DISTRICT CONTINGENCY PLAN
OF KVK-BISHNUPUR DISTRICT, MANIPUR

State: Manipur
Agriculture Contingency Plan for District: Bishnupur

1.0 District Agriculture profile

1. **Agro climatic /ecological zone**	Humid, sub-tropical with cold winter		
2. Agro Ecological Sub Region (ICAR)	Sub-tropical plain		
3. Agro-climatic Region (Planning Commission)	Eastern Himalayan		
4. Agro Climatic Zone (NARP)	Sub-tropical plain		
	Latitude	Longitude	Altitude
5. Geographical coordinate of the district	$24^0$15' and $24^0$45' N	$93^0$30' and 94^0 00' E	828.2m
6. KVK located	Utlou, Bishnupur district, Manipur		

7. Monsoon	Normal rainfall (in mm)	Normal rainy days (nos.)	Actual rainfall received (in mm)	Deficit rainfall (in mm)
1. SW monsoon (June-Sep).	830	55	June -187.3 July – 48.4	92.9 less 101.8 less
NE Monsoon (Oct-Dec)	200.8	15		
Winter (Jan-March)	122.4	9		
Summer (Apr-May)	316.30	21		
. Annual	1469.79	100		

1.2	**Land use pattern of the district (latest statistics)**	**Geographic area**	**Forest area**	**Land under agril. use**	**Permanent pastures**	**Cultivable Waste and land**	**Land under Misc tree crops and groves**	**Barren and uncultivable land**	**Current fallows**	**Other Fallows**
	Area (***'000*** ha)	49.600	-	42366	760	325	1360	225	140	60

1.3	**Soil type**		
	Alluvial Soil Texture: Sandy Loam, Clay loam & Clay. pH: 4.5 to 5.5 (Strongly Acidic) Low in organic carbon, phosphorous and potassium content		
1.4	Agricultural land	Area ('000 ha)	Cropping intensity %
	Net sown area	38.671	109.55
	Total cropped area	42.366	
	Area under more than once	3.69	

1.5	Irrigation	Area ('000 ha)	Percent %
	Net irrigated Area (ha)	18.91	
	Gross irrigated area	18.91	
	Rainfed area	27.93	
	Source of irrigation	Area ('000 ha)	
	Canal	18.19	

1.6 Area under major crops & horticulture etc.

	Major field crops cultivated	Area ('000 ha)						
		Pre-kharif	Kharif		Rabi		Summer		Total
		-	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	
	Rice	-	15.64	12.08	0	0			26.51
	Maize	-			1.21				1.21
	Wheat	-				0.2			0.2
	Sugarcane	-		1.66					1.66
	Potato	-				2.23			2.23
	Pulses (Blackgram)	-		0.53					0.53
	Pea	-				4.22			4.22
	Oilseed (groundnut, soybean)	-		1.00					1.00
	Rapeseed	-				5.08			5.08

	Horticulture crops-Fruits	Total area ('000 ha)	Irrigated*	Rainfed *
	1 Fruits (Pineapple, Banana, Lime, Papaya)	3.99		3.99
	2 Vegetables (Beans, Cabbage, Cauliflower, Brinjal, Pumpkin, gourd, Ladies finger, tomato, Pea)	3.27	3.27	00

	Major field crops	Area ('000 ha)	Production ('000 ha)	Productivity (t/ha)
2010-11				
	Rice	26.51	93.85	3.54
	Maize	1.21	2.06	1.70
	Wheat	0.27	0.69	2.56

	Sugarcane	1.66	97.30	58.61
	Potato	2.23	19.32	8.66
	Pulses Kharif	0.53	0.67	1.26
	Pulses Rabi	4.22	3.50	0.83
	Oilseeds Kharif	1.00	0.83	0.83
	Oilseeds Rabi	5.08	3.76	0.74

Horticultural and commercial crops

Year	**Fruits**			**Vegetables**			**Spices**		
	A	**P(tons)**	**Y**	**A**	**P**	**Y**	**A**	**P**	**Y**
2010-11	3991	32592	8.16	3271	31759	9.70	1219	10469	8.58

A=Area ('000 ha), P=Production ('000 mts), Y=Yield (t/ha) Source: Horticulture and Soil Conservation, GOM.

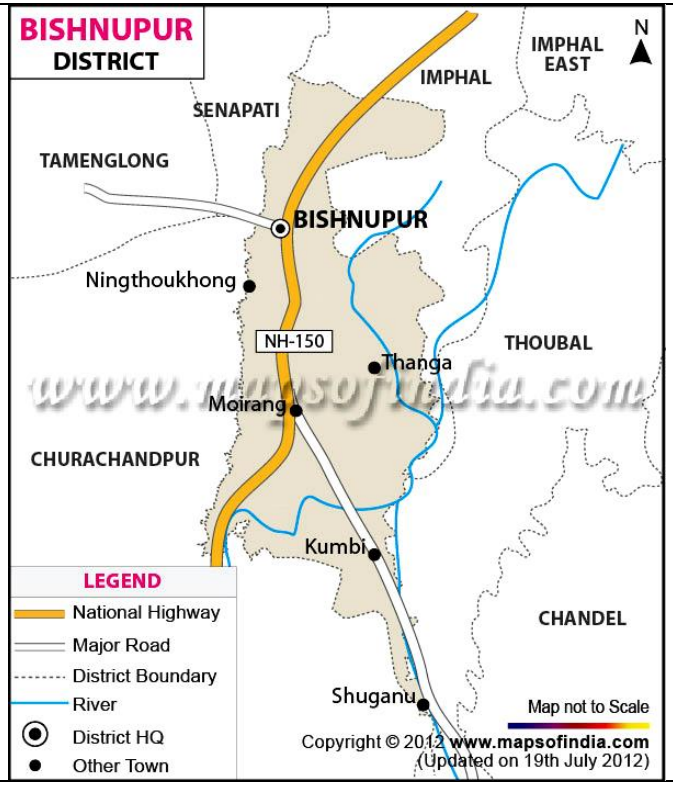
1.7	**Livestock***	**Male**	**Female**	**Total**
	Cattle,			37400
	Buffalo			1101
	Goat,			202
	Pigs			22090
	Poultry			160916
	Duck			100061

