

State: KERALA

Agriculture Contingency Plan for District: THIRUVANANTHAPURAM

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) Konkan, Karnataka and Kerala Coastal plain, hot humid to perhumid eco-subregion (19.3)			
	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	Thiruvananthapuram, Kollam, Pathanamthitta, Kottayam			
	Geographic coordinates of district	Latitude	Longitude	Altitude	
		8° 29' N	76° 59' E	800m	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RARS (Southern Zone), Vellayani, Thiruvananthapuram, Kerala 695 522			
	Mention the KVK located in the district	KVK, Mithranikethan, Vellanad P.O., Thiruvananthapuram, Kerala 695 543			
1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-September):	806.8	45	June 1 st wk	September 1 st wk
	NE Monsoon(October-December):	559.1	26	October 2 nd wk	November 3 rd wk
	Winter (January- February)	120.2	10		
	Summer (March-May)	193.4	16		
	Annual	1679.5	97		

1.3	Land use pattern of the district (latest statistics)	Geographical area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area (000' ha)	218.7	49.0	24.4	Nil	0.5	0.1	0.3	2.5	0.3

1.4	Major Soils (common names like shallow red soils etc.,)	Area ('000 ha)	Percent (%) of total
	Sandy soils	8.5	3.8
	Sandy loam soils	2.4	1.1
	Gravelly sandy loam soils	11.1	5.1
	Sandy clay loam soils	9.9	4.5
	Gravelly sandy clay loam soils	155.9	71.3
	Loamy soils	4.3	2.0
	Clay loam soils	8.6	4.0
	Gravelly clay loam soils	12.0	5.5
	Beach sand soils	2.5	1.1
	Water body	3.2	1.4
	Total	218.6	100

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	135	120.7
	Area sown more than once	28	
	Gross cropped area	163	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	8.2		
	Gross irrigated area	13.7		
	Rainfed area	126.8		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		4.6	56.1
	Tanks	1206	0.4	4.9
	Open wells	-	2.9	35.4
	Bore wells	85	0.02	0.2
	Lift irrigation	-	-	-
	Micro-irrigation		-	-
	Other sources	-	-	-
	Total Irrigated Area		8.2	
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) Area	
	Over exploited	Nil		
	Critical	Nil		
	Semi- critical	Nil		
Safe	All Blocks	100%		
Wastewater availability and use	NA			
Ground water quality	Good			

*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)					
		<i>Kharif</i>		<i>Rabi</i>		Summer	Total
		<i>Irrigated</i>	<i>Rainfed</i>	<i>Irrigated</i>	<i>Rainfed</i>		
	Tapioca	-	5.2	-	5.4	9.6	20.3
	Rice	1.3	0.1	1.5	0.02	0.1	2.9
	Other Tubers(Annual crop)	1.2	0.3	-	-	-	1.5
	Pulses	-	0.002	-	0.002	0.2	0.2
	Horticulture crops - Fruits	Total area					
	Banana & Plantain	8.3					
	Jack	5.4					
	Mango	3.6					
	Papaya	1.3					
	Pineapple	0.3					
	Horticultural crops - Vegetables	Total area					
	Amaranthus	0.2					
	Cucumber	0.2					
	Snake gourd	0.1					
	Bitter gourd	0.1					
	Ladies finger (okra)	0.1					
	Medicinal and Aromatic crops	Total area					
	Pepper	5.7					
	Ginger	0.1					
	Nutmeg	0.1					
	Clove	0.04					
	Other medicinal plants	0.01					

	Plantation crops	Total area
	Coconut	71.7
	Rubber	30.0
	Cashew	1.0
	Arecanut	1.0
	Tea	1.0
	Fodder crops	Total area
	Hybrid Napier	-
	Guinea grass	-
	Congo signal	-
	Fodder maize	-
	Total fodder crop area	0.1
	Grazing land	-
	Sericulture etc	-
	Others (Specify)	-

1.8	Livestock	Male (Number)	Female (Number)	Total (Number)
	Non descriptive Cattle (local low yielding)	552	3,338	3,890
	Crossbred cattle	6,854	1,36,228	1,43,082
	Non descriptive Buffaloes (local low yielding)	563	2,707	3,270
	Graded Buffaloes	38,425	1,07,876	1,46,301
	Goat	148	145	293
	Sheep	846	1,044	1,890
1.9	Poultry	No. of farms	Total No. of birds ('000)	
	Commercial		1097.07	
	Backyard			

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)										
	Tapioca	Crop of 10 months duration						525.9	25921	Nil
	Rice	3.4	2488	3.6	2359	0.3	2638	7.3	2429	7.3
	Other Tubers	Crops of 10-11 months duration						25.4	16869	Nil
	Pulses	0.001	719	0.001	719	0.1	720	0.1	419	0.3
Major Horticultural crops (Crops to be identified based on total acreage)										
	Banana	Crops of 10-11 months duration						18.8	7000	13.4
	Plantain	Crop of 10-18 months duration						43.3	7680	27.5
	Jack	Perennial crop						260.0	47800	15.0
	Mango	Perennial crop						23.4	6490	Nil
	Papaya	Perennial crop						7.7	5800	Nil
	Pine apple	Biennial crop						2.1	6626	Nil

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Tapioca	Rice	Tubers	Pulses
	Khharif- Rainfed	April 1 st wk to May 2 nd wk	April 1 st wk to June 3 rd wk	February 3 rd wk to June 3 rd wk	April 2 nd wk to May 2 nd wk
	Khharif-Irrigated	April 1 st wk to May 2 nd wk	May 3 rd wk to June last wk	August 3 rd wk to October 2 nd wk	No irrigated crop
	Rabi- Rainfed	September 1 st wk to October 2 nd wk	August last wk to September 3 rd wk	No Rabi planting	August 2 nd wk to October 1 st wk
	Rabi-Irrigated	September 1 st wk to October 2 nd wk	September 1 st wk to October 2 nd wk	No Rabi planting	No irrigated crop

