrigation iii. Harvesting physiological mature leafy vegetables	Top dressing (or foliar application with 2% Potash) ii. Mulching in pulse and vegetable i. Deep sowing ii. Use FYM @ 5 t/ha.	

At flowering / fruiting stage					
		Banana(Var. Local)/	-		i. Mulching & conservation in furrows with dried bio- mass ii.Drip irrigation
	Moderately slopping, side slope of hills-deep fine silting soils	Rice(Var.RC Maniphou-6) Maize(Var.VL-9) Pulse(HY-10) Vegetables (Okra Var. Arka Anamika, Prabhani Kranti)	Weeding/ intercultural operations etc. Lifesaving irrigation Harvesting before flowering		Top dressing of 2% Potash Mulching in pulse and vegetable Use FYM @ 5 t/ha.
		Banana (Var. Local)/	-		Mulching for conservation in furrows with dried bio- mass Drip irrigation
		Ginger (Var. Nadia, Local)	Weeding and earthing up		i. Mulching
		Turmeric (Var. Megha turmeric, Lakadong, Local)			

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)	Gently sloping valley plains. Deep fine soils.	Ginger (Var. Nadia, Local)	-	Mulching Plan for early rabi with vegetables	
		Turmeric (Var. Megha turmeric, Lakadong, Local)	-		
		Colocasia (var. Muktakeshi & Local)/ sweet potato (var. Gouri & Local)/ tapioca (var. Shriprakash & Local)	-		
	Moderately slopping, side slope of hills-deep fine silting soils	Ginger (Var. Nadia, Local)	-		
		Turmeric (Var. Megha turmeric, Lakadong, Local)	-		

		Colocasia (var. Muktakeshi & Local)/ sweet potato (var. Gouri & Local)/ tapioca (var. Shriprakash & Local)	-		
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2.1.2 Drought - Irrigated situation-- not applicable

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall	Not applicable				
Limited release of water in canals due to low rainfall					
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					
Insufficient flow of water in streams					

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity	Post-harvest
Continuous high rainfall in a short span leading to water logging				
Rice	1. If the crop is submerged 5-7 days the plant will die so, the flood water should be drained out	1. The flowering is very critical stage for the crop production if the crop is submerged up to flower part, the pollen grains will	1. Drain out the excess water 2. Harvest the rice where 75% panicles are matured. Water should be drained out 10-15	1. Harvest and dry by making bundles to increase grain filling. 2. Dry the seed on a concrete

	and maintain 5-8 cm	<p>be washed away and it will lead to chaffy grains, so all the excess water caused by unusual rain should be drained out and maintain the same depth 5-8 cm</p> <p>2. An RC Maniphou variety is preferable. Frequent irrigation should be given to maintain water temperature and enhances vegetative growth.</p>	<p>days before harvesting.</p> <p>3. Drain out water 10 days before harvesting.</p> <p>4. If the temperature is raised, disease and pest population is increased so plant protection measures should be taken up.</p>	<p>floor or frequently turn over the seed until the seeds are dried.</p> <p>3. Harvest when panicle is turned yellow 75-80% matured. Moisture level should be 10-12% and store properly for enhancing germination. Gunny bag storage is preferred and for seed purpose. Store in RC-bin. Can be used for 2 years</p>
Soybean	<p>1. Weeding at 40 days should be done</p> <p>2. Excess water should be drained out since it is moisture sensitive plant</p>	1. Weeding at 60 days after sowing followed by earthing up	<p>1. Mulching in between rows for moisture conservation</p> <p>2. Timely harvest when pods turn yellow</p>	<p>1. Dry the seed 3-4 days with plants and sun dried 2-3 days about 10-12% moisture content</p> <p>2. Threshing the plant and screening the seeds and remove</p> <p>3. Other unwanted debris and sundry.</p>
Groundnut	<p>1. Earthing up in groundnut should be done before flowering</p> <p>2. Proper drainage should be made in and around the field</p> <p>3. Make the field clean by weeding</p>	1. Drain out the excess water to avoid water logging	<p>1. All the matured seed should be harvested timely to prevent from germination</p> <p>2. Disease free pods should be harvested</p>	<p>1. Harvest the crop, spread and sundry for 2-3 days</p> <p>2. Pods should be dried after harvesting dry to 10% moisture.</p>
Blackgram	1. Proper bed should be prepared	<p>1. Weedicide should not be applied in the black gram at any stage</p> <p>2. Hand weeding is preferred if possible</p>	<p>1. All the matured seed should be harvested timely to prevent from germination</p> <p>2. Harvesting should be done when crop is 75% mature</p> <p>3. Pods should not be allowed to over mature to avoid shattering</p>	<p>1. Pods should be harvested, dried and spread in the shed</p> <p>2. Dry the seed on a concrete floor and frequently turn over the seed until the seed are dry</p> <p>3. Pods should be dried after harvesting so that moisture is</p>