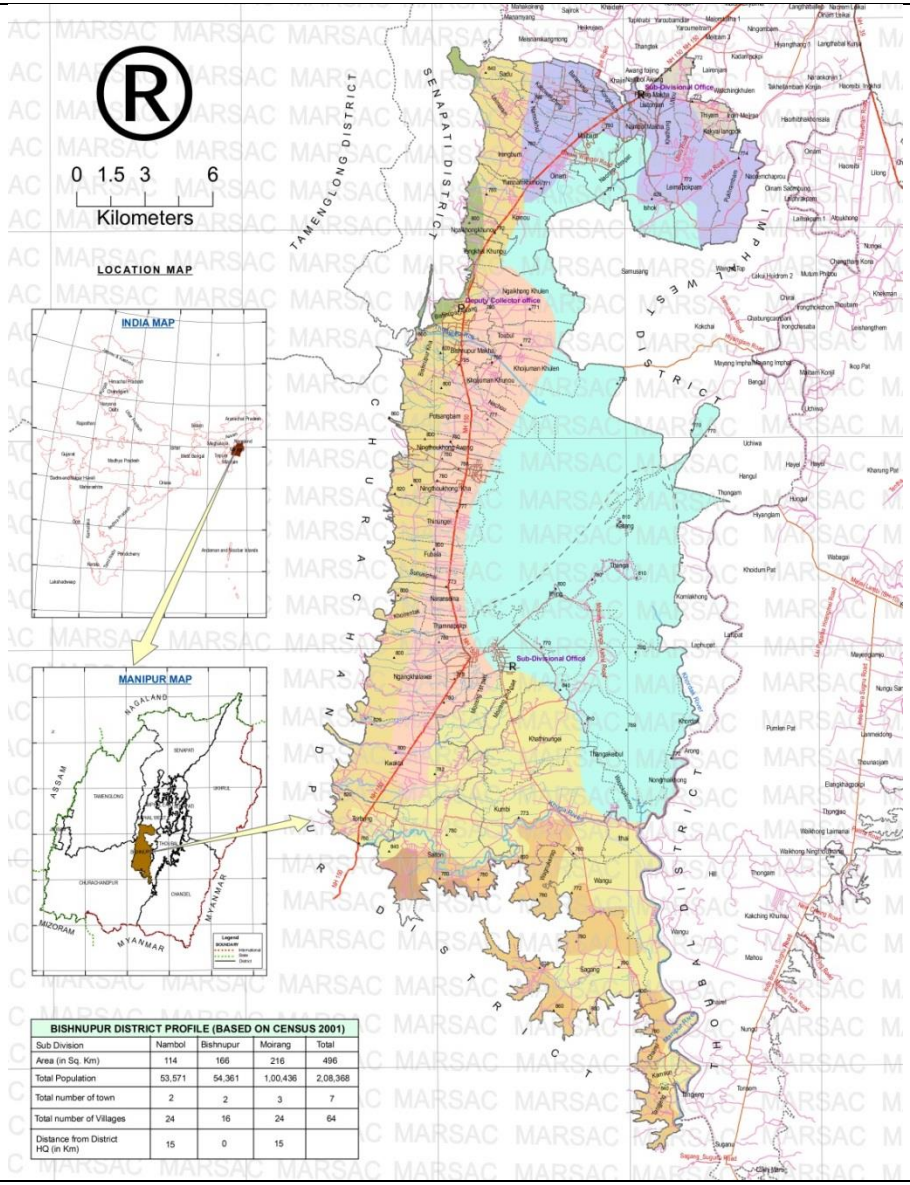
- ***As per livestock census report of Manipur Government based on 2007 census data of Manipur.***

	Inland Fishery	**Area**		**Production**
	Pond and ring bund culture			15.15 (MT)
	Cage culture			

1.7	Sowing window for 5 major crops (start and end of sowing period)	Crop 1-Rice	2. Pea	3. Mustard	4. Cabbage	5. Cauliflower
	Pre-kharifrainfed	April-june	-	-	-	-
	Kharif- rainfed	June to July	-	-	-	July-Sept. (off season)
	Kharif-irrigated	June to July	-	-	-	-
	Rabi-rainfed	-	Oct to Nov	Oct to Nov	Oct to Nov	Oct to Nov
	Rabi- irrigated	-	-	Oct to Nov	Oct to Nov	Oct to Nov

1.8	What is the major contingency the district is prone to?	Regular	Occasional	None
	Drought		√	
	Flood	√		
	Cyclone		√	
	Hail storm		√	
	Heat wave		√	
	Cold wave		√	
	Frost		√	
	See water intrusion			
	Pests and diseases other (specify)			
	Rice	Leaf blast, Neck blast, BLB**(%)**	Stem borer, gall midge	
	Potato	Leaf blight and bacterial wilt		
	Tomato	Leaf blight and bacterial wilt		

1.9	**Include digital maps of the district**	Location map of district with in state as annexure I	
		Mean annual rainfall	1388.17mm

Soil map	 **BISHNUPUR DISTRICT PROFILE (BASED ON CENSUS 2001)** Sub Division: Nambol | Bishnupur | Moirang | Total Area (in Sq. Km): 114 | 166 | 216 | 496 Total Population: 53,571 | 54,361 | 1,00,436 | 2,08,368 Total number of town: 2 | 2 | 3 | 7 Total number of Villages: 24 | 16 | 24 | 64 Distance from District HQ (in Km): 15 | 0 | 15 |

2. Strategies for weather related contingencies
2.1 Drought
2.1.1 Rainfed situation

Condition	**Major Farming situation**	**Crop/Cropping system**	**Suggested contingency measures**		
Delayed onset			**Change in crop/ cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks (4th week of June Kharif Sowing: 1 Fortnight of July	Medium lowland and clay to sandy soil (kharif cropping area)	Ricebase	R/ var.RC Maniphou-7 &10 G/var: ICGS-76S/var:JS-335, Mustard/var.M-27, Pea: Arkel, Rachana B/gram var.T-9	Normal agronomic practices	Zero tillage for mustard
		Groundnut			
		Rice-Pea			
		Soybean			
		Rice-Mustard			
		Black gram			
Medium upland soils Rabi cropping areas)		*Kharif*	*Rabi*	*Kharif*	*Rabi*
		Fallow	Rabi maize Var. RCM-76	No change	No change

Condition	**Major Farming situation**	**Crop/Cropping system**	**Suggested contingency measures**		
Delayed onset			Change in crop/ cropping system	Agronomic measure	Remarks On Implementation
Delay by 4 weeks (July) 2nd week	Medium lowland and clay to sandy soil (kharif	Rice	R/ var.RC Maniphou-7 &10	Normal agronomic practices	Seed should be made readily available by the
		Mustard	M-27		

Kharif sowing : II Fortnight of July	cropping area)	Groundnut	ICGS-335	(details to be provided)	concerned department or corporation
		Soybean	GS-76		
		Black gram	T-9		
Clay to sandy soils (Rabi cropping area)		*Kharif*	*Rabi*	*Kharif*	*Rabi*
		Fallow	Rabi maize Var. RCM-76	No change	No change

