State: KERALA

Agriculture Contingency Plan for District: PATHANAMTHITTA

1.0 District Agriculture profile					
1.1	**Agro-Climatic/Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	Central and south Sahyadris, hot moist, subhumid to humid eco-subregion (19.2)			
	Agro-Climatic Region (Planning Commission)	West Coast Plains And Ghat Region (XII)			
	Agro Climatic Zone (NARP)	Southern Zone (KE-2)			
	List all the districts or part thereof falling under the NARP Zone	Trivandrum, Kottayam, Kollam			
	Geographic coordinates of district	Latitude	Longitude	Altitude	
		9° 16' 0" N	76° 47' 0" E	18 m above MSL	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Agricultural Research Station, Thiruvalla Kallungal,P.O.,Thiruvalla,Pathanamthitta Dt.Pin – 689102 and RARS, Kumarakom			
	Mention the KVK located in the district	NGO KVK CARD, Thelliyoor, Pathanamthitta – 689 102			
1.2	**Rainfall**	Normal RF(mm)	Normal Rainy days (number)	Normal Onset	Normal Cessation
	SW monsoon (June-September):	1559.5	64.5	1st week of June	Last week of September
	NE Monsoon(October-December):	481.1	25.3	1st week of October	Last week of December
	Winter (January-February)	120.9	6.2		
	Summer (March-May)	407.1	17.7		
	Annual	2568.6	113.7		

1.3	**Land use pattern of the district** (latest statistics)	Geographical Area	Forest area Far	Land under non-agricultural use	Permanent pastures	Cultivable wasteland (Ha.)	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area (000' ha)	265.3	155.2	17.8	-	2.9	0.1	0.4	3.0	3.5

*PAO office, Pathanamthitta

1. 4	**Major Soils (common names like shallow red soils etc.,)**	**Area ('000 ha)**	**Percent (%) of total**
	Forest loam	127.4	48.0
	Loamy soils	118.2	44.5
	Clay soils	4.7	1.8
	Sandy soil **(acidic)**	0.2	0.1
1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	81.4	135.9%
	Area sown more than once	29.2	
	Gross cropped area	110.6	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	10.0		
	Gross irrigated area	17.9		
	Rainfed area	116.4		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals			
	Tanks	90		
	Open wells	1341		
	Bore wells	5		
	Lift irrigation	47		
	Micro-irrigation			
	Other sources	2657		
	Total Irrigated Area	7627		

		(KVK CARD)		
	Pump sets			
	No. of Tractors			
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	
	Over exploited	-	-	
	Critical	-	-	
	Semi- critical	-	-	
	Safe	3212	32 %	
	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 etc. (2008-09)

1.7	**Major Field Crops cultivated**	**Area ('000 ha)**					
		Kharif		***Rabi***		**Summer**	**Total**
		Irrigated	***Rainfed***	***Irrigated***	***Rainfed***		
	Paddy	0.3		1.3		1.3	3.2 (Farm guide) 4.3(DES, 2006)
	Sugarcane	-	-	-	-	-	0.02 (Farm guide) 0.1 (DES, 2006)
	Horticulture crops - Fruits	**Total area**					
	Banana	2.3					
	Horticultural crops - Vegetables	**Total area**					
	Vegetables	0.9					
	Medicinal and Aromatic crops	**Total area**					
	Pepper	4.3 (Farm guide) 5.6 (DES, 2006)					
	Nutmeg	0.07(Farm guide)					
	Plantation crops						
	Coconut	12.8 (Farm guide					

		21.7 (DES, 2006)
	Rubber	72.1 (Farm guide) 47.8 (DES, 2006)
	Arecanut	1.5 (Farm guide)
	Tapioca Minor tubers	6.2 (Farm guide) 7.9(DES, 2006) 4.0 (Farm guide)

1.8	**Livestock**				**Total (Number)**		
	Non descriptive Cattle (local low yielding) Deshi cow				113544 (Livestock census, 2003)		
	Crossbred cattle						
	Non descriptive Buffaloes (local low yielding)				2413 (ATMA report)		
	Graded Buffaloes				-		
	Goat				60,187 (ATMA report)		
	Sheep				1165 (ATMA report)		
	Others (Camel, Pig, Yak etc**.) Pig**				646 (ATMA report)		
	Commercial dairy farms (Number)				-	-	
1.9	**Poultry**				**Total No. of birds (Number)**		
	Commercial Poultry birds				6,46,320		
	Backyard Improved birds				60,760		
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)	
		2444 (DES, 2006)					

	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	-	-	-

1.11 Production and Productivity of major crops (Average of last 5 years: 2004, 05, 06, 07, 08)

1.11	Name of crop	**Kharif**		**Rabi**		**Summer**		**Total**		**Crop residue as fodder** ('000 tons)
		Production ('000 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)										
	Paddy	7.5	2280	-	-	-	-	-	-	-
	Sugarcane	-	-	-	-	-	-	16	80,000	-
	Tapioca	-	-	-	-	-	-	255	32450	-
Major Horticultural crops (Crops to be identified based on total acreage)										
	Banana	-	-	-	-	-	-	23.3	9020	-
	Coconut	-	-	-	-	-	-	84 m nuts	4500 nuts	-
	Arecanut	-	-	-	-	-	-	1.0	670	-
	Vegetables	-	-	-	-	-	-	5.0	5000	-
	Pepper	-	-	-	-	-	-	1.4	260	-

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	**Rice**	**Banana**	**Sugarcane**	**Vegetables**
	Kharif- Rainfed	August - September	-	-	-
	Kharif-Irrigated	-	-	-	-
	Rabi- Rainfed	October - November	January - February	-	-
	Rabi-Irrigated	-	September - October	December - January	September- October and April - May

1.13	**What is the major contingency the district is prone to?** (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought		√	
	Flood	√		
	Cyclone			√
	Hail storm			√
	Heat wave			√
	Cold wave			√
	Frost			√
	Sea water intrusion			√
	Pests and diseases (specify) **(**1) Woolly aphid Sugarcane (2) Pseudostem weevil in banana, Rhizome weevil in banana, Sigatoka in banana Army worm in banana (3) Mosaic disease in cucurbits and Cowpea			

