State: KERALA

Agriculture Contingency Plan for District: KASARAGOD

1.0 District Agriculture profile					
1.1	**Agro-Climatic/Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	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)	Northern Zone (KE-1)			
	List all the districts or part thereof falling under the NARP Zone	Kasaragod, Kannur and Kozhikode			
	Geographic coordinates of district	Latitude		Longitude	Altitude
		12° 30' 5" N		74° 59' 24" E	20 to 300m above MSL
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Agricultural Research Station, Pilicode, Kasaragod District, Pin 671 353			
	Mention the KVK located in the district	KVK, CPCRI Campus, Kasaragod- 671 353			
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):	2692	87	22nd week month :June	39th week month : November
	NE Monsoon(October-December):	282	15	40th week month : October	46th week month: November
	Winter (January-February)	58	2	-	-
	Summer (March-May)	334	11	-	-
	Annual	3366	115	-	-

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 (Lakh ha)	199.1	5.6	28.6	0.01	12.4	0.02	8.8	2.4	2.5

1. 4	**Major Soils (common names like shallow red soils etc.,)**	**Area ('000 ha)**	**Percent (%) of total**
	Red Soils	146.7	74.8
	Alluvial Soils	16.5	8.4
	Sandy Soil	17.9	9.1
	Sandy loam Soils	14.9	7.6
	Others (specify):		
1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	136.3	106.4
	Area sown more than once	8.8	
	Gross cropped area	145.1	

1.6	**Irrigation**	Area ('000 ha)	
	Net irrigated area	49.5	
	Gross irrigated area	53.8	
	Rainfed area	86.8	
	Sources of Irrigation	**Area ('000 ha)**	**Percentage of total irrigated area**
	Canals	1.5	2.9
	Tanks	12.0	24.2
	Open wells	25.4	51.4
	Bore wells	4.6	9.3
	Lift irrigation	-	-
	Micro-irrigation	0.3	0.6
	Other sources	5.7	11.5
	Total Irrigated Area	49.5	

	Pump sets		
	No. of Tractors		
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsil	(%) area
	Over exploited	1	21.5 Kasaragod Block
	Critical	nil	
	Semi- critical	2	56.6 Kanhangad + Manjeswaram Blocks
	Safe	1	21.8 Neeleswaram Block
	Wastewater availability and use	nil	
	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) 2007-08

1.7	**Major Field Crops cultivated**	**Area ('000 ha)**					
		Kharif		**Rabi**		**Summer**	**Total**
		Irrigated	**Rainfed**	**Irrigated**	**Rainfed**		
	Rice	0.2	2.8	1.9	0.0	0.2	5.2
	Pulses	NIL	NIL	NIL	0.05	0.04	
	Horticulture crops - Fruits	**Total area**					
	Jack	2.2					
	Mango	2.3					
	Banana	2.8					
	Pineapple	0.1					
	Papaya	0.7					
	Tamarind	0.1					
	Horticultural crops - Vegetables	**Total area**					
	Drumstick	0.4					
	Amaranthus	0.05					
	Bitter gourd	0.03					
	Snake gourd	0.01					

	Okra	0.05
	Brinjal	0.04
	Green chillies	0.08
	Little gourd	0.07
	Ash gourd	0.03
	Pumpkin	0.02
	Cucumber	0.2
	Others	0.3
	Medicinal and Aromatic crops	**Total area**
	Lemon grass	0.002
	Medicinal plants	0.01
	Spices	
	Ginger	0.1
	Turmeric	0.1
	Clove	0.04
	Nutmeg	0.1
	Cardamom	0.4

	Plantation crops	**Total area**
	Coconut	57.1
	Rubber	28.2
	Arecanut	15.1
	Cashew	11.7
	Pepper	6.7
	Cocoa	0.1
	Fodder crops	**Total area**
	Fodder grasses	0.1
	Total fodder crop area	0.1
	Grazing land	NA
	Sericulture etc Mulberry	0.001
	Others (Specify) Tobacco	0.03