Condition	**Major Farming situation**	**Crop/Cropping system**	**Suggested contingency measures**		
Delayed onset			Change in crop/ cropping system	Agronomic measures	Remarkson Implementation
Delay by 6 weeks (July 4th week) *Kharif* sowing:1 Fortnight of August	Medium lowland and clay to sandy soil (kharif cropping area)	Rice (RC Maniphou-7)	R/var: RC Maniphou-7 &10	Normal agronomic practices	Seed should be made readily available by the concerned department or corporation
		Groundnut	M-27		
		soybean	ICGS-335		
		Black gram	GS-76		
Clay to sandy soils (Rabi cropping area)		*Kharif*	*Rabi*	T-9	*Rabi*
		Fallow	Rabi maize Var. RCM-76	No change	No change

Condition	**Major Farming situation**	**Crop/Cropping system**	**Suggested contingency measures**	
Delayed onset			Change in crop/ cropping system	Agronomic measures

Delay by 8 weeks (August 2nd week) *Kharif* sowing: II Fortnight of August		Rice bean	Rice bean	Normal agron. practices
		-	-	-
		Soybean	Soybean	Provide life saving irrigation at critical stages, increase seed rate
		Black gram	Black gram	Provide life saving irrigation at critical stages, Short duration var. T-9 (65- 70 days)
Medium lowland and Clay to sandy soils (Rabi cropping area)		*Kharif*	*Rabi*	*Kharif*
		Fallow	Rabi maize	No change

Condition	**Major Farming situation**	**Crop/ Cropping system**	**Suggested contingency measures**	
Delayed onset			**Crop management**	**Soil nutrient & moisture conservation measures**
Condition normal onset follow by 15-20 days dry spell after sowing leading to poor germination /crop stand etc.	Medium lowland and clay to sandy soil (kharif cropping area)	Rice	Lifesaving irrigation at nursery stage, Foliar application of urea 2.5 % , In case ofgerminationless than 50% pre-sprouted seed sowing is recommended.	Deep ploughing 3-4 times followed by harrowing to conserve moisture. Apply FYM@ 10-15 t /ha for better retention moisture
		Groundnut	If germination is poor, re-sowing may be done.	Furrow sowing along with locallyvegetative mulching
		Soybean	Lifesaving irrigation at one week interval. If lifesaving irrigation is not possible, re-sowing is recommended.	Mulching with straw between the rows is recommended.

		Redgram	Lifesaving irrigation at critical crop stage	Mulching with straw between the rows is suggested	
Upland and Clay to sandy soils (Rabi cropping area)		*Kharif*	*Rabi*	*Kharif*	*Rabi*
		Fallow	Rabi maize	No change	No change

Condition	**Major Farming situation**	**Crop/ Cropping system**	**Suggested contingency measures**	
			Crop management	**Soil nutrient & moisture conservation measures**
Mid season drought (long dry spell, consecutive 2 weeks rainless period (> 2.5 mm) At vegetative stage	Medium lowland and clay to sandy soil (kharif cropping area)	Rice	Select upland rice variety like RC Maniphou-6,split dose application of nitrogen and potash	Thinning is must if plant population is too high, apply FYM @10-15 t/ha for better soilmoistureretention and nutrients uptake.
		Groundnut	Make furrows 7cm depth and sow the seed and cover immediately, earthing up at 35 days DAS before peg formation	Mulching should be done in between the rows to conserve soil moisture, proper weeds managementto check loss of nutrient,
		Soybean	Select short duration var. JS-335,sow in furrows for conservation of moisture, weeds mgt.	Soil conserving crops should be raised in the field to check soil erosion and moisture conservation the seed should be sown against the slope,vegetative mulching.

Upland and Clay to sandy soils	*Kharif*	*Rabi*	*Kharif*	*Rabi*
	Fallow	Rabi maize	No change	No change

Condition	**Major Farming situation**	**Crop/ Cropping system**	**Suggested contingency measures**	
			Crop management	**Soil nutrient & moisture conservation measures**
Mid season drought (long dry spell) at flowering/fruiting stage.	Medium lowland and clay to sandy soil (kharif cropping area)	Rice	Lifesavingirrigation at flowering stage, repairing of bunds around field to check water loss	Apply split application of nitrogen and potassium
		Groundnut	Earthing up should be done to increase peg formation	Mulching should be given between the rows by straw, tree leaves of possible by v1ater hyacinth and azolla
		Soybean	Select short duration var. JS-335,sprayImidachlorprid@1.5 ml/litre to control caterpillars and white ant	Soil conserving crops should be raised in the field, vegetative mulching for better moisture conservation

Condition	**Major Farming situation**	**Crop/ Cropping system**	**Suggested contingency measures**	
-	-	-	**Crop management**	**Soil nutrient & moisture conservation measures**
Terminal drought	Medium lowland and clay to sandy soil (kharif cropping area)	Rice	Harvest the crop for grain purpose, if the expected yield is to poor, harvest the grain filled panicle only.	Plough repeatedly 3-4 times followed by harrowing toincrease soil fertility and soil moisture for rabi season.The prepared field should be planned for rabi pulse and oil seed crops. For mustard var.M-27 pea var. Rachna may be recommended
		Groundnut	Short duration varieties like JL-24 (100 days) TAG-24 (100days) usually infected by caterpillars and Tikka disease plant protection measure should be taken up.	Left all the plants and roots to increase fertility for rabi crop
		Soybean	Select short duration varieties JS·335.Plant protection measure should be taken up	Mulching in the rows for moisture conservation

2.1.2 Irrigation situation

Condition	Major Farming situation	Crop/ Cropping system	Suggested contingency measures		
			Change in crop/cropping system	**Agronomic measures**	**Remark**
Delayed /limited release of water in canals due to low rainfall	Medium lowland and clay to sandy soil (kharif cropping area)	Rice	Rice- mustard/ pea	Prepare rice seed bed near the pond or any water source, select var. RC maniphou-6 which required less water	Seed should be made available by concern authority and corporation
		Mustard	Mustard-rice	Zero tillage cultivation	Utera cropping
		Mustard	Rice -mustard	Zero tillage sowing imidiately after paddy harvest followed by nitrogen fertilizer application at 30 and 60 days after sowing	-
		Pea	Rice-pea	Select pea var: Rachna sown in well pulverized field until monsoon set.Soil moisture should be maintained at flowering stage. Spray fipronil @1ml/litre for control of pod borer	-