	(4) Downey mildew attack in Cucurbits, *Alternaria* disease in Cucurbits, *Fusarium* wilt in cowpea, cucurbits, *Rhizoctonia* attack in cowpea, *Colletotrichum* attack of cowpea, Bacterial wilt of cowpea (5) Eryophid mite in coconut Bud rot of coconut Root wilt disease of coconut Leaf rot of coconut Red palm weevil of coconut			
	Others	-	-	-

1.14	**Include Digital maps of the district for**	Location map of district within State as Annexure I	Enclosed: No
		Mean annual rainfall as Annexure 2	Enclosed: No
		Soil map as Annexure 3	Enclosed: No

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks (June 1st week)	Airavan (Wet land soil, medium – strongly acidic)	Rice- Rice-Fallow Fallow-Rice-Fallow Fallow-Fallow-Rice	No Change	• Adjust planting accordingly • Select short duration varieties	RKVY
		Vegetables as pure crop in rice fallows as well as garden lands	-do-	• Delay planting • Pot irrigation	RKVY and SHM
		Sugarcane as monocrop	-do-	Not a problem since sugarcane is mostly cultivated as an irrigated crop	ICAR schemes
	Adoor (Sandy clay loam, very strongly acidic)	Rubber- first three years intercropping with banana, tubers and pineapple. Third year onwards maintained as monocrop.	-do-	The crop is able to withstand drought for two weeks	Rubber board schemes
Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks (June 1st week)		Coconut with intercrops such as banana, tubers, nutmeg, ginger etc.	No Change	No management is required for first two weeks	CDB schemes

		Vegetables as pure crop	-do-	Delay planting Pot irrigation	RKVY and SHM
Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks	Ayroor (Loam – sandy loam, extremely to medium acidic)	Banana as monocrop Banana with tubers as intercrop	No Change	Mulching with leaves	RKVY and SHM
		Coconut with intercrops such as banana, tubers, nutmeg, ginger etc.	-do-	No management is required for first two weeks	CDB schemes
		Vegetables as pure crop	-do-	• Delay planting • Pot irrigation	RKVY and SHM
		Sugarcane as monocrop	-do-	Not a problem since sugarcane is mostly cultivated as an irrigated crop	ICAR schemes

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks	1. Kumaranperur (Gravelly clay loam, slightly acidic	Rubber- first three years intercropping with banana, tubers and pineapple. Third year onwards maintained as monocrop.	No Change	The crop is able to withstand drought for two weeks	Rubber board schemes
		Banana as monocrop Banana with tubers as intercrop	-do-	Mulching with leaves	RKVY and SHM

		Coconut with intercrops such as banana, tubers, nutmeg, ginger etc.	-do-	No management is required for first two weeks	CDB schemes

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks	Gudarakal (Clay loam – sandy clay) Very strongly acidic	Mainly Forest vegetation Cool season Vegetables	Cool season Vegetables as pure crop	Raise the vegetables as irrigated crop	RKVY and SHM

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks	1. 1. Airavan (Wet land soil, medium – strongly acidic)	Rice- rice-fallow Rice -fallow-rice Fallow-fallow-rice	No Change	1.Plant pulse crops, green gram/ black gram 2. Cropping pattern is altered with less duration pulse crop	RKVY
		Vegetables as pure crop in rice fallows as well as garden lands	-do-	1.Micro irrigation 2.Mulching pit basin with organic matter, coir pith compost, coconut leaves etc.	Micro irrigation scheme, RKVY and SHM
		Sugarcane as mono crop	-do-	No management since irrigated	-

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks	2. Adoor (Sandy clay loam, very strongly acidic)	Rubber as monocrop after three years	Tubers as inter crop during initial stage of growth especially cassava which require less moisture	1. Swabbing with kaolinite from base to a height of 1.5 m	Rubber board schemes
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	No Change	1. Mulching coconut basin with coconut leaves	CDB schemes
		Vegetables as pure crop	-do-	Micro irrigation Mulching pit basin with organic matter, coir pith compost, coconut leaves etc.	Micro irrigation scheme, RKVY and SHM
Condition					
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks	2. Ayroor (Loam – sandy loam, extremely to medium acidic)	Banana as monocrop Banana with tubers a intercrop	No Change	1. Pot irrigation 2. Mulching 3. Covering the pseudostem with lower dried leaves	RKVY and SHM
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	1. Mulching coconut basin with coconut leaves	CDB schemes
		Vegetables as pure crop	-do-	Micro irrigation Mulching pit basin with organic matter, coir pith compost, coconut leaves etc.	Micro irrigation scheme, RKVY and SHM
		Sugarcane as mono crop	-do-	NO management since irrigated	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks	4. Kumaranperur (Gravelly clay loam, slightly acidic	Rubber as monocrop after three years	No Change	1. Swabbing with kaolinite from base to a height of 1.5 m	Rubber board schemes
		Banana as monocrop Banana with tubers a intercrop	-do-	Pot irrigation Mulching Covering the pseudostem with lower dried leaves	RKVY and SHM
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	Mulching coconut basin with coconut leaves	CDB schemes
Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks	5. Gudarakal (Clay loam – sandy clay) Very strongly acidic	Vegetables as pure crop	Vegetables as pure crop	1. Micro irrigation 2. Mulching pit basin with organic matter, coir pith compost, coconut leaves etc.	Micro irrigation scheme, RKVY and SHM

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks	Airavan/Adoor/Avroor/Kumaranperur/ Gudarakal	Not Applicable			

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks	Airavan/Adoor/Avroor/Kumaranperur/ Gudarakal	Not Applicable			

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.	1. Airavan (Wet land soil, medium – strongly acidic)	Rice- rice-fallow Rice -fallow-rice Fallow-fallow-rice	No Change	1. Gap filling 2. Increasing the dose of fertilizers after the receipt of rain 3. Adequate weed control measures	RKVY
		Vegetables as pure crop in rice fallows as well as garden lands	-do-	1. Pot irrigation 2. Gap filling 3. Fertigation	RKVY, SHM and micro irrigation schemes
		Sugarcane as monocrop	-do-	1. Gap filling with poly bag settling after receipt of rain 2.Mulching 3.Raise nursery for transplantation 4.Increase the fertilizer dose by 25%	ICAR schemes
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.	2. Adoor (Sandy clay loam, very strongly acidic)	Rubber as monocrop after three years	-do-	1. Gap filling with poly bag seedlings	Rubber board schemes
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	1. Provision of shade	CDB schemes
		Vegetables as pure	-do-	1. Pot irrigation 2. Gap filling	RKVY, SHM and micro irrigation