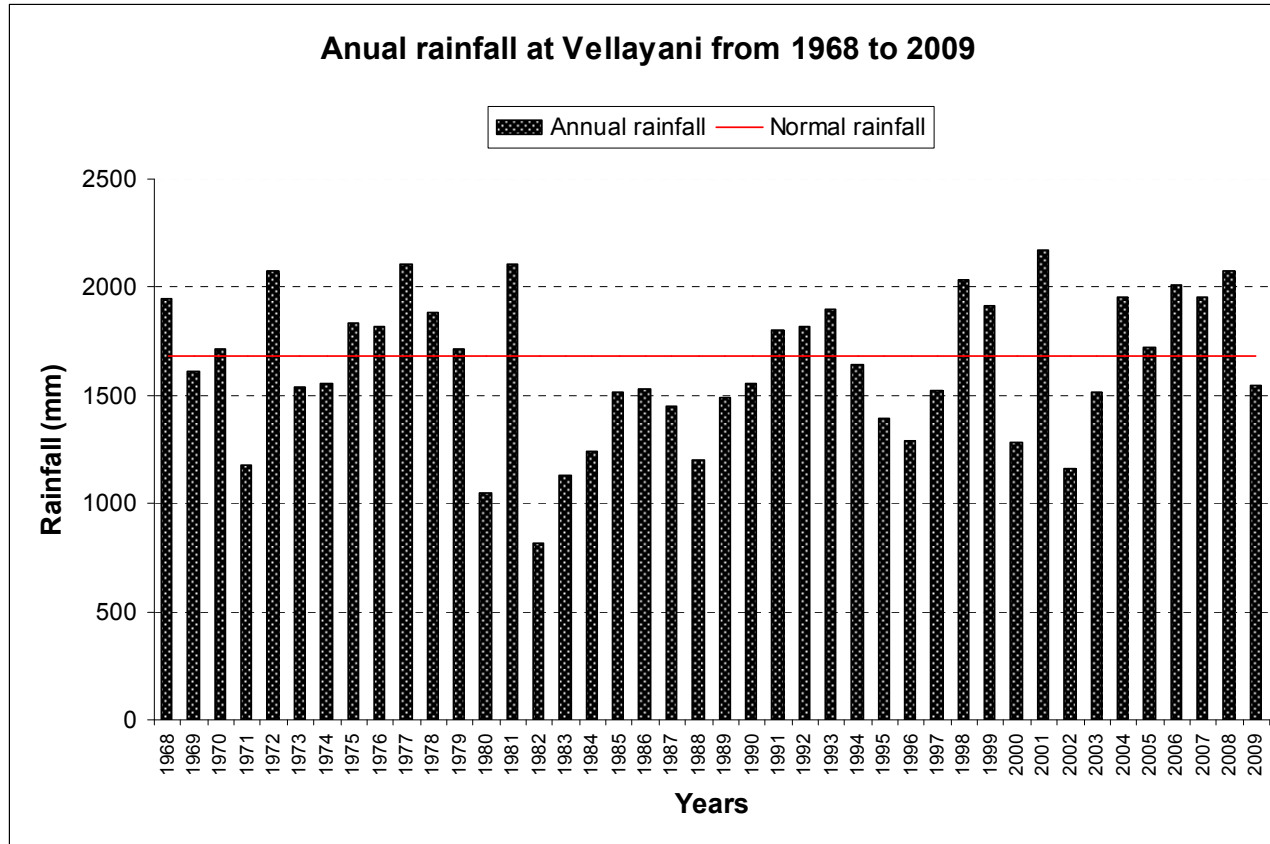
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought	√		
	Flood	√		
	Cyclone			√
	Hail storm			√
	Heat wave			√
	Cold wave			√
	Frost			√
	Sea water intrusion			
	Pests and diseases (specify)	√		
	Others Attack of wild animals on crops raised near forest area	√		

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

Annexure 1: Location map of TIRUVANANTHAPURAM



Annexure 2: Annual Rainfall



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 3 rd week	Kazhakkuttam series Coarse loamy, mixed isohyperthermic (Kazhakkuttam Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation	Not required Drought tolerant table purpose plantain variety Njalipoovan may be used for intercropping	Rice <ul style="list-style-type: none"> • Direct seeding • Prefer short duration, drought tolerant varieties • In transplanted crop prepare mat nursery and • Adopt community nursery • Rainwater harvesting in farm tanks or ponds • Adopt Summer ploughing for moisture conservation Coconut based cropping system <ul style="list-style-type: none"> • Husk burial in trenches to conserve moisture • Application of bulky organic manures like farm yard manure, green leaf manure etc. • Deepening of trenches in the inter row spaces to conserve moisture • Recharging of open wells and other ground water resources by rain water harvesting • Mulching with dried coconut leaves and other available crop residues, dust mulching etc. Tubers <ul style="list-style-type: none"> • Adjust planting time of Tubers in order to 	NREGS, RKVY, BRGF
	Amaravila series Fine mixed (Perumkadavila Block)	Coconut + Tapioca/ other Tubers / Banana / Pepper Banana + Vegetables in low lands Homestead cultivation Rice-Rice-Vegetable/ Pulses Rubber	-		
	Vellayani series Clayey kaolinitic isohyperthermic (Nemom Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Tapioca Homestead cultivation	-		Micro irrigation schemes by the State department

Trivandrum series clayey- skelal, kaolinitic, isohyperthermic (Kazhakkuttam Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation	-	avoid drought during crop period. Banana <ul style="list-style-type: none"> • Protecting pseudo stems of standing crop with the hanging dry leaves • Application of bulky organic manures • Deepening of trenches in low lands for rain water harvesting • Mulching Vegetables <ul style="list-style-type: none"> • Direct seeding of for the first crop • Sprinkler/drip Irrigation • Sufficient mulching • Organic Manuring Homesteads <ul style="list-style-type: none"> • Recycle used water, • Mulching 	
Nedumangadu series, clayey – skela, mixed isohyperthermic. (Nedumangadu Block)	Rubber Coconut + Tapioca/ other Tubers / Banana / Pepper Banana + Vegetables in low lands Homestead cultivation	-		Micro irrigation scheme, RKVY , NREGS
Kallar series Clayey, mixed, isohyperthermic (Vamanapuram Block)	Coconut + Tapioca/ other Tubers / Banana / Pepper Rubber Banana + Vegetables in low lands Homestead cultivation	-		
Ponmudi series Fine loamy, mixed, isohperthermic (Vamanapuram Block)	Tea Homestead cultivation Tapioca/ other Tubers / Banana / Pepper	-		
Kottur series Gravelly sandy clay- forest (Nedumangadu Block)	Coconut/ Tapioca/ other Tubers / Banana / Pepper Rubber Homestead cultivation	-		
Thonnackal series Gravelly sandy loam forest (Thiruvananthapuram Block)	Coconut Tapioca/ other Tubers / Banana/Vegetables / Pepper Homestead cultivation, Rubber	-		Micro irrigation scheme, RKVY , NREGS