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

Condition	**Suggested contingency measures**			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity**	**Post harvest**
Rice	1. Prepare bund around the field to save from water loss 2. If the crop is submerged 5-7 days the plant will die so, the flood water will be drain out and maintained 5-8 cm 3. Weeding should be done at tillering and Pl stage. Plant protection measures should be taken up.	1. Apply irrigation from ponds and rivers. 2. The flowering is very critical stage for the crop production if the crop is submerged up to flower part, the pollen grains will wash away and it will lead chaffy grains so, all the excess water caused by unusual rain should be drained out and maintain the same depth 5-8 cm 3. An RC Maniphou variety is preferable. Frequent irrigation should be given to maintain water temperature and enhances vegetative growth.	Drain out the excess water. Harvest the rice where 75% panicles are matured. Water should be draining out 10-15 days before harvested. Drain out water 10 days before harvesting. If the temperature is raised disease and pest population is increased so plant protect on measures should be taken up.	Harvest and dry by making bundles to increase grain filling. Dry the seed on a concrete floor or frequently turn over the seed until the seed dried. Harvest when panicle is turned yeIIow 75% matured. Moisture level should be 10-12% and store properly for enhancing germination. Gunny bag storage is preferred and for seed proposes store in RC- bin can be used for 2 years
Soybean	1. Weeding at 40 days should be done. 2. Excess Water should be drain out since it is moisture sensitive plant	Weeding at 60 days after sowing	Mulching in between rows for moisture conservation Timely harvest when pods turn yellow.	Dry the seed 34 days with plants and sun dried 23 days about 10-12% moisture content. Threshing the plant and screening the seeds and removed other unwanted debris and sundry. Separate the grains and

				Store in gunny bags.
Ground nut	Earthing up in groundnut should be done. Proper drainage should be made in and around the field. Make the field clean by weeding	Drain out the excess water to avoid water logging	All the matured seed should be harvested timely to prevent from germination. Disease free pods should be harvested.	Harvested crop, spread and sundry for 2·3 days Pods should be dried after harvesting reduced to 10% moisture.
Blackgram	Proper bed should be prepared	Weedicide should not be applied in the black gram at any stage. Hand weeding is preferred if possible.	All the matured seed should be harvested timely to prevent from germination Harvesting should be done when crop is 75%matured Pods should not allowed to Over mature to avoid shattering	Pods should be harvested, dried and spread in the shed Dry the seed on a concrete floor and frequently tum over the seed until the seed dried. Pods should be dried after harvesting so that moisture is reduced to 10%.
Mustard	Thinning should be done. Apply recommended dose of fertilizers to give higher yield.	Apply irrigation	Harvested as soon as it mature to avoid over ripening and prevent seed shattering.	Proper drying should be done. After proper drying, seed are stored in dry and cold place.
Outbreak of pests	The control measures may be taken up as per package of practices			

2.3 Flood

Condition	**Suggested contingency measure**			
Transient water logging/ partial inundation	**Seedling /nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Early Rice	Usually all the stagnant water should drain out and maintain 2-3 cm depth during the seedling stage.	During the vegetative or tillering stage all the stagnant water cause by uncertain floods should be drain out. The flood water should not be allowed to submerge rice plant 5 -6 days, so it may lead crop damage in flood prone area.	Variety China-1,HYV RC- Maniphou-4 and RC Maniphou-5 may be recommended During this stage water should not allowed submerged the flower part of rice otherwise all the pollen grain will wash away and it will lead chaffy grain.	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. In July flood water submerge the plant upto 52 cm level, the matured panicle should be harvested and left the rice straw by cutting and by using local boats.
Kharif rice	If the nursery sov1nin the month of June is damaged by flood, it may re-sown in the months of July	During the vegetative or tillering stage all the stagnant water cause by uncertain floods should be drain out. The flood water should not be allowed to submerge rice plant 5-6 days ,so it may lead crop damage in flood prone areas.	The floating rice/deep water rice variety KD14-7-9 may grown in the flood prone area. Variety China-1 HYV RC-Maniphou-4 and RC Maniphou-5 may be recommended.	The harvested rice should make bundle wise and dry the rain protected place and thresh manually as soon as possible before germination. Drying under direct sun with frequent over turning to bring down seed moisture level up to10%.

Cucurbits	Shift immediately to a safer place, pro-tray nursery is suggested. Avoid raising in open nursery field pro-tray is suggested for nursery raising.	Bunds or drainage facility is made before rainy season. Low cost poly house is preferred; time of transplanting is change either before or after flood by using low tunnel system.	Rain shelter and bunds are helpful. Sufficient drainage System is provided, rain shelter facility may also suggested.	Mature ones and low quality crops should be Harvested. Separate ripe and unripe fruit, drying in well ventilated room and zero energy cool chamber for a week for marketing.
Solanaceae	Totally avoid from flood.	Drained is must, caterpillar is active in this stage, powdery mildew is increased. Prophylactic measures is taken up.	Formation of pod is very poor during the heavy rain.	Mature ones are harvested for sale.
Leguminosae	Can't germinate inn such condition.	If plant reaches upto 6 nodes they can't thrive for about a week, therefore use any means for drain out the field.	Mature pods are harvested and immature ones are still in the plants. Necessary should be taken up for drained out the areas.	Mature ones are harvested for sale no pods can be harvested for seed.

Continuous submergence for more than 2 days

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

Extreme event type	**Suggested contingency measure**			
Cold wave/ Frost / Hailstorm/ Cyclone	**Seedling /nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Early kharif Rice	Usually nurseries are raised in Feb-March. During this month, soil temperature is low. 1t/fYM/ 700 m^2 may be applied for proper germination and seedling growth, water should be maintained 2-3cm	Cold and frost resistance varieties should be selected free from disease and insects. Frequent irrigation should be given to maintain water temperature this enhances vegetative growth	If the temperature is raised disease and pest population is increased so plant protection measures should be taken up	Harvest the panicle when 75% is matured
Kharif rice	Usually nurseries ate raised in June. During this month, 1t/FYM/100 m^2 may be applied for proper germination and seedling growth, water should be maintained 2-3 cm. uprooting.	Frequent irrigation should be given to maintain 5-8 cm depth. Intercultural operation should be taken up to increase the effective tillers	If the temperature is raised disease and pest population is increased so plant protection measures should be taken up	Harvest the panicle when 75% is matured
Cucurbits	Portrays required.	Adjust time of transplanting with low tunnel system with UV film 200 micron.	Mature fruits should be kept free from direct soil by using paddy straw.	Harvest the fruits when fruit is soft and tender, too much mature is undesirable.
Solanaceae	Avoid nursery raising in the end of March and beginning of April as cyclone and hail storm arrives in valley districts.	45 to 50 days old plant can withstand to some extent, adjusting time of transplant.,	Wind break vegetative barrier towards the south western side recommended	Red and green mature seeds are harvested and sorted out separately, Store in the shed.