				3. Fertigation	schemes
Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	3. Ayroor (Loam – sandy loam, extremely to medium acidic)	Banana as monocrop	No Change	1. Mulching 2. Pot irrigation 3. Provision of shade 4. Gap filling	RKVY, SHM and micro irrigation schemes
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	1. Provision of shade	CDB schemes
		Vegetables as pure crop	-do-	1. Pot irrigation 2. Gap filling 3. Fertigation	RKVY, SHM and micro irrigation schemes
		Sugarcane as monocrop	-do-	1. Gap filling with poly bag settling after receipt of rain 2.Mulching 3.Raise nursery for transplantation 4.Increase the fertilizer dose by 25%	ICAR schemes
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.	4. Kumaranperur (Gravelly clay loam, slightly acidic	Rubber as monocrop after three years	No Change	Gap filling with poly bag seedlings	Rubber board schemes
		Banana as monocrop	-do-	Mulching Pot irrigation Provision of shade Gap filling	RKVY, SHM and micro irrigation schemes
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	1. Provision of shade	CDB schemes

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.	5. Gudarakal (Clay loam – sandy clay) Very strongly acidic	Cool season Vegetables as pure crop	As irrigated crop	Pot irrigation Gap filling Fertigation	RKVY, SHM and micro irrigation schemes

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	1. Airavan (Wet land soil, medium – strongly acidic)	Rice- rice-fallow Rice -fallow-rice Fallow-fallow-rice	No Change	1. Foliar nutrition with N, P and K after initation of rain. 2. Application of organic manures 3. Maintain weed free condition	RKVY
		Vegetables as pure crop in rice fallows as well as garden lands	-do-	1. Basin irrigation through drip system 2. Foliar nutrition	RKVY, SHM and micro irrigation schemes
		Sugarcane as mono crop	-do-	1. Trash Mulching 2. Earthing up 3. Foliar nutrition of N, P and K additionally 4. Removal of water shoots for moisture conservation 5. Application of 3% Kaoline spray at critical stages of moisture stress 6. Foliar spray of 500 ppm Cycocel (1 ml of commercial product per litre of water) 7. Foliar spray of 0.5% zinc	ICAR schemes

				sulphate + 0.3 % boric acid + 0.5 % Ferrous sulphate + 1% urea	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	1. Adoor (Sandy clay loam, very strongly acidic)	Rubber as monocrop after three years	No Change	1. Swabbing kaolinite up to trunk portion 2. Mulching 3. Raise cover crops	Rubber board schemes
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	1.Pizer irrigation (using porous mud pots) 2.Surveillance for the attack of termites and adopt proper control measures	CDB and micro irrigation schemes
		Vegetables as pure	-do-	3.Basin irrigation through drip system 4.Foliar nutrition	RKVY, SHM and micro irrigation schemes
Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	2. Ayroor (Loam – sandy loam, extremely to medium acidic)	Banana as monocrop	Banana with tubers a intercrop	1. Moisture conservation measures such as mulching 2. Pot irrigation 3. Micro sprinkler irrigation 4. Increase of dose of P and K nutrient to the tune of 25 % of recommended dose	RKVY, SHM and micro irrigation schemes
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	Coconut as monocrop Coconut with	3. Pizer irrigation (using porous mud pots) 4. Surveillance for the attack of termites and adopt proper control	CDB and micro irrigation schemes

			intercrops such as banana, tubers etc.	measures	
		Vegetables as pure crop	Vegetables as pure crop	5. Basin irrigation through drip system 6. Foliar nutrition	RKVY, SHM and micro irrigation schemes
		Sugarcane as mono crop	Sugarcane as mono crop	8. Trash Mulching 9. Earthing up 10. Foliar nutrition of N, P and K additionally 11. Removal of water shoots for moisture conservation 12. Application of 3%Kaoline spray at critical stages of moisture stress 13. Foliar spray of 500 ppm Cycocel (1 ml of commercial product per litre of water) 14. Foliar spray of 0.5% zinc sulphate + 0.3 % boric acid + 0.5 % Ferrous sulphate + 1% urea	ICAR schemes
Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Kumaranperur (Gravelly clay loam, slightly acidic	Rubber as monocrop after three years	No Change	Swabbing kaolinite up to trunk portion Mulching Raise cover crops	Rubber board schemes
		Banana as monocrop	-do-	Moisture conservation measures such as mulching Pot irrigation Micro sprinkler irrigation Increase of dose of P and K nutrient to the tune of 25 % of recommended dose	RKVY, SHM and micro irrigation schemes
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	Pizer irrigation (using porous mud pots) Surveillance for the attack of	CDB and micro irrigation schemes

				termites and adopt proper control measures	
Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Gudarakal (Clay loam – sandy clay) Very strongly acidic	Vegetables as pure crop	Vegetables as pure	Basin irrigation through drip system Foliar nutrition	RKVY, SHM and micro irrigation schemes

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**
	Airavan (Wet land soil, medium – strongly acidic)	Rice- rice-fallow Rice –fallow-rice Fallow-fallow-rice	No Change	1.Foliar nutrition of N, P and K 2. Fertigation 3. Herbigation	RKVY
		Vegetables as pure crop in rice fallows as well as garden lands	-do-	1.Life saving irrigation 2. Removal of drier leaves and unproductive fruits 3. Fertigation/ foliar appl;ication of mineral nutrients	RKVY, SHM and micro irrigation schemes
		Sugarcane as mono crop	-do-	1.Harvest the crop for cane/cane crushing 2.Detrashing	ICAR schemes

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	2. Adoor (Sandy clay loam, very strongly acidic)	Rubber as monocrop after three years	No Change	Not applicable	
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc. .	-do-	1) Mineral nutrition of K increased by 50 %, 2) Removal of dried and unwanted leaves 3) Crown cleaning 4) Mulching the basins 5) Salt application 6) Substituting 50% of K with NaCl	CDB schemes
		Vegetables as pure crop	-do-	1.Life saving irrigation 2. Removal of drier leaves and unproductive fruits 3. Fertigation/ foliar application of mineral nutrients	RKVY, SHM and micro irrigation schemes

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
At flowering/ fruiting stage	3. Ayroor (Loam – sandy loam, extremely to medium acidic)	Banana as monocrop	No Change	1. Removal of dried and unwanted leaves to adjust source- sink relation 2. Earthing up 3. Propping 4. Nutrition with K @ 2.5 % to bunches 5. Weed control measures to be adopted	RKVY and SHM
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	1. Mineral nutrition of K increased by 50 %, 4. Removal of dried and	CDB schemes