	Vilappil series Fine loamy mixed isohyperthermic	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation	-		
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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 July 1 st week	Kazhakkuttam series Coarse loamy, mixed isohyperthermic (Kazhakkuttam Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation	No Change	Rice <ul style="list-style-type: none"> Wet seeding of sprouted seeds of short duration drought tolerant varieties Resort to seed hardening with KCl In transplanted crop prepare mat nurse and adopt community nursery Adopt closer spacing and increase the number of seedlings to 3-5 per hill and apply addition dose of N @ 5 Kg/ha Apply silica Coconut based cropping system <ul style="list-style-type: none"> Raise leguminous cover crops Production and application of vermin compost Application of bulky organic manures like farm yard manure, green leaf manure etc. Deepening of trenches in the inter row spaces to conserve moisture Mulching with dried coconut leaves and other available crop residues, dust mulching etc. 	NREGS, RKVY, BRGF
	Amaravila series Fine mixed (Perumkadavila Block)	Coconut + Tapioca/ other Tubers / Banana / Pepper Banana + Vegetables in low lands Homestead cultivation Rice – Rice- Vegetable/ Pulses Rubber			-
	Vellayani series Clayey kaolinitic isohyperthermic (Nemom Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Tapioca Homestead cultivation			Micro irrigation scheme, RKVY, NREGS

Trivandrum series clayey- skelal, kaolinitic, isohyperthermic (Kazhakkuttam Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation	<p>Tubers</p> <ul style="list-style-type: none"> Adjust planting time of Tubers in order to avoid drought during crop period. <p>Banana</p> <ul style="list-style-type: none"> Deepening of trenches in low lands for rain water harvesting Life saving irrigation Drip irrigation Mulching <p>Vegetables</p> <p>Regular weeding, Renovation of irrigation channels in time. Heavy mulching, organic manuring, drip irrigation/pitcher irrigation, rainwater conservation measures,</p> <p>Homesteads</p> <ul style="list-style-type: none"> Growing crops along contour strips. Convert cultivated area into leveled plots/contour strips Adopt single crop medium / long duration high yielding varieties. 	
Nedumangadu series, clayey – skela, mixed isohyperthermic. (Nedumangadu Block)	Rubber Coconut + Tapioca/ other Tubers / Banana / Pepper Banana + Vegetables in low lands Homestead cultivation		
Kallar series Clayey, mixed, isohyperthermic (Vamanapuram Block)	Coconut + Tapioca/ other Tubers / Banana / Pepper Rubber Banana + Vegetables in low lands Homestead cultivation		
Ponmudi series Fine loamy, mixed, isohperthermic (Vamanapuram Block)	Tea Homestead cultivation Tapioca/ other Tubers / Banana / Pepper		
Kottur series Gravelly sandy clay- forest (Nedumangadu Block)	Coconut/ Tapioca/ other Tubers / Banana / Pepper Rubber Homestead cultivation		
Thonnackal series Gravelly sandy loam forest (Thiruvananthapuram Block)	Coconut Tapioca/ other Tubers / Banana/Vegetables / Pepper Homestead cultivation Rubber		

	Vilappil series Fine loamy mixed isohyperthermic	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation			
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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 July 3 rd week	Kazhakkuttam series Coarse loamy, mixed isohyperthermic (Kazhakkuttam Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation	No Change	Rice <ul style="list-style-type: none"> • Prefer short duration, drought tolerant varieties • Resort to seed hardening with KCl. • In transplanted crop prepare mat nursery and adopt community nursery • Adopt closer spacing and increase the number of seedlings to 3-5 per hill and apply addition dose of N @ 5 Kg/ha • Apply silica • Spray K/ KCl to mitigate drought. • Irrigate at 1-4 days after disappearance of ponded water • Life saving irrigation at critical stages like flowering, PI and Grain filling. • Retain the available paddy fields under Rice cultivation. 	NREGS, RKVY, BRGF
	Amaravila series Fine mixed (Perumkadavila Block)	Coconut + Tapioca/ other Tubers / Banana / Pepper Banana + Vegetables in low lands Homestead cultivation Rice – Rice- Vegetable/ Pulses Rubber			

	Vellayani series Clayey kaolinitic isohyperthermic (Nemom Block)	Coconut + Tapioca/ other tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Tapioca Homestead cultivation		<p>Coconut based cropping system</p> <ul style="list-style-type: none"> • Adopt Micro irrigation like drip for main crop and intercropped Banana • Husk burial in trenches to conserve moisture • Application of bulky organic manures like farm yard manure, green leaf manure etc. • Deepening of trenches in the inter row spaces to conserve moisture • Mulching with dried coconut leaves and other available crop residues, dust mulching etc. • Raise leguminous cover crops <p>Tubers</p> <ul style="list-style-type: none"> • Production of more drought tolerant planting materials by mini sett technique • Adjust planting time of Tubers in order to avoid drought during crop period critical crop stages <p>Banana</p> <ul style="list-style-type: none"> • Life saving irrigation • Drip irrigation • Maximum conservation of water by mulching with organic residues <p>Vegetables</p>	
	Trivandrum series clayey- skelal, kaolinitic, isohyperthermic (Kazhakkuttam Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation			
	Nedumangadu series, clayey – skela, mixed isohyperthermic. (Nedumangadu Block)	Rubber Coconut + Tapioca/ other Tubers / Banana / Pepper Banana + Vegetables in low lands Homestead cultivation			