2.5.1 Contingent strategies for Livestock, Poultry & Fisheries

2 5.Livestock	**Suggested contingency measures**		
Drought	**Before the event**	**During the event**	**After the event**
Feed and fodder availability	Locally available fodder, cultivation of fodder for preparation of sillage and hay, maintaining fodder bank	Rice bran, oilcake, rice polish, kitchen waste or garbage etc.	Mixed with fodder and cooked rice bran
	Locally available	Under ground, tube well, reservoirs etc.	Locally available
	Timely vaccination, (FMD,HS,BQ.)	Sanitationand proper waste management	Scientific feed management, vaccination
Flood			
	Locally available fodder, storage of concentration feeds, storage of green fodder using silage	Rice bran, oilcake, rice polish, kitchen waste or garbage etc.	Mixed with fodder and cooked rice bran
	Locally available	Treated water (if possible water should be pasteurized)	Treated water (if possible water should be pasteurized)
	Timely vaccination, (FMD,HS,BQ.)	Keep the safety area, Sanitation and proper waste management	Scientific feed management, vaccination
Cyclone	Locally available	Locally available	Locally available
	Locally available	Locally available if source is contaminated treat the water	Locally available
	Proper support the shed	Free from rope	Proper support the shed
Heat wave and cold wave			
	Stocking of charcoal, paddy husk	Burning of charcoal, burning of paddy husk, covering of animal using jute sac,	Burning of charcoal, burning of paddy husk, covering of animal using jute sac,

Health and disease management	Timely vaccination,(FMD,HS,BO.)	Proper feeding, sanitation	Vaccination, proper feed management
Drought			
Shortage of feed ingredients	Stocking of feeds	Proper feed management	Proper feed management
Drinking water	Storage of water	Hygienic Water i.e, boiled water	Treated water
Health and disease management	Vaccination of F_1 and F_2,	Proper feeding ,sanitation	Vaccination, proper feed management
Flood			
Shortage of feed ingredients	Storage of concentration feeds, storage of grain (maize, rice bran)	Rice bran, rice polish, maize	Mixed with concentrated rice bran
Drinking water	Locally available	Treated water (if possible water should be pasteurized)	Treated water (if possible water should be pasteurized)
Health and disease management	Timely vaccination,(antibiotics)	Sanitation, proper waste management and vit. B-complex Ca and minerals	scientific feed management, vaccination
Cyclone			
Shortage of feed ingredients	Stocking of feeds	Proper feed management	Proper feed management
Drinking water	Locally available, Treated water	Treated water (if possible water should be pasteurized)	Treated water (if possible water should be pasteurized)
Health and disease management	Proper shed management	Sanitation, proper waste management and vit. B-complex Ca and minerals	Sanitation, proper waste management and vit. B·complexCa and minerals
Heat wave and cold wave			
Shelter/environment management	Proper shed management	Burning of charcoal, burning of paddy husk	Proper shed management

Health and disease management	Vaccination of F_1 and F_2	Sanitation, proper ventilation	Sanitation, proper ventilation

2.5.3 Fisheries /Aquaculture	**Suggested contingency measures**		
1. Drought	**Before the event**	**During the event**	**After the event**
A. Capture			
Marine	**NA**	**NA**	**NA**
Inland			
i. Shallow water depth due to insufficient rains/ inflow	10%of the total area should be created into deep pool/channels in selected area of the water (to ensure 1.25 m depth of water). Partial harvesting of fish.	Pooling the existing fish stocks should be done.	Aquatic weeds and unwanted animals should be removed. Lime/ash should be applied @ 200 kg to 300 kg/ha to correct the soil pH and disinfect the area.
8. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/ inflow	To create a constant water source to supp1y water to fish ponds, eg. Tube well	Partial harvesting of fish Transfer all the existing fishes to the deeper	Disinfectant of all ponds by applying lime@ 200-300 kg/ha. Clean all the unwanted aquatic

2.5,3 Fisheries	**Suggested contingency measures**		
	Before the event	**During the event**	**After the event**
1. Foods			
B. Aquaculture	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 out flow of pond water. 3. Health check and any incidence diseases should be done and isolate the pond, fish is transferred to the quarantine pond.	Encircle the pond /farm areas with proper nylon nets in order to prevent escape of fish from ponds/farms during flood.	Aquatic weed should be cleaned and controlled by using suitable methods. Liming should be done to get pond water near neutrality (P"6.5-7.5) Change pond water to fresh water
iii. Health and	To ensure enough fresh water	To ensure enough fresh	Liming @ 200- 300 kg/ha.

diseases		water	

3. Crop Planning for Kharif and Rabi and for **Normal Condition (Complete package)**

Kharif Crop Planning for Normal Condition

Sectors	Varieties	Nutrient management N:P:K:S:Zn (STV based)	Tillage operation	Water Management	Soil Water Conservation	Tool/Farm Implements
Cereals						
Rice	RC-Maniphou 7, RC-Maniphou 10 and RC-Maniphou 11	60:40:30 NPK kg/ha and 15-20 kg/ha Zinc Sulphate	Summer tillage, seed bed preparation, puddling, bunding around the field just after the first shower of monsoon	Thin film at the time of transplanting or only mud for better establishment of seedlings and 5 cm at maximum tillering stage. Drained out water from the field atleast one week earlier of harvesting in light soils and 2-3 weeks in heavy soils	Timely weed control, plant protection measures, organic source of fertilizers, its consumptive use along with chemical fertilizer in proportion of 50:50.	Tractor, Power tiller,mould board plough, puddler
Maize	Trisulata, RCM-76, HQPM-1	120:50:40 NPK kg/ha and 15-20 kg/ha zinc sulphate	One deep ploughing, in case of heavy soils 2-3 deep ploughings are needed whereas in light soils too much tillage is a wasteful, 2-4 harrowings.	Rainfed, Protect crop from water logging by providing shallow furrows after certain distance and these furrows are connected to main drains.	Timely weed control, plant protection measures, organic source of fertilizers, its consumptive use along with chemical fertilizer in proportion of 50:50.	Tractor, spade, wooden plough

Pulses						
Blackgram	T-9; Uttara	20:40:20:20 NPK&S	One deep ploughing followed by 2-3	Rainfed. However, soil moisture availability at	Timely weed control, Application of manures	Tractor, Power tiller

		kg/ha	harrowings and one planking	sowing, 25 DAS and pod filling is critical and should be obtained at optimum level.	and fertiliers, Crop rotation,seed inoculation with Rhizobium	
Greengram	Pant M-4, PDM-54 (Moti)	20:40:20:20 NPK&S kg/ha	One deep ploughing followed by 2-3 harrowings and levelling	Rainfed, avoid water logging	Timely weed control, Application of manures and fertiliers, Crop rotation,seed inoculation with Rhizobium	Tractor, Power tiller
Oilseeds						
Groundnut	ICGS-76, JL 24	20:60:40 NPK kg/ha and 25 kg/ha zinc sulphate	Thoroughly levelled to avoid water logging and ploughing twice or thrice followed by planking	Rainfed, avoid water logging	Timely weed control, Application of manures and fertiliers,Use of biofertilizers and bioorganics	Power tiller
Soybean	JS-335, Bragg	20:60:30 NPK kg/ha	Two cross ploughing	Rainfed, avoid water logging	Timely weed control, Application of manures and fertiliers,Use of biofertilizers and bio-organics	Power tiller, Spade

Rabi Crop Planning for Normal Condition

Sectors	Varieties	Nutrient management N:P:K:S:Zn (STV based)	Tillage operation	Water Management	Soil Water Conservation	Tool/Farm Implements
Cereals						
Maize	Trisulata, RCM-1-2, Deccan-105, Ganga-11	120:60:40 N, P_2O_5 and K_2O/ha	Conventional tillage, zero tillage, transplanting	If rainfall is scarce, irrigation should be given to just moisten the soil viz., sowing,25 DAS, 50 DAS, flowering,20 days after flowering and dough stage. In transplanted crop	Application of FYM, Mulching, timely weed control, in situ moisture conservation, planting in furrows.	Tractor, Power tiller, Wooden plough, spade, khurpi.