		.		unwanted leaves 5. Crown cleaning 6. Mulching the basins 7. Salt application 8. Substituting 50% of K with NaCl	
		Vegetables as pure	-do-	1.Life saving irrigation 2. Removal of drier leaves and unproductive fruits 3.Fertigation/ foliar application of mineral nutrients	RKVY, SHM and micro irrigation schemes
		Sugarcane as mono crop	-do-	1.Harvest the crop for cane/cane crushing 2.Detrashing	ICAR schemes
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	4. Kumaranperur(Gravelly clay loam, slightly acidic	Rubber as monocrop after three years	No Change	Not applicable	
		Banana as monocrop	-do-	Removal of dried and unwanted leaves to adjust source- sink relation Earthing up Propping Nutrition with K @ 2.5 % to bunches Weed control measures to be adopted	RKVY and SHM
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc. .	-do-	Mineral nutrition of K increased by 50 %, Removal of dried and unwanted leaves Crown cleaning Mulching the basins Salt application Substituting 50% of K with	CDB schemes

				NaCl	
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	Gudarakal (Clay loam – sandy clay) Very strongly acidic	Cool season Vegetables as pure crop	Vegetables as pure crop	1.Life saving irrigation 2. Removal of drier leaves and unproductive fruits 3. Fertigation/ foliar appl;ication of mineral nutrients	RKVY, SHM and micro irrigation schemes

Condition			**Suggested Contingency measures**		
Terminal drought	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
	1. Airavan (Wet land soil, medium – strongly acidic)	Rice- rice-fallow Rice -fallow-rice Fallow-fallow-rice	No Change	1.Early harvest 2. Product diversification 3. Use for fodder purpose or cattle feed	RKVY schemes
		Vegetables as pure crop in rice fallows as well as garden lands	-do-	1. Harvest the crop	RKVY and SHM
		Sugarcane as mono crop	-do-	1. Trash mulching 2. Early harvest 3. Plant seasonal crops for yield loss compensation 4. Grow early varieties in such areas	ICAR schemes
Condition			**Suggested Contingency measures**		
Terminal drought	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
	2. Adoor (Sandy clay loam, very strongly acidic)	Rubber as monocrop after three years	No Change	1.Arrest tapping 2.Plant is given a rest period	Rubber board schemes

		Coconut as monocrop Coconut with intercrops such as banana, tubers etc	-do-	1.Husk burial 2.Increase in K nutrition 3. Pizer irrigation 4. Salt application for 50 % of K	CDB and micro irrigation schemes
		Vegetables as pure crop	-do-	1. Harvest the crop	RKVY and SHM
Condition			**Suggested Contingency measures**		
Terminal drought	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
	3. Ayroor (Loam – sandy loam, extremely to medium acidic)	Banana as monocrop	No Change	1.Harvest the crop for culinary purpose 2.Removal of dried and unwanted leaves 3. Earthing up 4. Propping 5. Nutrition with K at 2.5 % to bunches 6.Weed control measures	SHM and RKVY schemes
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	1.Husk burial 2.Increase in K nutrition 3. Pizer irrigation 4. Salt application for 50 % of K	CDB and micro irrigation schemes
		Vegetables as pure crop	-do-	1. Harvest the crop	RKVY and SHM
		Sugarcane as mono crop	-do-	Trash mulching Early harvest Plant seasonal crops for yield loss compensation Grow early varieties in such areas	ICAR schemes
Condition			**Suggested Contingency measures**		
Terminal drought	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
	4. Kumaranperur (Gravelly clay loam, slightly acidic	Rubber as monocrop after three years	No Change	1.Arrest tapping 2.Plant is given a rest period	Rubber board schemes
		Banana as monocrop	-do-	1.Harvest the crop for culinary purpose 2.Removal of dried and unwanted leaves 3. Earthing up 4. Propping 5. Nutrition with K at 2.5 % to	SHM and RKVY schemes

				bunches 6.Weed control measures	
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	1.Husk burial 2.Increase in K nutrition 3. Pizer irrigation 4. Salt application for 50 % of K	CDB and micro irrigation schemes
Condition			**Suggested Contingency measures**		
Terminal drought	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
	5. Gudarakal (Clay loam – sandy clay) Very strongly acidic	Cool season Vegetables as pure crop	Vegetables as pure crop	1. Harvest the crop	RKVY and SHM

2.1.2 Irrigated situation

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed release of water in canals due to low rainfall	1. Airavan (Wet land soil, medium – strongly acidic)	Rice- rice-fallow Rice -fallow-rice Fallow-fallow-rice	No Change	1. Planting short duration varieties 2. Crop pattern altered with short duration cassava 3. Diversification of rice fallows with vegetables especially cucumber, watermelon	RKVY
		Vegetables as pure crop in rice fallows as well as garden lands	-do-	1. Delay planting 2. Vegetable with less water requirement especially bush vegetables, cowpea, ridge gourd, bottle gourd etc. shall be grown 3.Mulching	RKVY and SHM
		Sugarcane as mono	-do-	1. Delayed planting 2. early (8 months)	ICAR schemes

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
		crop			
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	2. Adoor (Sandy clay loam, very strongly acidic)	Rubber as monocrop after three years	No Change	1. Not applicable	
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	1. Husk burial 2. Coir pith application 3. Mulched with crop residues	CDB schemes
		Vegetables as pure crop	-do-	1. Delay planting 2. Vegetable with less water requirement especially bush vegetables, cowpea, ridge gourd, bottle gourd etc. shall be grown 3.Mulching	RKVY and SHM
Delayed release of water in canals due to low rainfall	3. Ayroor (Loam – sandy loam, extremely to medium acidic)	Banana as monocrop	No Change	1. Planting date adjusted according to release of water 2. Fertiliser application delayed 3. Provisional of shade made	RKVY and SHM

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	4. Husk burial 5. Coir pith application 6. Mulched with crop residues	CDB schemes
		Vegetables as pure crop	-do-	1. Delay planting 2. Vegetable with less water requirement especially bush vegetables, cowpea, ridge gourd, bottle gourd etc. shall be grown 3.Mulching	RKVY and SHM
		Sugarcane as mono crop	-do-	1. Delayed planting 2. early (8 months)	ICAR schemes