<p>Kallar series Clayey, mixed, isohyperthermic (Vamanapuram Block)</p>	<p>Coconut + Tapioca/ other Tubers / Banana / Pepper</p> <p>Rubber</p> <p>Banana + Vegetables in low lands</p> <p>Homestead cultivation</p>		<p>Use short duration varieties & resort to direct sowing. Strengthen rain water harvesting facilities. Use drought tolerant varieties, resort to lesser spacing, Irrigate at least once in 2 days Give heavy mulching, organic manuring, Reduce the use of chemical fertilizers, drip irrigation /pitcher irrigation, Rainwater conservation measures, Renovation of irrigation channels in time.</p> <p>Homesteads</p> <ul style="list-style-type: none"> • Rain water harvesting by soak pits • Roof water harvesting & recharging open wells for irrigation. • Grow cover crops 		
<p>Ponmudi series Fine loamy, mixed, isohperthermic (Vamanapuram Block)</p>	<p>Tea</p> <p>Homestead cultivation</p> <p>Tpioca/ other Tubers / Banana / Pepper</p>				
<p>Kottur series Gravelly sandy clay- forest (Nedumangadu Block)</p>	<p>Coconut/ Tapioca/ other Tubers / Banana / Pepper</p> <p>Rubber</p> <p>Homestead cultivation</p>				
<p>Thonnackal series Gravelly sandy loam forest (Thiruvananthapuram Block)</p>	<p>Coconut</p> <p>Tapioca/ other Tubers / Banana/Vegetables / Pepper</p> <p>Homestead cultivation</p> <p>Rubber</p>				
<p>Vilappil series Fine loamy mixed isohyperthermic</p>	<p>Coconut + Tapioca/ other ubers / Banana</p> <p>Rice – Rice- Vegetable/ Pulses</p> <p>Banana + Vegetables in low lands</p> <p>Homestead cultivation</p>				

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 8 Weeks August 1 st week	Kazhakkuttam series Coarse loamy, mixed isohyperthermic (Kazhakkuttam Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation	No Change	Rice <ul style="list-style-type: none"> • Apply silica • Spray K/KCl to mitigate drought. • Rainwater harvesting in farm tanks or ponds • Irrigate at 1-4 days after disappearance of ponded water • Life saving irrigation at critical stages like flowering, PI and Grain filling. • Retain the available paddy fields under Rice cultivation. Coconut based cropping system <ul style="list-style-type: none"> • Mulching with dried coconut leaves and other Husk burial in trenches to conserve moisture • Adopt Micro irrigation like drip for main crop and intercropped Banana • Application of bulky organic manures like farm yard manure, green leaf manure etc. • Deepening of trenches in the inter row spaces to conserve moisture 	NREGS, RKVY, BRGF
	Amaravila series Fine mixed (Perumkadavila Block)	Coconut + Tapioca/ other Tubers / Banana / Pepper Banana + Vegetables in low lands Homestead cultivation Rice – Rice- Vegetable/ Pulses Rubber			
	Vellayani series Clayey kaolinitic isohyperthermic (Nemom Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Tapioca Homestead cultivation	No Change	<ul style="list-style-type: none"> • Recharging of open wells and other ground water resources by rain water harvesting • available crop residues, dust mulching etc. • Raise leguminous cover crops Tubers <ul style="list-style-type: none"> • Selection of tuber crops which can tolerate droughts • Adjust planting time of Tubers in order to avoid drought during crop period. Banana <ul style="list-style-type: none"> • Life saving irrigation 	

	Trivandrum series clayey-skakal, kaolinitic, isohyperthermic (Kazhakkuttam Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation		<ul style="list-style-type: none"> • Drip irrigation • Mulching Protecting pseudo stems of standing crop with the hanging dry leaves • Application of bulky organic manures • Deepening of trenches in low lands for rain water harvesting <p>Vegetables Give very heavy mulching. Only organic manuring, drip irrigation / pitcher irrigation follow rainwater conservation measures, renovation of irrigation channels in time. Keep the field weed free. Timely repairing and renovation of irrigation channels, measures like surface storing of ground water, husk burial, life saving irrigation, reclining of used water. Minimize chemical fertilizers.</p> <p>Homesteads</p> <ul style="list-style-type: none"> • Subsidiary income generation through dairying, mushroom cultivation, bee keeping, sericulture etc. <p>Rubber</p> <ul style="list-style-type: none"> • Terracing • Digging slit pits • Cover cropping using Pueraria area /Mucuna mixture • Giving tapping rest for four weeks from December to February <p>Protect young plants</p> <ul style="list-style-type: none"> • By shading with plated coconut leaves of bamboo baskets • Whitewashing stem using lime/china clay till canopy closes • Mulching around plant based using dry leaves, grass cuttings etc. 	
	Nedumangadu series, clayey – skela, mixed isohyperthermic. (Nedumangadu Block)	Rubber Coconut + Tapioca/ other Tubers / Banana / Pepper Banana + Vegetables in low lands Homestead cultivation			Various schemes implemented by rubber board
	Kallar series Clayey, mixed, isohyperthermic (Vamanapuram Block)	Coconut + Tapioca/ other Tubers / Banana / Pepper Rubber Banana + Vegetables in low lands Homestead cultivation	No Change		
	Ponmudi series Fine loamy, mixed, isohperthermic (Vamanapuram Block)	Tea Homestead cultivation Tpioca/ other Tubers / Banana / Pepper			

	Kottur series Gravelly sandy clay- forest (Nedumangadu Block)	Coconut/ Tapioca/ other Tubers / Banana / Pepper Rubber Homestead cultivation		<ul style="list-style-type: none"> • Mulching after manuring before onset of summer 	
	Thonnackal series Gravelly sandy loam forest (Thiruvananthapuram Block)	Coconut Tapioca/ other Tubers / Banana/Vegetables / Pepper Homestead cultivation Rubber		<ul style="list-style-type: none"> • Cashew • Liberal addition of organic manure • Protective irrigation during peak summer (drip irrigation) • Mulching the basins with green/dry leaves • Forming terrace at 2 m at radius around the plant at the base within three years of planting by cutting the soil from upper portion of the slope and filling the lower portion so that the soil around the plant is flatted. • Husk burial in trenches of 1 m width 0.5 m depth and 3.5 m length opened across the slope between 2 rows of cashew • Digging the basin area or ploughing the ground between two rows of cashew before summer • In level area coconut has burial in circular trenches 0.3 m width and 0.5 m depth opened at 2 m away from the trunk of the plant 	
	Vilappil series Fine loamy mixed isohyperthermic	Coconut + Tapioca/ other tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation		<ul style="list-style-type: none"> • Arecanut • Protect young seedlings from direct exposure to sun by covering with coconut/Arecanut leaves • Whitewashing the stem • Cover the exposed trunk with dry areca leaves or opaque polythene film • Raising quick growing trees on the western or southern sites of the garden • Tea • New planning • Use drought resistant/grafted/biclinal progenies • Early planning before the onset of south-west monsoon • Follow trench planting • Avoid close planting (spacing 135 x75x75 cm) • Use China type (more tolerant to drought) • Make trenches across the slope 180x30x45) staggered every 2-3 rows depending on the slope 	