				1 irrigation should be given immediately after transplanting followed by one after 8-10 days.		
Pulses						
Field pea	Rachna , Aparna	20:60:40: 30 NPKS kg/ha and 15-20 kg/ha zinc sulphate (once after 3 years)	One deep ploughing followed by 2-3 harrowings and planking	2 light irrigations should be given at 45-50 days and 75 days after sowing, water logging condition should not be arise.	Timely weed control, use of organic manures, mulching, use of Rhizobium	Tractor, power tiller, spade, khurpi
Lathyrus	Bio Ratan 1, BIOL 212	20:50:30:30 N,P_2O_5 ,K and S kg/ha. Spray 20% urea at flowering	One deep ploughing followed by cross harrowing and planking	If there is no winter rain one very light irrigation between pod formation and grain filling stage should be given	Timely weed control, utera cropping, use of organic manures, use of Rhizobium	Tractor, power tiller, wooden plough, khurpi
Lentil	VL-1, Pant L 406	20:50:30 NPK kg/ha	One deep ploughing followed by 2-3 harrowings and planking	If there is no winter rain 1-2 light irrigations at flowering and grain filling stage should be given	Timely weed control, utera cropping, use of organic manures,	Tractor, Power tiller, wooden plough, khurpi
Oilseed						
Rapeseed	M-27	50:60:30:10 NP_2O_5K and S kg/ha	Ploughed for 3-4 times with desi plough and planking after each plough	2 irrigations at flowering/branching stage and at pod (siliqua) formation stage	Timely weed control, plant protection measures, use of organic manures,	Desi plough, wooden plough, spade

5. Kharif Crop Planning for Delayed Monsoon (complete package)

Sectors	Varieties	Nutrient management N:P:K:S:Zn (STV based)	Tillage operation	Water Management	Soil Water Conservation	Tool/Farm Implements
Cereal						
Rice (If monsoon is delayed upto 10th of July, upland rice should not be taken.)	Nursery for comparatively shorter duration varieties may be done. Eg. IR-64,	60:40:30 NPK kg/ha. For kharif crops, nitrogen can be applied in splits depending on rainfall. Second split may be avoided if the soil moisture is not adequate for top dressing in time.	Dry sowing, resowing of rice is needed in medium and lowland (direct sown rice), if plant population is less than 50%.	One life saving irrigation (5 cm) from harvested water	Seeding and moisture conservation, Timely weed control, Organic source of fertilizer, its consumptive use with chemical fertilizer in proportion of 50:50.	Wooden plough, spade, power tiller
Maize	Naveen	120:60:40 NPK kg/ha	Dry sowing, Minimal tillage, zero tillage,	Supplented irrigation with harvested water,	Reduced plant density, increased inter row distance, plant protection measures	Power tiller, Wooden plough, spade, Khurpi
Pulses						
Blackgram	T-9, Pant Urd-35, Narendra Urd-1	20:40:20 NPK kg/ha	Minimal or Reduced tillage, Zero tillage, Conservation tillage	Life saving irrigation by harvested water. The strategy for getting successful crop during dry spell is providing small quality of water, if available, at	Reduced plant density, increased inter row distance.	Power tiller, Wooden plough, spade, khurpi
Greengram	Pant Moong – 54, Narendramoong – 1	20:40 NP kg/a				

				any stage if the dry spell is more than 10 days in light soils and 15 days in heavy soils.		
Oilseed						
Groundnut	Short duration variety like Girnar -1. Spreading type should be avoided	20:40:40 NPK kg/ha.Spray 2 % urea at week to 10 days	Minimal or Reduced tillage, Zero tillage, Conservation tillage.	One life saving irrigation especially at pegging stage. spraying water at weekly intervals interval Groundnut responds to 10 mm of irrigation through sprinkler on affisols during pod development stage.	Mulching with thin black polythene film, rice straw during pre-rabiseason.	Power tiller, Wooden plough, spade, power tiller, khurpi

Fodder						
Maize+Cowpea	Maize var.Ganga Safed-2, Kanchan, Jaunpuri and Cowpea var.Bundle Lobia-1, Bundle Lobia-2	20:40 N and P kg/ha. Foliar application of urea.	Contingent operations relative to water stagnation/ drought	Supplemental irrigation, construction of diversion ditches ina case of intended rains	On availability of organic source of fertilizer, its conjunctive use along with chemical fertilizers in proportion of 50:50 has confirmed its utility in sustaining the	Power tiller, Wooden plough, spade, sickle, khurpi

					productivity of component crops in the proven system due to improved soil health. Weed control in standing crops, plant protection measure stirring interrow space for minimizing moisture loss	

6. Rabi Crop Planning for Delayed Monsoon (complete package)

Sectors	Varieties	Nutrient Management N:P:K:S:Zn (STV based)	Tillage operation	Water management	Soil and water conservation	Tool/farm implements
Cereal						
Maize	Short duration varieties such as RCM-1-2, Trisulata, Deccan-103, Ganga-11	120:60:40 NPK kg/ha	Minimal or Reduced tillage, Zero tillage	If winter rains are occuring and soil does not have sufficient moisture for the survival of crops then crops should be harvested for fodder	Application of FYM or Compost @ 10 tons/ha at 30 to 35 days before sowing, mulching, timely weed control	Power tiller, wooden plough, spade, khurpi, sprayer
Pulses						
Chickpea	Radhey, K-850	20:40:20 N, P_2O_5 and K_2O kg/ha.	Minimal tillage, Zero or no-tillage, Conservation tillage for	Life saving irrigation from harvested water Chickpea need 30 to 40 mm of supplemental	Thinning by removing every alternate row or every third row which will save the crop from failure by	Power tiller, wooden plough, spade, khurpi, sprayer
Lentil	NarendraMasoor, Pant L-639	20:40:20 N, P_2O_5 and K_2O kg/ha.				
Lathyrus	Bio Ratan	Only nitrogen @ 20 kg/ha				