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	Kumaranperur (Gravelly clay loam, slightly acidic	Rubber as monocrop after three years	No Change	1. Not applicable	
		Banana as monocrop	-do-	Planting date adjusted according to release of water Fertiliser application delayed Provisional of shade made	RKVY and SHM

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	Husk burial Coir pith application Mulched with crop residues	CDB schemes

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	5. Gudarakal (Clay loam – sandy clay) Very strongly acidic	Cool season Vegetables as pure crop	Vegetables as pure crop	1. Delay planting 2. Vegetable with less water requirement especially bush vegetables, cowpea, ridge gourd, bottle gourd etc. shall be grown 3.Mulching	RKVY and SHM

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Limited release of water in canals due to low rainfall	1. Airavan (Wet land soil, medium – strongly acidic)	Rice- rice-fallow Rice -fallow-rice Fallow-fallow-rice	No Change	1. Saturated condition is maintained during seedling stage, tillering phase, panids nit stage 2. Water level is maintained at 5 cm level at reproductivity stage	RKVY

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
		Vegetables as pure crop in rice fallows as well as garden lands	-do-	1. Cropping system altered with short duration tapioca short duration vegetables such as cucumber, watermelon, bush type vegetable cowpea	RKVY and SHM
		Sugarcane as mono crop	-do-	1. Alternate furrow irrigation + mulching 2. Alternate furrow irrigation + mulching 3. Paired row planting + mulching	ICAR schemes

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Limited release of water in canals due to low rainfall	2. Adoor (Sandy clay loam, very strongly acidic)	Rubber as monocrop after three years	No Change	1. Not applicable	
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	1. Basin irrigation + mulching 2. Drip irrigation	CDB schemes
		Vegetables as pure crop	-do-	1. Cropping system altered with short duration tapioca short duration vegetables such as cucumber, watermelon, bush type vegetable cowpea	RKVY and SHM

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Limited release of water in canals due to low rainfall	3. Ayroor (Loam – sandy loam, extremely to medium acidic)	Banana as monocrop	No Change	1. Basin irrigation + mulching 2. Drip irrigation 3. Fertilizer application through fertigation	RKVY and SHM
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	Basin irrigation + mulching Drip irrigation	CDB schemes
		Vegetables as pure crop	-do-	1. Cropping system altered with short duration tapioca short duration vegetables such as cucumber, watermelon, bush type vegetable cowpea	RKVY and SHM
		Sugarcane as mono crop	-do-	1. Alternate furrow irrigation + mulching 2. Alternate furrow irrigation + mulching 3. Paired row planting + mulching	ICAR schemes
Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Limited release of water in canals due to low rainfall	4. Kumaranperur (Gravelly clay loam, slightly acidic	Rubber as mono crop after three years	No Change	1. Not applicable	
		Banana as mono crop	-do-	4. Basin irrigation + mulching 5. Drip irrigation 6. Fertil application through fertigation	RKVY and SHM
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	3. Basin irrigation + mulching 4. Drip irrigation	CDB schemes

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Limited release of water in canals due to low rainfall	5. Gudarakal (Clay loam – sandy clay) Very strongly acidic	Cool season Vegetables as pure crop	Vegetables as pure crop	1. Cropping system altered with short duration tapioca short duration vegetables such as cucumber, watermelon, bush type vegetable cowpea	RKVY and SHM

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water in canals under delayed onset of monsoon in catchment	1. Airavan (Wet land soil, medium – strongly acidic)	Rice- Rice-fallow Rice -fallow-Rice Fallow-fallow-Rice	No Change	Altered with short duration cassava Raise green manure crops Sesamum as catch crop	RKVY
		Vegetables as pure crop in rice fallows as well as garden lands	-do-	Grow cassava Green manure crops Fodder crops Forage crops	RKVY and SHM
		Sugarcane as mono crop	-do-	1. Plant any subsidiary crop such as sesamum/pulses Such horsegram/blackgram/greengram	ICAR schemes and planting materials from KAU

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water in canals under delayed onset of monsoon in catchment	2. Adoor (Sandy clay loam, very strongly acidic)	Rubber as monocrop after three years	No Change	1. Not applicable	
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc. .	-do-	1. Husk burial 2. Mulching 3. Raise green manure crops as cover crops under rainfed cover	CDB schemes
		Vegetables as pure crop	-do-	1. Grow cassava 2. Green manure crops 3. Fodder crops 4. Forage crops	RKVY and SHM
		Sugarcane as mono crop	-do-	1. Plant any subsidiary crop such as sesamum/pulses Such horsegram/blackgram/greengram	ICAR schemes and planting materials from KAU

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water in canals under delayed onset of monsoon in catchment	3. Ayroor (Loam – sandy loam, extremely to medium acidic)	Banana as monocrop	Grow pineapple instead of banana Switch on to tuber crops		RKVY and SHM
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc. .	No Change	Husk burial Mulching Raise green manure crops as cover crops under rainfed cover	CDB schemes
		Vegetables as pure crop	-do-	Grow cassava Green manure crops Fodder crops Forage crops	RKVY and SHM
		Sugarcane as mono crop	-do-	1. Plant any subsidiary crop such as sesamum/pulses Such horsegram/blackgram/greengram	ICAR schemes and planting materials from KAU

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water in canals under delayed onset of monsoon in catchment	4.Kumaranperur (Gravelly clay loam, slightly acidic	Rubber as monocrop after three years	No Change	1. Not applicable	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
		Banana as monocrop	-do-	1.Grow pineapple instead of banana 2.Switch on to tuber crops	RKVY and SHM
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc. .	-do-	Husk burial Mulching Raise green manure crops as cover crops under rainfed cover	CDB schemes

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water in canals under delayed onset of monsoon in catchment	5.Gudarakal (Clay loam – sandy clay) Very strongly acidic	Cool season Vegetables as pure crop	Vegetables as pure crop	Grow cassava Green manure crops Fodder crops Forage crops	RKVY and SHM