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	12.4	77.1	89.5
	Crossbred cattle	5.7	48.5	54.2
	Non descriptive Buffaloes (local low yielding)	1.6	1.6	3.2
	Graded Buffaloes	Nil	Nil	Nil
	Goat	11.2	22.8	34.1
	Sheep	Nil	Nil	Nil
	Pig	0.7	0.6	1.3
	Commercial dairy farms (Number)			300

1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**
	Commercial	189	438.080 (Commercial + Backyard)
	Backyard	NA	NA

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)	
	11,121	1535	30	1510	119	8

ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**	**No. of Reservoirs**	**No. of village tanks**
	1858	Nil	265

B. Culture

	Water Spread Area (ha)	**Yield (t/ha)**	**Production ('000 tons)**
i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	3174.0	6.6	21.0
ii) **Fresh water** (Data Source: Fisheries Department)	76.4	2.0	0.2
Others	Nil	Nil	Nil

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)										
	Rice	7.6	2390	4.9	2061	0.3	1934	12.8	2245	-
	Pulses	Nil	Nil	0.04	787	0.03	760	0.1	775	-
Major Horticultural crops (Crops to be identified based on total acreage) Annual production and productivity										
	Coconut	-	-	-	-	-	-	411 million nuts	7108 nuts/ha	-
	Rubber	-	-	-	-	-	-	32.5	1289	-
	Arecanut	-	-	-	-	-	-	34.5	2137	-
	Cashew	-	-	-	-	-	-	16.5	1008	-
	Pepper	-	-	-	-	-	-	1.9	282	-
	Banana	-	-	-	-	-	-	24.6	7727	-
	Mango	-	-	-	-	-	-	15.8	6300	-

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	**Rice**	**Pulses**	**Vegetables**
	Kharif - Rainfed	2nd Fortnight of April to 1st fortnight of June	-	1st Fortnight of June to 2nd Fortnight of June
	Kharif-Irrigated	-	-	-
	Rabi- Rainfed	2nd Fortnight of August 1st Fortnight of September	2nd Fortnight of October to 1st fortnight of November	-
	Rabi-Irrigated	1st Fortnight of September to 2nd Fortnight of September	-	2nd fortnight of October to 1st Fortnight of November
	Summer- Irrigated	2nd Fortnight of December to 2nd Fortnight of January	2nd Fortnight of December to 2nd Fortnight of January	2nd Fortnight of December to 2nd Fortnight of January

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)Tea mosquito bug 2) Coconut mite, Red palm weevil, Rhinocerous beetle 3) Banana Pseudo Stem Weevil, Rhizome weevil 4) Root grub 5) Mango and Cashew Stem Borer 6) Gall fly, Brown Plant Hopper, Coried bug 7)Rice blast and Sheath blight diseases, Rice bug, Leaf roller 8) Coconut Stem bleeding, Bud rot disease and Ganoderma wilt 9) cashew inflorescence blight	✓		
	Others Vegetables Viral disease, Damping off Amaranthus Leaf spot Fruit fly, White Fly Banana Sigatoka Mealy bugs (Papaya, Vegetables) Pumpkin Caterpillar Pepper, Foot rot, Pollu beetle Viral diseases			

	Animals Monkey Wild boar Peacock Elephant	 ✓ ✓

1.14	**Include Digital maps of the district for 10 years 2000 to 2009**	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: No
		Soil map as Annexure 3	Enclosed: No