	1	should be top dressed after 15 days of sowing Most economical responses were with low rates of 25-30 kg N/ha. 10. On heavy black soils, crops respond to about 30 kg P2O5/ha. Most of the nutrients have to be band placed in the soil at sowing as basal application.	in situ moisture conservation	irrigation applied as drip or sprinkler irrigation during flowering.	reducing the competition, mulching, timely weed control, water harvesting, recycling of run-off.	
Oilseed						
Rapeseed	M-27, TS-36, Local Yella	Economical responses were obtained with low levels of 'N' only.	Minimal tillage, Zero or no-tillage, Conservation tillage for in situ moisture conservation	Life saving irrigation from water harvesting pond. Drip and sprinkler irrigations are more suitable because small amount of water can be delivered, even on uneven soils without conveyances losses Subsurface drip irrigation is very efficient for providing supplemental irrigation.	Water harvesting. The stored water can be used for giving the life saving irrigation during prolonged dry spells.	Power tiller, wooden plough, spade, khurpi, water can.
Fodder						
Oat+Mustard	Oat var. JHO-822	25:40 N and P kg/ha,	Minimal tillage, Zero or no-tillage,	Supplemental irrigation from	Water harvesting, Timely Weed	Power tiller, Spade, khurpi, water can

	and Kent; Mustard var.Varuna, Sanjukta and Kranti	foliar application of urea.	Conservation tillage for in situ moisture conservation	harvested water,	control measures, plant protection measure stirring interrow space for minimizing moisture loss	
Sectors	Varieties breed species	Nutrient Management N:P:K:S: Zn (STV based)	Tillage operation	Water management	Soil water conservation	Tool/Farm Implements

Horticultural Crop Planning for **Normal Condition (**Kharif and Rabi**).**						
Fruits						
Passion fruit	Purple & yellow	NPK @ 100:50:100g/vine/yr in two split doses in Feb.-March and in July-August.	Dig pits of 45 x 45 x45cm at a distance of 3m in rows spaced 2m apart. Dig these pits in advance and leave open for 15 days and then fill with a mixture of soil and 10kg well rotten compost.	Provide protective irrigation if possible during dry spell (Dec. to April)	Application of organic manure, mulching, intercropping, countour farming etc.	Spade, khurpi, water can, sickles, sprayer etc.

Pineapple	Gaintkew, queen and mauritius	NPK @ 12:4:12g/plant, N & K is applied in two equal split doses. The first dose-2 months after planting & last dose-12month after planting. Entire P & half dose of K should be given at the time of planting and remaining K should be given at 6 months after planting.	The field is prepared by deep ploughing, harrowing etc. before planting in hill areas, proper terracing is necessary.	During scarcity of moisture, irrigation once in 10-15 days linterval should be given.	i. Application of balanced fertilizers & organic manures. ii. Mulching, intercropping, countour farming etc. should be practiced.	Tractor, power tiller, spade, khurpi, water can, sickles, sprayer etc.
Banana	Dwaft Cavendish, G-naine, local etc.	NPK @ 100-200:40-70:200-300g/plant in 3rd and 5th month after planting.	Dig the pits of 50 x 50 x 50 cm at a spacing of 1.8 x.1.8 m.	Irrigation is given in once in 7 to 10 days. For high-tech cultivation drip irrigation can be installed.	i. Application of balanced fertilizer and organic manures intime, ii. Intercropping with legume crops, desuckering, mulching etc. should be practiced.	Spade, khurpi, water can, sickles, sprayer etc.
Vegetables						
Tomato	Arkaalok, avinash-2, swaraksha, avantika etc.	Urea, SSP, MOP @ 266, 500, 100kg/ha	The field should be ploughed by tractor and followed by power tiller to a depth of about 20-25cm. All the weeds and stumbles should be removed and prepare to a fine tilth and levelled properly. The field should be	Rainfed and giving life saving irrigation from canal, farm ponds etc.	i. Application of balanced fertilizer and organic manures intime, ii. Timely weeding, hoeing, earthing up, proper management of crop residues, mulching etc. should be practiced.	Tractor, Power tiller, Spade, khurpi, plastic rope, water can, sickles, sprayer etc.
Ash gourd	APAU Shakti, CO1, CO2 etc.	Urea, SSP, MOP @ 100, 300, 100kg/ha				
Bitter gourd	Arkaharit, Pusavisesh, viveketc	Urea, SSP, MOP @ 44, 187, 50 kg/ha				
Bottle gourd	Pratima, US-15, pusameghdut, pusa long etc	Urea, SSP, MOP @ 88, 250, 99kg/ha				
Brinjal	Bholanath,	Urea, SSP, MOP @				

	Sel-5, RCMBL-1, local etc	222, 468, 74kg/ha	divided in to raised beds. The breadth of each bed should not more than 1.5 m but the length can be of own convenient.			
Broccoli	Fiesta, KTS-1, pushpa, harumi-188 etc.	Urea, SSP, MOP @ 266, 500, 99 kg/ha				
Cabbage	Rareball, pusamukta, green hero, pride of india etc.	Urea, SSP, MOP @ 266, 375, 99kg/ha				
Capsicum	Green & yellow	Urea, SSP, MOP @ 223, 500, 100 kg/ha				
Carrot	Nantes, pusameghali, kritietc.	Urea, SSP, MOP @ 55, 157, 150 kg/ha				
Cauliflower	Snowball-16, himani, pusa him jyoti, white flash, NS-60N, sweta etc.	Urea, SSP, MOP @ 266, 375, 100 kg/ha				
Colocasia	Local-Mukhi pan, haopan, ganga pan etc.	Urea, SSP, MOP @ 177, 375, 99 kg/ha				
Cucumber	Poinsette, pusasanjog, local etc.	Urea, SSP, MOP @ 333, 562, 149 kg/ha				
French bean	RCMFB-1, arkakomal, pusaparbati etc.	Urea, SSP, MOP @ 88, 375, 83 kg/ha				
Knolkhol	Large green,	Urea, SSP, MOP @				

	white viena etc.	222, 531, 282 kg/ha				
Okra	7-dhari, parbhani, kranti, arkaanamika etc.	Urea, SSP, MOP @ 267, 500, 100 kg/ha				
Pea (garden)	Arkel, Bonneville, local-makuchabi, makhyatmubi etc.	Urea, SSP, MOP @ 44, 250,83 kg/ha				
Pumkin	CO2, pusavikas, local-sanamairel, charatambi etc.	Urea, SSP, MOP @ 222, 312, 83 kg/ha				
Radish	Japanese white, Chinese pink etc.	Urea, SSP, MOP @ 111, 312, 83 kg/ha				
Sponge gourd	NS-445, local chakhao nimbi etc.	Urea, SSP, MOP @ 44, 187, 49 kg/ha				
Water melon	Arkamanik, sugar baby, asahiyamato	Urea, SSP, MOP @ 155, 187, 49 kg/ha				
Spice						
Chilli	Agni, barnali, 86235, local-Meitei morok, haomorok etc.	Urea, SSP, MOP @ 266, 375, 83 kg/ha	The field should be ploughed by tractor and followed by power tiller to a depth of about	Rainfed and giving life saving irrigation from canal, farm ponds	i. Application of balanced fertilizer and organic manures intime. ii. Timely weeding, hoeing,	Tractor, Power tiller, Spade, khurpi, plastic rope, water can, sickles, sprayer etc.
Chinese chives	Local-ningthamshida	Urea, SSP, MOP @ 222, 437, 132 kg/ha				