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	1. Airavan (Wet land soil, medium – strongly acidic)	Rice- rice-fallow Rice -fallow-rice Fallow-fallow-rice	No Change	Altered with short duration cassava Raise green manure crops Sesamum as catch crop	RKVY
		Vegetables as pure crop in rice fallows as well as garden lands	-do-	Grow cassava Green manure crops Fodder crops Forage crops	RKVY and SHM
		Sugarcane as mono crop	-do-	Plant any subsidiary crop such as sesamum/pulses such horsegram/blackgram/greengram	ICAR schemes
Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	2. Adoor (Sandy clay loam, very strongly acidic)	Rubber as monocrop after three years	No Change	1. Not applicable	
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc. .	-do-	Husk burial Mulching Raise green manure crops as cover crops under rainfed cover	CDB schemes
		Vegetables as pure crop	-do-	Grow cassava	RKVY and SHM

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
				Green manure crops Fodder crops Forage crops	
Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	3. Ayroor (Loam – sandy loam, extremely to medium acidic)	Banana as monocrop	No Change	Grow pineapple instead of banana Switch on to tuber crops	RKVY and SHM
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc. .	-do-	Husk burial Mulching Raise green manure crops as cover crops under rainfed cover	CDB schemes
		Vegetables as pure crop	-do-	Grow cassava Green manure crops Fodder crops Forage crops	RKVY and SHM
		Sugarcane as mono crop	-do-	1. Plant any subsidiary crop such as sesamum/pulses auch horsegram/blackgram/greengram	ICAR schemes

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	4. Kumaranperur (Gravelly clay loam, slightly acidic	Rubber as monocrop after three years	No Change	1. Not applicable	
		Banana as monocrop	-do-	Grow pineapple instead of banana Switch on to tuber crops	RKVY and SHM
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc. .	-do-	Husk burial Mulching Raise green manure crops as cover crops under rainfed cover	CDB schemes

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Gudarakal (Clay loam – sandy clay) Very strongly acidic	Cool season Vegetables as pure crop	As irrigated crop	Grow cassava Green manure crops Fodder crops Forage crop	RKVY and SHM

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall	1. Airavan (Wet land soil, medium – strongly acidic)	Rice- rice-fallow Rice -fallow-rice Fallow-fallow-rice	No Change	1. Raise aerobic rice varieties 2. Short duration vegetables, bush cowpea 3. Raise pulse crop 4. Green manure crops	RKVY
		Vegetables as pure crop in rice fallows as well as garden lands	-do-	1. Drip irrigation 2. Short duration vegetables of 2½ months 3. Basin irrigation + mulching	RKVY and SHM
		Sugarcane as mono crop	-do-	1. Alternate furrow irrigation 2. Paired row irrigation 3. bed irrigation	ICAR schemes

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall	2. Adoor (Sandy clay loam, very strongly acidic)	Rubber as monocrop after three years	Rubber as monocrop after three years	1. Water harvesting techniques to recharge ground water infiltration 2. Soil conservation measures to recharge ground water infiltration 3.Raise cover crops	Rubber board schemes

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	Coconut as monocrop. Coconut with intercrops such as banana, tubers etc	1. Drip irrigation + mulching 2. Husk burial	CDB schemes
		Vegetables as pure crop	Vegetables as pure crop	Drip irrigation Short duration vegetables of 2½ months Basin irrigation + mulching	RKVY and SHM
Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall	3. Ayroor (Loam – sandy loam, extremely to medium acidic)	Banana as monocrop	No Change	1. Drip irrigation 2. Recharge ground water through water conservation measures mulching, raising, green manure crops	RKVY and SHM
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	3. Drip irrigation + mulching 4. Husk burial	CDB schemes
		Vegetables as pure crop	-do-	Drip irrigation Short duration vegetables of 2½ months Basin irrigation + mulching	RKVY and SHM
		Sugarcane as mono crop	-do-	Alternate furrow irrigation	ICAR schemes

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
				Paired row irrigation Bed irrigation	
Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall	Kumaranperur (Gravelly clay loam, slightly acidic	Rubber as monocrop after three years	No Change	1. Water harvesting techniques to recharge ground water infiltration 2. Soil conservation measures to recharge ground water infiltration 3.Raise cover crops	Rubber board schemes
		Banana as monocrop	-do-	Drip irrigation Recharge ground water through water conservation measures mulching, raising, green manure crops	RKVY and SHM
		Coconut as monocrop Coconut with intercrops such as banana, tubers etc.	-do-	Drip irrigation + mulching Husk burial	CDB schemes
Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall	5. Gudarakal (Clay loam –	Cool season Vegetables	As irrigated crop	Drip irrigation Short duration vegetables of 2½ months	RKVY and SHM

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	sandy clay) Very strongly acidic			Basin irrigation +Mulching	

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

Condition	**Suggested contingency measure**			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Rubber based	Not grown in plain area			
Banana based	1.Cultivating in raised ridges/ mounts 2. Drain out excess water	Propping up to reduce lodging		
Coconut based	1. Flood provide drainage			
Rice based	1. Pump out water from field			
Vegetable based	1. Pump out water from field 2.On rainfed beds/mounts			
Sugarcane	1. Gap filling using polybag settlings after water logging 2. Planting flood tolerant varieities in such areas 3. Planting in raised beds in such areas 4. Earthing up to enhance root aeration			
Heavy rainfall with high speed winds in a short span		Propping		
1. Rubber based	1. Plant wind brakes along the borders			
2. Banana based	1. Propping up 2. Plant wind brakes			

3.Coconut based	No special measures required			
4. Rice based			Harvest the crop	
5. Vegetables based	Rain shelter cultivation/precision farming			
6.Sugarcane	1. Trash twisting after 150 days			
Outbreak of pests and diseases due to unseasonal rains				
1. Rubber	➢ Maintenance of field and crop sanitation, ➢ Prophylactic application of copper based fungicides against fungal diseases such as pink diseases affecting the normal latex flow			1.Proper drying to reduce the moisture content which may incite fungal attack, 2.Careful harvesting of the produce to prevent fungal or bacterial attack, 3. Careful storage and transportation, storage under improved facilities if long term storage is demanded.
2. Banana	➢ Surveillance against the occurrence of pests and diseases, ➢ Prophylactic application of recommended plant protection chemicals against leaf spot diseases such as sigatoka. ➢ Maintenance of field and crop sanitation and removal of dried and diseased plant parts.			
3. Coconut	➢ Sanitation of the field and crown cleaning, Prophylactic application of plant protection chemicals round the year against the out break of bud rot disease, ➢ avoid wounds of the petiole and leaves to avoid attack and entry of pests and fungal pathogens, ➢ cut, removal and burning of affected palms, ➢ Addition of organic and chemical fertilizers to maintain growth and yield attributes, application of lime			
4. Rice	➢ Surveillance against the occurance of pests and diseases, ➢ Avoid untimely application of fertilizers especially nitrogenous fertilizers,			