				reduced to 10%.
Mustard	1. Thinning should be done 2. Apply recommended dose of manure & fertilizers to give higher yield	1. Apply irrigation at flowering and pod filling stages	1. Harvested as soon as it mature to avoid over ripening and prevent seed shattering	1. Proper drying should be done 2. After proper drying, seed are stored in dry and cold place
Outbreak of pests and diseases due to unseasonal rains	-			

3 Floods:

Condition	Suggested contingency measure			
	Seedling /nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				

Early Rice	<ol style="list-style-type: none"> 1. Seed treatment with fungicide before sowing 2. Usually all the stagnant water should be drained out and maintain 2-3 cm depth during the seedling stage. 	<ol style="list-style-type: none"> 1. During the vegetative or tillering stage all the stagnant water caused by uncertain floods should be drained out 2. The flood water should not be allowed to submerge rice plants more than 5 – 6 days, it may lead to crop damage in flood prone areas 	<ol style="list-style-type: none"> 1. Variety China-1, HYV RC-Maniphou-4 and RC Maniphou-5 may be recommended 2. During this stage water should not allow the flower part of rice to be submerged otherwise all the pollen grain will be washed away and it will lead to chaffy grain. 	<ol style="list-style-type: none"> 1. Some local variety China 1 and HYV like RC Maniphou 4, RC Maniphou 5 may be grown in the low laying areas/flood prone areas. These varieties are generally sown as a direct seeded or transplanted in the month of March/April and harvested in the month of July. 2. In July flood water submerge the plant up to 52 cm level, the matured panicle should be harvested and leave the rice straw by cutting and by using local boats.
Kharif Rice	<ol style="list-style-type: none"> 1. If the nursery sown in the month of June is damaged by flood, it may re-sown in the months of July 	<ol style="list-style-type: none"> 1. During the vegetative or tillering stage all the stagnant water caused by uncertain floods should be drained out. 2. The flood water should not be allowed to submerge rice plant 5 – 6 days, so it may lead to crop damage in flood prone areas. 	<ol style="list-style-type: none"> 1. The floating rice/deep water rice variety KD14-7-9 may be grown in the flood prone area 2. Variety China-1, HYV RC-Maniphou-4 and RC Maniphou-5 is recommended 	<ol style="list-style-type: none"> 1. The harvested rice should be made into bundles and dried in the protected place and thresh manually as soon as possible before germination. 2. Drying under direct sun with frequent over turning to bring down seed moisture level up to 10%.
Cucurbits	<ol style="list-style-type: none"> 1. Shift immediately to a safer place, pro-tray nursery is suggested. 2. Avoid raising in open nursery field pro-tray is 	<ol style="list-style-type: none"> 1. Bunds or drainage facility is made before rainy season. 2. Low cost poly house is preferred, time of transplanting is changed either before or after flood by using low tunnel system 	<ol style="list-style-type: none"> 1. Rain shelter and bunds are helpful. 2. Sufficient drainage system should be provided, rain shelter facility is also suggested 	<ol style="list-style-type: none"> 1. Mature ones and low quality crops should be harvested 2. Separate ripe and unripe fruit, drying in well ventilated room and zero energy cool chamber for a week for marketing

	suggested for nursery raising			
Solanaceae	1. Plant in raised beds	1. Drainage is a must, caterpillar is active in this stage, powdery mildew is increased. 2. Prophylactic plant protection measures is taken up	1. Give staking 2. Harvest the crop even if the fruits are not fully mature in case of tomato. 3. Harvest the crop even though the tubers are not fully developed.	1. Mature ones are harvested for sale
Leguminosae	1. Cannot germinate in such condition	1. If plant reaches up to 6 nodes they cannot thrive for about a week, therefore use any means to drain out water from the field	1. Mature pods are harvested and immature ones are still in the plants. 2. Necessary measures should be taken up for draining out water from the areas.	1. Mature ones are harvested for sale .No pods can be harvested for seed