				<ul style="list-style-type: none"> Foliar application of a suspension of 12 Kg kaolin in combination with vinofan at 3.30 mn in hundred liters of water Provide shade by Silver oak (<i>Grevillea robusta</i>) <p>Mature Plants</p> <ul style="list-style-type: none"> Manuring should be completed by the end of October. Heavy dose/haphazard application should be avoided Hard plucking/shear harvesting should be avoided Addition of one tier of maintenance foliage every year between January and March Follow the recommended duration of pruning cycle Retain the pruning materials by chopping and spreading in the soil <p>Foliar application of KCl (MoP combined with urea 2 Kg each + 500 ml Green Miraculan in 200 litres of water per hectare to induce drought tolerance. Commence from mid November and repeat at monthly intervals</p>	
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Condition			Suggested Contingency measures		
Early season drought (normal onset)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient and moisture conservation measures	Remarks on Implementation
Normal onset followed by 15 – 20 days dry spell after sowing leading to poor germination/ crop stand etc	Kazhakkuttam series Coarse loamy, mixed isohyperthermic (Kazhakkuttam Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation	Rice <ul style="list-style-type: none"> Delay seeding 3 – 4 weeks Irrigate 1 - 4 days after appearance of pounded water If transplanting is delayed, adopt closer spacing, increase the number of seedlings to 3-5 per hill and apply additional dose of N @ 5kg/ha 	Application of P & K as basal, Reduce nitrogen dose Apply organic manures.	

	Amaravila series Fine mixed (Perumkadavila Block)	Coconut + Tapioca/ other Tubers / Banana / Pepper Banana + Vegetables Homestead cultivation Rice – Rice- Vegetable/ Pulses Rubber	<ul style="list-style-type: none"> • In direct seeding/upland Rice, adopt seed hardening technique. • In the direct seeding/upland area, midterm correction i.e. reduce plant population and use the weed biomass (through land weeder) for mulching and moisture conservation. • Give phasic stress/life saving irrigations from available irrigation sources 		
	Vellayani series Clayey kaolinitic isohyperthermic (Nemom Block)	Coconut + Tapioca/ other tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Tapioca Homestead cultivation	<ul style="list-style-type: none"> • Supply N & K fertilizers through foliar application • Resowing with shorter duration varieties • Husk burial in trenches to conserve moisture • Application of bulky organic manures like farm yard manure, green leaf manure etc. • Deepening of trenches in the inter row spaces 		
	Trivandrum series clayey- skelal, kaolinitic, isohyperthermic (Kazhakkuttam Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation	<p>Coconut based cropping system Continue irrigation in Coconut gardens.</p> <p>Open basins of Palms and mulch with organic matter / green</p>		

	Nedumangadu series, clayey – skela, mixed isohyperthermic. (Nedumangadu Block)	Rubber Coconut + Tapioca/ other Tubers / Banana / Pepper Banana + Vegetables in low lands Homestead cultivation	leaves or Coconut leaves Adopt moisture conservation measures to prevent loss of available moisture Tubers Adopt measures to protect the plants from direct sunlight		
	Kallar series Clayey, mixed, isohyperthermic (Vamanapuram Block)	Coconut + Tapioca/ other Tubers / Banana / Pepper Rubber Banana + Vegetables in low lands Homestead cultivation	Mulching Banana Continue irrigation for Banana and other intercrops Vegetables Continue irrigation		
	Ponmudi series Fine loamy, mixed, isohperthermic (Vamanapuram Block)	Tea Homestead cultivation Tapioca/ other Tubers / Banana / Pepper	Give mulching to conserve moisture available		
	Kottur series Gravelly sandy clay-forest (Nedumangadu Block)	Coconut/ Tapioca/ other Tubers / Banana / Pepper Rubber Homestead cultivation			

	Thonnackal series Gravelly sandy loam forest (Thiruvananthapuram Block)	Coconut Tapioca/ other Tubers / Banana/Vegetables / Pepper Homestead cultivation Rubber			
	Vilappil series Fine loamy mixed isohyperthermic	Coconut + Tapioca/ other tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient and moisture conservation measures	Remarks on Implementation
Mid season drought (Long dry spell, consecutive two weeks rainless(<2.5 mm) period)					
At vegetative stage	Kazhakkuttam series Coarse loamy, mixed isohyperthermic (Kazhakkuttam Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation	Rice <ul style="list-style-type: none"> • Suppress weed growth • Make shelter belts • Spraying potassium chloride • Thinning of 30-50 % of population • Anti transpirant spray • Irrigate at 1-4 days after disappearance of ponded water • In situ rainwater conservation Coconut based cropping system	<ul style="list-style-type: none"> • Application of NPK as basal to reduce Nitrogen lose • Application of bulky organic manures • Rainwater harvesting • Intermittent flooding maintaining the soil in sub-saturated condition Alternate drying and wetting	

	Amaravila series Fine mixed (Perumkadavila Block)	Coconut + Tapioca/ other Tubers / Banana / Pepper Banana + Vegetables in low lands Homestead cultivation Rice – Rice- Vegetable/ Pulses Rubber	Establish leguminous cover crops Shading young plants Painting the trunk white. Anti transpirant spray Zero tillage, Mulching, Sub surface storing of ground water, Drip irrigation, terracing, husk burial, leaf cutting Tubers Production of buffer stock planting materials by mini sett technique Life saving irrigation		
	Vellayani series Clayey kaolinitic isohyperthermic (Nemom Block)	Coconut + Tapioca/ other tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Tapioca Homestead cultivation	Mulching with available oraganic matter Banana Life saving irrigation Irrigation coinciding with the time of application of fertilizers Construction of rain water harvesting structures in the field Application of bulky organic manures Deepening of trenches in low lands for rain water harvesting Vegetables		
	Trivandrum series clayey- skelal, kaolinitic, isohyperthermic (Kazhakkuttam Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation	Life saving irrigation Roof water harvesting & recharging open wells for irrigation. Grow cover crops Recharging of open wells and ponds Improved techniques like precision farming Popularization of drip irrigation.		