	➢ unfolding of the folded leaves mechanically, ➢ in endemic areas of specific pests or diseases sow resisitant varietiesto those biotic stresses.			
5. Vegetables	➢ Surveillance for the presence of pests and diseases, ➢ Application of plant protection chemicals such as Bordeaux mixture against *Fusarium* wilt, *Colletotrichum* rot of cowpea and leaf spot of amaranthus, ➢ use of biocontrol agents such as *Trichoderma* and *Pseudomonas* for seed treatment and soil application as a precautionary measure and also to control the diseases. ➢ Use of organic sources of pesticides, maintance of field and crop sanitation and Use of resistant varieties, ➢ lime application to maintain the soil configuration.			
6. Sugarcane	➢ Use of resistant varieties viz., Madhuri, Madhurima in case of red rot affected areas, ➢ application of lime and biocontrol agents such as *Beaveria bassiana* against root grub during planting and after the receipt of summer showers, ➢ judicious and balanced application of nitrogenous fertilizers at vegetative stage, conservation of natural enemies and refuge cropping in case of wooly aphid attack. If severe attack is observed application of acephate @ 2g/litre water can be done.			

2.3 Floods

Condition	**Suggested contingency measures**			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
1. Rubber based		No contingency measure required as the crop is usually grown in midland and high ranges		
2 .Banana	1. Planting in raised bed/mounts	1.Adopt Drainage facilities		
3. Coconut based		Drainage		
4.Rice based		Not applicable		
5.Vegetable based	1. Raised beds 2.Drain out water	Precision farming		
6. Sugarcane based		1. Growing flood tolerant varities like Madhuri 2. Adopt drainage measures where ever possible 3. Foliar spray of 2% DAP + 1% KCl (MOP)		
Continuous submergence for more than 2 days				
1. Rubber based				
2. Banana based		Provide drainage channels from root zone		
3. Coconut based		Provide drainage channels from root zone		
4. Rice based				
5. Vegetable based	Precision farming	1.Replicate the crop after draining flood water since continuous submerge is harmful to crop		

		2.Grow short duration vegetable crops like bush cowpea, ridge gourd, amaranthus after draining water.		
6. Sugarcane	Plant water logging resistant varieties such as Madhuri.	Will not affect the growth of sugarcane		
Sea water intrusion	Not applicable			

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

Not applicable to the district

Contingent strategies for Livestock

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Feed and fodder availability	Reserve fodder material either raw or as silage or hay, Raise cover crops feedable to livestock in rubber plantations, raise drought resistant fodder on field borders and bunds	Use fodder as such or fodder converted to silage or hay. Harvest cover crops as feeds, harvest drought resistant fodder	With the receipt of rain, fodder or cover crops can be planted
Drinking water	Harvest rain water using water harvesting structures	Use stored as well as harvested water, Purify water from available sources of upper Kuttanad areas using local filter techniques, harness water from natural sources such as springs, streams etc.	Erect water harvesting structures and harvest water
Health and disease management	Timely vaccination, Sanitation of the premises and livestock shed, keep the animals clean, provide adequate cooling for the animals through fans	Proper medication for diseased animals, Isolate the affected animals to prevent spread to other animals, adopt proper quarantine measures and adopt sanitary measures.	Sanitation of the premises and shed, maintain the animals in a clean condition, collect and preserve proper medicines in case of disease spread.

Floods			
Feed and fodder availability	Keep reserve straw, fodder converted to silage and hay	Sugarcane tops can be used as feed.	Covers cops grown for fodder purpose.
Drinking water	Erect water harvesting structures	Clean and boiled water to be provided	Harvesting structures erected and water stored
Health and disease management	Raise the level of floor of the shed	Protect the livestocks from flood, surveillance for diseases and proper medication, keep medicines in reserve.	Disinfect the cattle sheds
Cyclone			
Feed and fodder availability	Keep fodder as reserve	Use cover crops grown as fodder or silage or hay preserved	Grow cover crops for feeding purpose and prepare for silage
Drinking water	Harvest water using proper harvesting structures	Use the reserve water stored	Erect harvesting structures to store water
Health and disease management	Timely vaccination, Maintain the premises and animals in a clean condition	Proper medication and quarantine measures to be adopted	Disinfecting the cattle shed
Heat wave and cold wave			
Shelter/environment management	Proper ventilation in case of heat wave. Provision of warm providing facilities such as lights in the shed and provide cover for the ventilation.	Proper medication and quarantine measures. Provide adequate feed for the cattle.	Disinfect the shed, storage of proper medicines and proper feeding of the animals
Health and disease management	Timely vaccination, sanitary measures for the shed and cattle.	Proper medication and quarantine measures to prevent the spread of diseases.	Disinfecting the shed and cleaning the animals

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	Collection and preservation of feed ingredients in required quantity	Feeding with nutritionally balanced feed	Ensure adequate supply of ingredients for future use	
Drinking water	Construction of storage tank with adequate capacity	Provide clean drinking water round the clock, medication to reduce stress	Maintenance of existing water storing facilities and setting up of additional water sources	
Health and disease management	Vaccination, provide stress free environment	Proper feeding and watering, maintain correct stock density, observe for health problem and give treatment if required	Observe the production and growth. Avoid weaklings. Maintain proper stock density	
Floods				
Shortage of feed ingredients	Correct storage of feed stuffs to avoid fungal infestation, maintenance of store room , testing of feedstuff for quality	Feeding with nutritionally balanced feed	Disinfestations of surrounding premises and water bodies, proper disposal of dead birds	
Drinking water	Infrastructure reinforcement to avoid contamination of drinking water	Provide clean drinking water round the clock, medication to reduce stress	Disinfection of water bodies, provide adequate drainage	
Health and disease management	Avoid possibilities of disease outbreak, maintenance of shed to give adequate protection from flood , provide stress free environment	Timely detection of diseases and treatment , avoid chances of disease spreading , medication to reduce stress, isolation of affected birds	Proper disposal of dead birds, sanitation of surroundings, isolation of affected birds	