	bi		20-25cm. all the weeds and stumbles should be removed and prepare to a fine tilth and levelled properly. The field should be divided in to raised beds. The breadth of each bed should not more than 1.5 m but the length can be of own convenient.	etc.	earthing up, proper management of crop residues, mulching etc. should be practiced.	
King chilli	Local	Urea, SSP, MOP @ 13g, 25g, 8g/plant - during transplanting, another 10g, 25g, 8g/plant in 2nd and 3rd year alongwith FYM @ 1kg/plant				
Garlic	Agri found white, local-meiteichanam etc.	Urea, SSP, MOP @ 55, 375, 99 kg/ha				
Ginger	Nadia, varada, thingpui etc.	Urea, SSP, MOP @ 166, 312, 83 kg/ha				
Onion	Pusa red, N-53, prema, Matahari etc.	Urea, SSP, MOP @ 277, 375, 166 kg/ha				
Turmeric	Lakadong, megha turmeric etc.	Urea, SSP, MOP @ 133, 312, 33 kg/ha				
Horticultural Crop Planning for Delayed monson (Kharif and Rabi**).**						
Vegetable						
Tomato	F1 hybrid like swaraksha, 815, rocky etc.	Urea, SSP, MOP @ 266, 500, 100kg/ha	Summer tillage of off season tillage should be practiced. The field should be ploughed by tractor and followed by power tiller to a depth of about	Water harvesting structure should be made at farm site for giving life saving irrigation. Drip and sprinkler	All the cultural practices such as deep ploughing, sowing, intercultivation etc. should be done across the slope. Wider spacing i.e. low plant population,	Tractor, Power tiller, Spade, khurpi, plastic rope, water can, sickles, sprayer
Cabbage	Rareball, pride of india, green hero etc	Urea, SSP, MOP @ 266, 375, 99kg/ha				
Cauliflower	White flash, NS-60N etc	Urea, SSP, MOP @ 266, 375, 100 kg/ha				
Radish	Pusachetki	Urea, SSP, MOP @ 111, 312, 83 kg/ha				

Okra	Parvanikranti	Urea, SSP, MOP @ 267, 500, 100 kg/ha	20-25cm. all the weeds and stumbles should be removed and prepare to a fine tilth and levelled properly. The field should be divided in to raised beds. The breadth of each bed should not more than 1.5 m but the length can be of own convenient.	irrigation can be installed. Pot watering is also and efficient method of water management for transplanting crops.	intercropping with legume crops should be done. Balanced application of organic manures and fertilizer, management of crop residures, mulching of standing cropped area, weeding etc. should be done intime.	
Cucumber	Japanese long green					
Ridge gourd	Pusanasadar, CO1	Urea, SSP, MOP @ 44, 187, 49 kg/ha				
French bean	Pusaparvati	Urea, SSP, MOP @ 88, 375, 83 kg/ha				
Spices						
Turmeric	Sudarsan, romaetc	Urea, SSP, MOP @ 133, 312, 33 kg/ha	Summer tillage of off season tillage should be practiced. The field should be ploughed by tractor and followed by power tiller to a depth of about 20-25cm. all the weeds and stumbles should be removed and prepare to a fine tilth and levelled	Water harvesting structure should be made at farm site for giving life saving irrigation. Drip and sprinkler irrigation can be installed. Pot watering is also and efficient method of	All the cultural practices such as deep ploughing, sowing, intercultivation etc. should be done across the slope. Wider spacing i.e. low plant population, intercropping with legume crops should be done. Balanced application of organic manures	Tractor, Power tiller, Spade, khurpi, plastic rope, water can, sickles, sprayer
Ginger	Vardhan, nadia, suprabha etc.	Urea, SSP, MOP @ 166, 312, 83 kg/ha				
Chilli	86235, barnalietc	Urea, SSP, MOP @ 266, 375, 83 kg/ha				
King chilli	Local	Urea, SSP, MOP @ 13g, 25g, 8g/plant - during transplanting, another 10g, 25g, 8g/plant in 2nd and 3rd year alongwith FYM @ 1kg/plant				
Corriander	CO1, CO2	1% urea should be given as foliar spray.				

			properly. The field should be divided in to raised beds. The breadth of each bed should not more than 1.5 m but the length can be of own convenient.	water management for transplanting crops.	and fertilizer, management of crop residures, mulching of standing cropped area, weeding etc. should be done intime.	

7. Live Stock

Species	**Varieties breed species**	**Feeding management**	**Housing management**	**Health Management**	**Vaccination**	**Others**
Pig	Hempshire	Feeding management with locally available feeds including garbage	Intensive	Proper health care & management	Vaccination for Swine fever at 6 months intervals	
Cattle	Cross bred cattles	Proper feeding management with locally available feeds & feeding of oat during winter season	Semi intensive	Proper health care & management including regular de-worming	Vaccination for BQ, HS & FMD vaccines at 6 months intervals	
Poultry	Vanaraja	Rearing on 50% readymade feed available in market + to let out for foraging during day time.	Semi intensive	Proper health care & management	Vaccination for Ranicket vaccine	

8. Fishery

	Feeding Management	Pond Management
Summer	As marority of the farming practices are carp based traditional, modified traditional and few semi-intensive carp, Supplementary feeding is provided as natural food organisms in culture ponds may	Normal Pre and post stocking practices are followed in carp based culture systems and poolymanged in integrated fish cum paddy culture

	not support even after manuring of organic and inorganic soueces.Major feeding ingredients are rice bran and Mustard oil cake (1:1) and aquatic macrophytes. Generally broadcasted or bag feeding @ 2 -5 % of the total biomass. The chopped succulent grass should also be supplied to feed the grass carp thrice daily.	systems. Liming in installmentwise @200-250kg/ha followed by mannuring with NPK or organic elements for grow out culture systems.
Winter	In many cases of the sources of pond water is rainfed type .Hence during this period the utmost care and proper water management practices are to be followed.	Pond construction and renovation works including the pond bed preparations are to be done from November to February.
Rainy	As breeding season collides for majority of the carps and catfish (*clariasbatrachus*), the feeds are being manged for the newly hatched fishes, fry and fingerlings.	To avoid adverse natural calamities like flood, care should be taken.