ANNEXURE 1: Location map of Kasaragod

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	Arathil Series (Gravelly clay loam soils)	Cashew Coconut Rubber	No change	• Agronomic practices like fertilizer application, opening of basins: delayed for 2 weeks • Mulching of the entire field for moisture conservation • Other moisture conservation practices like mulching of basins • Husk Burial • Rain water harvesting pits • Life saving irrigation	Improved varieties by KAU, CPCRI and Dept. of Agriculture. land development activities and agronomic measures through National Rural Employment Guarantee Scheme (NREGS), National Food Security Mission (NFSM)
	Meeyanganam Series (clay to clay loamy soils)	Coconut Rubber Pepper	No change	-do-	-do-
		Banana	No change	Mulching organic manuring Sprinkler Irrigation	Micro Irrigation Scheme and RKVY Delay monsoon planting
	Edanad Series (Moderately shallow clay loam to sandy clay loam soils)	Cashew Coconut Pepper	No change	• Agronomic practices like fertilizer application, opening of basins: delayed for 2 weeks • Mulching of the entire field for moisture conservation • Other moisture conservation practices like • Mulching of basins • Husk Burial • Rain water harvesting pits • Life saving irrigation	Improved varieties by KAU, CPCRI and Dept. of Agriculture. land development activities and agronomic measures through National Rural Employment Guarantee Scheme (NREGS), National Food Security Mission (NFSM),

		Banana	No change	Mulching organic manuring Sprinkler Irrigation	Micro Irrigation Scheme and RKVY
	Thekkila Series (Clay to clay loam soils)	Rice-Rice Rice-Vegetables Rice- Maize/Sweet potato Arecanut	No change	Direct seeding of for the first crop	No Scheme required
				• Agronomic practices like fertilizer application, opening of basins: delayed for 2 weeks • Mulching of the entire field for moisture conservation • Other moisture conservation practices like • Mulching of basins • Husk Burial • Rain water harvesting pits • Life saving irrigation	-do-
	Payalam series(Clay)	Coconut Areca nut Pepper Rubber Cashew	No change	-do-	Improved varieties by KAU, CPCRI and Dept. of Agriculture. land development activities and agronomic measures through National Rural Employment Guarantee Scheme (NREGS), National Food Security Mission

	Kolathur series (Rock out crop)	Cashew Coconut	No change	• Agronomic practices like fertilizer application, opening of basins: delayed for 2 weeks • Mulching of the entire field for moisture conservation • Other moisture conservation practices like • Mulching of basins • Husk Burial • Rain water harvesting pits • Life saving irrigation	-do-

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 (Specify month)	Arathil Series (Gravelly clay loam)	Cashewnut Coconut Rubber	No change	• Agronomic practices like fertilizer application, opening of basins: delayed for 4 weeks • Mulching of the entire field for moisture conservation • Other moisture conservation practices like • Mulching of basins • Husk Burial • Rain water harvesting pits • Life saving irrigation. • Stopping the tapping. • Harvesting of tender coconut, removal of older leaves of coconut, mulching around basins. • Organic farming, • Antitranspirants to young plants.	-do-

	Meeyanganam Series (clay to clay loamy	Coconut Rubber Pepper	No change	• Agronomic practices like fertilizer application, opening of basins: delayed for 4 weeks • Mulching of the entire field for moisture conservation • Other moisture conservation practices • Mulching of basins • Husk Burial • Rain water harvesting pits • Life saving irrigation • Covering the whole wine with planted coconut leaves, Kaolin spray.	-do-
		Banana	No change	Mulching Organic manuring. Covering psuedostem with older leaves, pitcher irrigation. Drip Irrigation	Micro Irrigation Scheme and RKVY
	Edanad Series (Moderately shallow clay loam to sandy clay loam)	Cashew Coconut Pepper	No change	• Agronomic practices like fertilizer application, opening of basins: delayed for 4 weeks • Mulching of the entire field for moisture conservation • Other moisture conservation practices • Mulching of basins • Husk Burial • Rain water harvesting pits and measures • Life saving irrigation	Improved varieties by KAU, CPCRI and Dept. of Agriculture. land development activities and agronomic measures through National Rural Employment Guarantee Scheme(NREGS), National Food Security Mission
		Banana		Mulching organic manuring Drip irrigation.	Micro Irrigation Scheme and RKVY
	Thekkila Series (Clay to clay loam)	Rice-Rice Rice-Vegetables Rice- Maize/Sweet potato Areca nut	No change	Direct seeding, Irrigate at 1 to 4 days after disappearance of ponded water	NREGS