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

Extreme event type	Suggested contingency measure			
	Seedling /nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat wave/ Cold wave/ Frost / Hailstorm / Cyclone				
Early kharif Rice	Usually nurseries are raised in Feb. - March. During this month, soil temperature is low. Apply FYM @ 1 ton in 700 m ² and add sufficient plant residues to increase soil temperature for proper germination and seedling growth, water level should be maintained 2-3 cm	-	-	-

2.5.1 Contingent strategies for Livestock, Poultry & Fisheries

2.5.2 Livestock

	Suggested contingency measures		
	Before the event^s	During the event	After the event
Drought/ Lean period (Oct-March)			
Feed and fodder availability	Encourage perennial fodder on bunds and waste land on community basis Establishing fodder banks, encouraging hedge row species for fodder crops Preparation of Hay	Utilizing fodder from perennial trees and Fodder bank reserves Transporting excess fodder from adjoining districts Use of non conventional fodders. Use of commercial feed mixtures and feed blocks. Culling unproductive livestock	Use of non conventional fodders. Use of commercial feed mixtures and feed blocks Availing Insurance
Drinking water	Roof top water harvesting , Preserving water in the tank for drinking purpose. Collection of water from streams Deworming	Judicious use of water, Using preserved water in the tanks for drinking purpose, recycling of household used water.	Maintenance/cleaning of community reservoirs/ village ponds . Deworming
Health and disease management	Insurance, Veterinary preparedness with medicines and vaccines, organizing vaccination camps and commercial feed supplements.	Conducting mass animal Health Camps and treating the affected one, commercial feed supplements.	Culling sick animals and commercial feed supplements
Floods	Not applicable		
Feed and fodder availability			
Drinking water			
Health and disease management			
Cyclone	Not applicable		
Feed and fodder availability			
Drinking water			
Health and disease management			
Heat wave and cold wave	Not applicable		
Shelter/environment management			
Health and disease			

management			
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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	Procurement and storage of feed ingredients, Establishing feed reserve Bank	Utilizing from feed reserve banks, nutritional supplements to poultry	Nutritional supplements to poultry	
Drinking water	Arrangement for drinking water, Roof top water harvesting , Preserving water in the tank for drinking purpose	Judicious use of water, providing B-complex and Vit.C in water		
Health and disease management	Insurance and Emergency Veterinary preparedness with medicines and vaccination to birds	Sanitation and Hygiene	Culling affected birds, Mass vaccination. Segregation of sick birds.	
Floods	Not applicable			
Cyclone	Not applicable			
Heat wave and cold wave	Not applicable			

2.5.3 Fisheries/ Aquaculture

2.5.3 Fisheries	Suggested contingency measures		
	Before the event	During the event	After the event
2. Floods			
B. Aquaculture	<ol style="list-style-type: none"> Construction of ring bund/embankment of fish farm. The height of the bund should have 0.5 – 1.0 m higher than the highest flood level (data should be taken 10 yrs.) Provide proper drainage system in order to prevent inflow and outflow of pond water 	Encircle the pond /farm areas with proper nylon nets in order to prevent escape of fish from ponds/ farms during flood.	<ol style="list-style-type: none"> Aquatic weed should be cleaned and controlled by using suitable methods Liming should be done to get pond water near neutrality(P^H 6.5-7.5)

	3. Health check and any incidence diseases should be done and isolate the pond, fish is transferred to the quarantine pond		3. Change pond water to fresh water
(i) Inundation with flood water	-do-	-do-	-do-
(ii) Water continuation and changes in water quality	Provide proper drainage system in order to prevent inflow and outflow of pond water.	Checking the quality of water and maintain at the optimum level of required physical, chemical & biological water quality parameters.	-
(iii) Health and diseases	i. To ensure enough fresh water Preparedness with medicines and proper sanitation programme	To ensure enough fresh water	Liming @ 200-300 kg/ha.
(iv) Loss of stock and inputs (feed, chemicals etc)	i. Arrangement of feed and feed ingredients & chemicals ii. Establishment of feed reserve bank iii. Precaution for the upcoming event by providing standby infrastructure and space	Utilization of the stock reserve Proper utilization of standby infrastructure and space	Maintain stock for self sufficiency Arrangement for repayment of the received input from the banks
v) infrastructure damage (pumps, aerators, huts, etc)	iv. To shift the machineries to safer sides. The huts should be properly guarded the natural calamities	To arrange shifting of the item to a safer place	Repairing of item whenever needed by skilled labors