	<p>Nedumangadu series, clayey – skela, mixed isohyperthermic . (Nedumangadu Block)</p>	<p>Rubber Coconut + Tapioca/ other Tubers / Banana / Pepper Banana + Vegetables in low lands Homestead cultivation</p>			
	<p>Kallar series Clayey, mixed, isohyperthermic (Vamanapuram Block)</p>	<p>Coconut + Tapioca/ other Tubers / Banana / Pepper Rubber Banana + Vegetables in low lands Homestead cultivation</p>			
	<p>Ponmudi series Fine loamy, mixed, isohperthermic (Vamanapuram Block)</p>	<p>Tea Homestead cultivation Tapioca/ other Tubers / Banana / Pepper</p>			
	<p>Kottur series Gravelly sandy clay- forest (Nedumangadu Block)</p>	<p>Coconut/ Tapioca/ other Tubers / Banana / Pepper Rubber Homestead cultivation</p>			

	Thonnackal series Gravelly sandy loam forest (Thiruvananthapuram Block)	Coconut Tapioca/ other Tubers / Banana/Vegetables / Pepper Homestead cultivation Rubber			
	Vilappil series Fine loamy mixed isohyperthermic	Coconut + Tapioca/ other tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient and moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell)					
At flowering / fruiting stage	Kazhakkuttam series Coarse loamy, mixed isohyperthermic (Kazhakkuttam Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation	Rice Make shelter belts Spraying potassium chloride Anti transpirant spray Irrigate at 1-4 days after disappearance of ponded water		

	Amaravila series Fine mixed (Perumkadavila Block)	Coconut + Tapioca/ other Tubers / Banana / Pepper Banana + Vegetables in low lands Homestead cultivation Rice – Rice- Vegetable/ Pulses Rubber	Give phasic stress/life saving irrigations from available irrigation sources Coconut gardens Mulching with dried coconut leaves and other Husk burial in trenches to conserve moisture Adopt Micro irrigation like drip for main crop and intercropped Banana, green leaf manure etc.	Coconut Application of bulky organic manures like farm yard manure	
	Vellayani series Clayey kaolinitic isohyperthermic (Nemom Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Tapioca Homestead cultivation	Deepening of trenches in the inter row spaces to conserve moisture Banana Irrigation is very important during the 5 th month of the plant as development of bunch starts during this month Covering of bunches to protect from direct sun Vegetables		
	Trivandrum series clayey- skelal, kaolinitic, isohyperthermic (Kazhakkuttam Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation	Irrigation is very much important for proper fertilization and fruit development. Immediate measures should be taken to provide irrigation otherwise a long dry spell during this stage may result in crop failure		

	<p>Nedumangadu series, clayey – skela, mixed isohyperthermic.</p> <p>(Nedumangadu Block)</p>	<p>Rubber</p> <p>Coconut + Tapioca/ other Tubers / Banana / Pepper</p> <p>Banana + Vegetables in low lands</p> <p>Homestead cultivation</p>			
	<p>Kallar series Clayey, mixed, isohyperthermic (Vamanapuram Block)</p>	<p>Coconut + Tapioca/ other Tubers / Banana / Pepper</p> <p>Rubber</p> <p>Banana + Vegetables in low lands</p> <p>Homestead cultivation</p>			
	<p>Ponmudi series Fine loamy, mixed, isohperthermic (Vamanapuram Block)</p>	<p>Tea</p> <p>Homestead cultivation</p> <p>Tapioca/ other Tubers / Banana / Pepper</p>			
	<p>Kottur series Gravelly sandy clay- forest (Nedumangadu Block)</p>	<p>Coconut/ Tapioca/ other Tubers / Banana / Pepper</p> <p>Rubber</p> <p>Homestead cultivation</p>			

	Thonnackal series Gravelly sandy loam forest (Thiruvananthapuram Block)	Coconut Tapioca/ other Tubers / Banana/Vegetables / Pepper Homestead cultivation Rubber			
	Vilappil series Fine loamy mixed isohyperthermic	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Rabi crop planning	Remarks on Implementation
Terminal drought	Kazhakkuttam series Coarse loamy, mixed isohyperthermic (Kazhakkuttam Block)	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation	<ul style="list-style-type: none"> • Life saving irrigation • Harvest the crop at Physiological maturity • In severe situations convert to fodder purpose • Shading of crops • Mulching • Shelter belts • Establishment of cover crops 	-	-

	<p>Amaravila series Fine mixed (Perumkadavila Block)</p>	<p>Coconut + Tapioca/ other Tubers / Banana / Pepper</p> <p>Banana + Vegetables in low lands</p> <p>Homestead cultivation</p> <p>Rice – Rice- Vegetable/ Pulses</p> <p>Rubber</p>	<ul style="list-style-type: none"> • Water storing pits in the field • Husk burial • Contour terracing 	-	-
	<p>Vellayani series Clayey kaolinitic isohyperthermic (Nemom Block)</p>	<p>Coconut + Tapioca/ other ubers / Banana</p> <p>Rice – Rice- Vegetable/ Pulses</p> <p>Banana + Vegetables in low lands</p> <p>Tapioca</p> <p>Homestead cultivation</p>		-	-
	<p>Trivandrum series clayey- skelal, kaolinitic, isohyperthermic (Kazhakkuttam Block)</p>	<p>Coconut + Tapioca/ other Tubers / Banana</p> <p>Rice – Rice- Vegetable/ Pulses</p> <p>Banana + Vegetables in low lands</p> <p>Homestead cultivation</p>		-	-

	<p>Nedumangadu series, clayey – skela, mixed isohyperthermic. (Nedumangadu Block)</p>	<p>Rubber Coconut + Tapioca/ other Tubers / Banana / Pepper Banana + Vegetables in low lands Homestead cultivation</p>		-	-
	<p>Kallar series Clayey, mixed, isohyperthermic (Vamanapuram Block)</p>	<p>Coconut + Tapioca/ other Tubers / Banana / Pepper Rubber Banana + Vegetables in low lands Homestead cultivation</p>		-	-
	<p>Ponmudi series Fine loamy, mixed, isohperthermic (Vamanapuram Block)</p>	<p>Tea Homestead cultivation Tapioca/ other Tubers / Banana / Pepper</p>			
	<p>Kottur series Gravelly sandy clay- forest (Nedumangadu Block)</p>	<p>Coconut/ Tapioca/ other Tubers / Banana / Pepper Rubber Homestead cultivation</p>			

	Thonnackal series Gravelly sandy loam forest (Thiruvananthapuram Block)	Coconut Tapioca/ other Tubers / Banana/Vegetables / Pepper Homestead cultivation Rubber			
	Vilappil series Fine loamy mixed isohyperthermic	Coconut + Tapioca/ other Tubers / Banana Rice – Rice- Vegetable/ Pulses Banana + Vegetables in low lands Homestead cultivation			