Cyclone				
Shortage of feed ingredients	Correct storage of feed stuffs to avoid fungal infestation, maintenance of store room , testing of feedstuff for quality	Avoid feeding fungal infected feed, treatment if required	Disposal of damaged feed, testing of feed for quality	
Drinking water	Infrastructure reinforcement to avoid contamination of drinking water	Provide clean drinking water round the clock, medication to reduce stress	Disinfection of water bodies, provide adequate drainage	
Health and disease management	Avoid possibilities of disease outbreak, maintenance of shed to give adequate protection from cyclone	Timely detection of diseases and treatment , avoid chances of disease spreading , medication to reduce stress, isolation of affected birds	Proper disposal of dead birds, sanitation of surroundings, isolation of affected birds	
Heat wave and cold wave				
Shelter/environment management	Timely maintenance of shelter, proper ventilation during hot days , proper insulation during very cold days	Hot days-Avoid direct exposure to severe weather. Provisions for air circulation Cold days- keep in shelter, give bedding for insulation. Provide brooding facilities	Construct modern weather proof shelter with ample space, Plant trees to provide shade to shelter.	
Health and disease management	Create awareness among farmers about adverse effect of bad weather	Avoid thermal stress to birds, keep in shelter with proper feeding and watering, give treatment if any health problem observed. Give more attention to chicks and parent stocks, reduce stock density.	Provide recuperative measures with proper management	

[a] based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine	Insuring the fishers Shall be provided with life saving equipments and provide weather forecast	Facility of patrol boats/ sea rescue. Support of coast guard shall be solicited . Opening of control room	Rehabilitation pacxkage Damaged boats / gears to be repaired/ replaced
Inland			
(i) Shallow water depth due to insufficient rains/inflow	Fixing of display boards indicatng navigation routes Bottom dredging of navigation routes	Arrange rescue facilities Opening of control room	Rehabilitation measures Livelihood support to the affected
(ii) Changes in water quality	Continued water quality monitoring	Amelioration measures by expert team	Rehabilitation measures and continued vigilance against pollution
(iii) Any other			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Develop varieties tolerant to low water table and warm shallow water condtions	Oxygen supply will be affected.so water filling arrangements and aeration facilites	Development of deeper ponds, by annual desilting and prevention of water loss.
(ii) Impact of salt load build up in ponds / change in water quality	Seepage proofing and Storage of sufficient water to safeguard form salinity ingression.	Emergency harvest	Flushing with freshwater. Fixing of bore well
(iii) Any other			
2) Floods			
A. Capture			
Marine	NA	NA	NA

Inland	Fore warning of calamities	Livelihood support .Opening of relief camps	Rehabilitation stocking in open waters affected by fish loss .Ranching of commercially important seeds to recoup fisheries
(i) Average compensation paid due to loss of human life		Rs. 2 .00 Lakhs	
(ii) No. of boats / nets/damaged			
(iii) No.of houses damaged			
(iv) Loss of stock			
(v) Changes in water quality		Water pH decline , Increase in organic matter content and sediment load ,	Algal blooms and fish kill possible due to blooming of algae. To counter this vigilant monitoring of water quality needed.
(vi) Health and diseases		EUS disease outbreak possible with lowering of temperature	EUS disease outbreak possible with lowering of temperature and consequent fish kill and unemployment and fisher folks.
B. Aquaculture			
(i) Inundation with flood water	Raising of pond dykes above flood mark. Provision of protective fencing to protect fish loss. Insurance cover	Rapid action to protect the stock against breach of dykes and protective maintenance of the outer bund.	Assessment of loss and compensation measures against loss. Supply of seed for fresh crop.
(ii) Water continuation and changes in water quality		pH decline.. Productivity decline-primary productivity of water body. Fish growth affe4cted	Algal blooming and fish kill .
(iii) Health and diseases		EUS disease outbreak possible with lowering of temperature. Fungal, bacterial and protozoan disese outbreak	Fish kill to be compensation and pond treatment against agents of dises
(iv) Loss of stock and inputs (feed, chemicals etc)	Insurance cover to be ensured	Loss of valuable germplasm / Brood stock possible. Stored Feed can loose its quality , afflotoxin problem . Loss of feed/ chemicals	Compensation for loss . Livelihood Support to the affected . Support by providing critical inputs seed/ feed for fresh crop

		in storage system possible	
(v) Infrastructure damage (pumps, aerators, huts etc)	Insurance cover.	Craft, gears, pumps. Aerators etc can become damaged	Compensation. Repair and replacement of macjinery and craft anf gears
(vi) Any other			
3. Cyclone / Tsunami			
A. Capture			
Marine	Protecting shoreline by afforestation by forming a mangrove belt Strict enforcement of CRZ regulation Construction of tsunami resistant housing and dwelling places. Forewarning system	Speedy rescue Operation to save the affected. Provision for shelter to the affected. . Rapid health care Drinking water can become saline	Assessment of loss and compensation. Rehabilitation housing, Livelihood support , Action to prevent epidemic outbreak
(i) Average compensation paid due to loss of fishermen lives		Rs 5 lakh / person	
(ii) Avg. no. of boats / nets/damaged			
(iii) Avg. no. of houses damaged			
Inland			
B. Aquaculture			
(i) Overflow / flooding of ponds		Salination of pond systems affecting freshwater fish stock and fish kill	Assessment of loss and compensation.. Loss of fish stock to be compensated by sedd msupply ands support ofor building stock
(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		Fish availability will be affected fish shoal can move to deeper waters. Tropical fish close to their upper tolerance limit so fish availability will be affected	Rehabilitation of the coastal fishers. Alternate livelihood enterprises.
Marine			
Inland		Rivers can go dry affecting fish gernplasm and stock will affect livejood of inland fishers	Rehabilitation of the fishers affected
B. Aquaculture		Perennial pond can become seasonal. Cropping intensity will be reduced. The product ivy will be affected	Facilities for water storage. Deepening of ponds to store more water .Annual desilitign should become necessary
(i) Changes in pond environment (water quality)	Develop and popularize temperature tolerant eurythermal species for culture systems. Develop water storage systems and water reservoirs to tide over adversity. Insurance cover against drought	Low DO. Warming of waters. Fish kill in summer. Breeding of fishes will be affected. Seed availability will be affected. Severe shortage for fish seeds possible	Supply of fish seeds from other places might become necessary. Can upset the inland fish production programe as fish spawning and seed production is affected. Compensationg clamity.
(ii) Health and Disease management		Disease outbreak especially parasitic diseases possible. DO decline and recurrent fish mortality.	Rehabilitation package. Fresh stocking support. Replacement with Healthy seeds