2.1.2 Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall	Amaravila series Kazhakkuttam „ Vellayani „ Trivandrum „ Nedumangadu „ Kallar „ Ponmudi „ Kottur „ Thonnackal „ Vilappil „	Rice based Coconut based Banana based Tubers Vegetables Homesteads Plantations	The third crop of Rice can be skipped and Pulses can be cultivated utilizing available water	Direct seeding, Dapog nurseries and short duration varieties in case third crop of Rice Alternative irrigation methods in case of Banana and Vegetables	RKVY SHM

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Limited release of water in canals due to low rainfall	Amaravila series Kazhakkuttam „ Vellayani „ Trivandrum „ Nedumangadu „ Kallar „ Ponmudi „ Kottur „ Thonnackal „ Vilappil „	Rice based Coconut based Banana based Tubers Vegetables Homesteads Plantaions	Not required	More concentration should be given to conserve the available water. Mulching Shelter beds Selection of more tolerant varieties	NREGS, RKVY

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Amaravila series Kazhakkuttam „ Vellayani „ Trivandrum „ Nedumangadu „ Kallar „ Ponmudi „ Kottur „ Thonnackal „ Vilappil „	Rice based Coconut based Banana based Tubers Vegetables Homesteads Plantaions	Rice single crop	Recharging of wells and ponds, rainwater harvesting, direct sowing, conservation of available water	NREGS RKVY 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	Amaravila series Kazhakkuttam ,, Vellayani ,, Trivandrum ,, Nedumangadu ,, Kallar ,, Ponmudi ,, Kottur ,, Thonnackal ,, Vilappil ,,	Rice based Coconut based Banana based Tubers Vegetables Homesteads Plantations	Not required	Conservation of available water Filling of tanks with rainwater during season	NREGS

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	Amaravila series Kazhakkuttam ,, Vellayani ,, Trivandrum ,, Nedumangadu ,, Kallar ,, Ponmudi ,, Kottur ,, Thonnackal ,, Vilappil ,,	Rice based Coconut based Banana based Tubers Vegetables Homesteads Plantations	Not required	Contour terracing Bunding, rainwater harvesting pits, small check dams, growing more vegetative cover over ground	NREGS

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

Outbreak of pests and diseases due to unseasonal rains	Vegetative stage			Flowering stage	Crop maturity stage
	Rice	Cultivation of resistant varieties, Application of bio-control agents, Use of disease free seeds, Proper seed treatment, Balanced application of fertilizers, Phyto-sanitation.			

Horticulture	
Coffee	Remove dead leaves and twigs which harbor the resting stage of the fungus, Provide proper drainage and spray 1 % BM before the onset of monsoon, Prune the affected branches and protect the new shoots and berry stalks with 0.5% Bordeaux Mixture, Proper shade regulation to avoid sun scalding.
Pepper	Remove and burn all infected plant debris and dead vines along with root system to reduce the build up of the inoculum in the field. Prune the runner shoots or tie back to vines before the onset of monsoon. Prune off the leaves and shoots of vines to a height of 2 feet from the soil. Application of bio-control agents.
Banana	Remove and destroy severely infected and completely dried leaves, Use disease free healthy planting material. Avoid any sort of root injury through intercultural operations or by nematode infestation, Provide better drainage. Remove the pseudostem of plants from the field immediately after harvest as a prophylactic measure to avoid the spread of pseudostem weevil.
Arecanut	Grow cover crops in the garden and apply <i>in situ</i> . Avoid water stagnation in the garden by providing drainage facilities. Prophylactic spray of 1% Bordeaux mixture with stickers once before the onset of south west monsoon followed by second and third applications at 40-45 days interval. Collect and destroy all fallen and infected nuts.
Rubber	Spray 1 % Bordeaux mixture as a prophylactic measure against abnormal leaf fall of rubber. While tapping during rainy season care should be taken to see that the latex in tapping panel is dried in between alternate tapping. This will help to prevent panel dryness.

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Rice	Improve drainage facility		Improve drainage facility, Cultivation of varieties having seed dormancy, Harvest the crop at physiological maturity.	Improve storage facility/ godowns
Horticulture				
Coconut	Improve drainage facility, Cover crops, Strip cropping with fodder grasses, Collection and conservation of rainwater			-do-
Pepper				
Banana				
Arecanut				
Heavy rainfall with high speed winds in a short span				

Rice	Shelter belts, alley cropping, Improve drainage facility		-do-
Horticulture			
Coconut	Propping of Banana plants, Improve drainage facility, shelter belts		-do-
Pepper			
Banana			
Arecanut			
Outbreak of pests and diseases due to unseasonal rains			
Rice	Cultivation of resistant varieties, Application of bio-control agents, Use of disease free seeds, Proper seed treatment, Balanced application of fertilizers, Phyto-sanitation. Planting plants belonging to compositae family will help to increase the population of natural enemies	Harvest the crop at physiological maturity.	Building storage yards in the fields
Horticulture			
Pepper	Remove and burn all infected plant debris and dead vines along with root system to reduce the build up of the inoculum in the field. Prune the runner shoots or tie back to vines before the onset of monsoon. Prune off the leaves and shoots of vines to a height of 2 feet from the soil. Application of bio-control agents.		-do-
Banana	Remove and destroy severely infected and completely dried leaves, Use disease free healthy planting material. Avoid any sort of root injury through intercultural operations or by nematode infestation, Provide better drainage,		-do-
Arecanut	Grow cover crops in the garden and apply <i>in situ</i> . Avoid water stagnation in the garden by providing drainage facilities. Prophylactic spray of 1% Bordeaux mixture with stickers once before the onset of south west monsoon followed by second and third applications at 40-45 days interval. Collect and destroy all fallen and infected nuts.		-do-

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
Rice	Buffer stock of seeds, Preparation of mat nursery, Direct sowing, using short duration varieties	Improving drainage, using varieties tolerant to lodging	Crop insurance, Improving drainage, using varieties tolerant to lodging	Building storage yards and structures in the fields
Horticulture				
Coconut				
Pepper	Widening of natural canals, Cleaning of drainage channels at proper intervals, deepening of ponds and other natural reservoirs, construction of water harvesting pits in big plantations, improving the green surface cover by planting more cover crops, contour terracing, planting of fodder crops on the bunds to provide protection from surface run off and soil erosion. Small check dams will act as a temporary storing structure which reduces chances of flash floods.			
Banana				
Vegetables				
Continuous submergence for more than 2 days				
Rice	Buffer stock of seeds, flood tolerant varieties, improving drainage facilities			
Horticulture				
Coconut				
Pepper	Crop insurance, widening of natural canals, cleaning of drainage channels at proper intervals, deepening of ponds and other natural reservoirs, construction of water harvesting pits in big plantations, improving the green surface cover by planting more cover crops, contour terracing, planting of fodder crops on the bunds to provide protection from surface run off and soil erosion. Small check dams will act as a temporary storing structure which reduces chances of flash floods			
Banana				
Vegetables				
Sea water intrusion				
Rice	Improving drainage facilities, Flood and salinity tolerant varieties in prone areas			

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

Condition	Suggested Contingency measures
Heat wave	NA
Cold wave	NA
Frost	NA
Hailstorm	NA
Cyclone	NA

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder	Fodder can be converted to silage, hay & straw. Bailing technologies to be adopted for proper conservation of fodder. Proper storage of concentrate feeds.	Focus on efficient utilization of existing feed resources. Partially damaged grains not used for human consumption can be used to feed animals but ensure that it is not of substandard quality. Use of preserved and stored silage, hay & straw.	Irrigated fodder production to be encouraged for getting enough fodder. Establishment of feed and fodder banks.
Feeding practices	Provide mineral mixture to overcome loss of reproductive efficiency. Supply feed high in energy and protein.	Feed only for body maintenance and minimum production.	Feed to attain full level of growth and production.
Drinking water	Rain water harvesting should be encouraged.	Stored water can be used and prefer cold water for drinking.	Rain water harvesting should be done. Construction of water troughs to store water.
Management practices	Proper construction or renovation of shed for more ventilation. Planting trees near shed	Keep animals in clean and ventilated sheds; avoid direct sunlight falling on them, less hours of grazing, feed during early morning and late evening.	Renovation of shed
Health and disease management	Vaccination of animals as per schedule	Any mortality due to starvation /opportunistic diseases should be managed effectively with veterinary aid. Periodic health check up in camps should be practiced.	Improve the health status of animal by proper feeding, adopt regular de worming to improve feed intake; vaccination to be done as per scheduled.
Floods			
Feed and fodder	Storage of concentrate feeds and conserved fodder in air tight containers to avoid fungal attack.	Ensure minimal exposure of feed to moisture. Green fodder must be made available from near by areas not affected.	Dry feed and fodder in sunlight.
Feeding practices	Provide balanced feed to animals.	Feed with high quality feed. Ensure that feed is free of fungal toxins.	Include feed additives and mineral mixture in the feed.
Drinking water	Storage of safe and clean drinking water.	Provide wholesome water for drinking. Available water may be chlorinated if possible.	Adopt measures to store clean water.

Management practices	Construction of flood resistant indigenous sheds. Transfer the animals to upland areas.	Keep animals in clean sheds; Keep the shed clean and well ventilated. If needed transfer the animals to upland places which are not affected with flood. Temporary shelter system must be provided at village level. Let loose the animals than tying them to save their lives.	Strengthening of the shed from future disaster.
Health and disease management	District administration should procure and store sufficient medicines to take care of livestock. Vaccinate the animals as per schedule. Keep the animals insured.	Timely intervention of veterinary aid in case of disease outbreak. Sanitation of temporary sheds	Analyze the health status of animals by organising health camps and carry out prophylactic vaccinations against contagious diseases in the area. Prompt disposal of carcasses to prevent epidemics. Deworm with broad spectrum anthelmintics to regain health.
Cyclone			
Feed and fodder	Storage of sufficient quantity of feed and fodder. Identify the availability of dry and green fodder in the nearby villages so as to make arrangements to procure and supply to the affected areas if needed.	Use the conserved fodder. Procure and supply fodder from near by villages.	Assess the availability of feed and fodder stocks in the affected area and plan for procuring feed and green/dry fodder from the neighboring areas.
Drinking water	Storage of sufficient quantity of feed and fodder. Identify the availability of dry and green fodder in the nearby villages so as to make arrangements to procure and supply to the affected areas if needed.	Use the conserved fodder. Procure and supply fodder from near by villages.	Construction of water trough to store water.
Management practices	Safe storage of drinking water.	Provide clean wholesome stored water for drinking	Strengthening of the shed from future calamity. Advise the farmers on the spread of diseases through possible media.
Health and disease management	Watch the cyclone movement and alert the farmers.	Keep the shed clean and well ventilated. Livestock and fodder loss must be assessed and veterinary relief operations must be adopted.	Organise health camps, carry out prophylactic vaccinations against contagious diseases in the area. Prompt disposal of carcasses to prevent epidemics.

2.5.2. Poultry

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Storage of feed ingredients	Store all available feed and feed ingredients for future use	Provide kitchen waste and Vegetable waste to the birds.	Cultivation of maize and other feed ingredients
Drinking water	Storage of clean drinking water in tanks.	Provide clean cold wholesome water	Construction of troughs to store water
Health and disease management	Deworming and Vaccination of birds as per scheduled. Construct clean, well ventilated Coops.	Balanced feed and medicated water should be provided. Veterinary aid should be provided in case of a disease outbreak. Minimize the possibilities of stress.	Proper feeding to improve health. Provide clean coops for shelter.
Floods			
Storage of feed ingredients	Storing of feed and ingredients in air tight rooms to avoid fungal attack	Provide balanced feed. Ensure minimal exposure of feed to moisture.	Feed must be dried in sunlight.
Drinking water	Storage of clean and safe drinking water	Provide wholesome/medicated water	Construction of tanks to store water
Health and disease management	Construction of elevated coops. Vaccination of birds against contagious diseases. If required transfer the birds to safe places	Let loose the birds than tieng them to save their lives. Timely intervention of veterinary aid in case of disease outbreak	Conduct preventive vaccinations against contagious diseases. Prompt disposal of carcasses to prevent epidemics.
Cyclone			
Storage of feed ingredients	Storing of feed and ingredients	Provide feed and clean water	Cultivation of maize and other fodder
Drinking water	Safe storage of drinking water	Provide clean and wholesome water	Construction of troughs to store water
Health and disease management	Procure and store sufficient medicines to take care of the poultry. Vaccination of birds as per scheduled	Immediately after the cyclone hits, veterinary authorities should visit the affected areas and provide necessary treatment	Prompt disposal of carcasses to prevent epidemics.

2.5.3 Fisheries: Not Applicable