	Palayam series (Clay	Coconut Arecanut Pepper Rubber Cashew	No change	Agronomic practices like fertilizer application, opening of basins: delayed for 4 weeks Mulching of the entire field for moisture conservation Other moisture conservation practices like Mulching of basins Husk Burial Rain water harvesting pits and measures Life saving irrigation	Improved varieties by KAU, CPCRI and Dept. of Agriculture. land development activities and agronomic measures through National Rural Employment Guarantee Scheme (NREGS), National Food Security Mission
	Kolathur series (Rock out crop	Cashew Coconut	No change	-do-	-do-

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 3rd week)	NA				

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 (July 3rd week)	NA				

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.	Thekkila Series (Clay to clay loam soils)	Rice-Rice Rice-Vegetables Rice- Maize/Sweet potato	Resowing with short duration varieties. Delay exceeding 3–4 weeks, Irrigate at 1 to 4 days after disappearance of ponded water	Application of P and K as basal, Reduce N dose, Apply bulky organic manures.	No scheme required

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 6 weeks rainless (>6.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Arathil Series (Gravelly clay loam soils)	Cashew Coconut Rubber	Weeding, Make Shelterbelts, Establishment of leguminous cover crop, Shading the young plants, white washing the main stem, Antitranspirant spray	Zero tillage, Mulching, Sub-surface storing of ground water, Less exploitation of ground water, Drip irrigation, Terracing, Husk burial, leaf cutting	
	Meeyanganam Series (clay to clay loamy soils)	Coconut Rubber Pepper Banana	-do-	-do-	
	Edanad Series (Moderately shallow clay loam to sandy clay loam soils)	Cashew Coconut Pepper Banana	-do-	-do-	

	Thekkila Series (Clay to clay loam soils)	Rice-Rice Rice-Vegetables Rice- Maize/Sweet potato Areca nut	Weeding, Make Shelterbelts, spraying potassium chloride, thinning of 33–50% population , anti-transpirant spray	Irrigate at 1 to 4 days after disappearance of ponded water, Insitu rainwater conservation, Application of P and K as basal, Reduce N dose, Apply bulky organic manures. Collection and conservation of rain water, Intermittent flooding, maintaining the soil in sub-saturated condition, alternate drying and wetting.	
	Payalam series (Clay)	Coconut Areca nut	Weeding, Make Shelterbelts, Establishment of leguminous cover crop, Shading the young plants, white washing the main stem, Anti-transpirant spray	Zero tillage, Mulching, Sub-surface storing of ground water, Less exploitation of ground water, Drip irrigation, Terracing, Husk burial, leaf cutting.	
		Pepper Rubber Cashew			
	Kolathur series (Rock out crop)	Coconut Cashew			

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 6 weeks rainless (>6.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At flowering/ fruiting stage	Arathil Series (Gravelly clay loam)	Cashew Coconut Rubber	Formation of Shelterbelts. Antitranspirant spray	Irrigate at 1 to 4 days after disappearance of ponded water, Insitu rainwater conservation, Collection and conservation of rain water, Intermittent flooding, maintaining the soil in sub-saturated condition, alternate drying and wetting.	
	Meeyanganam Series (clay to clay loamy	Coconut Rubber Pepper Banana	-do-	-do-	
	Edanad Series (Moderately shallow clay loam to sandy clay loam	Cashew Coconut Pepper Banana	-do-	-do-	
	Thekkila Series (Clay to clay loam	Rice-Rice Rice-Vegetables Rice- Maize/Sweet potato	Sprinkler irrigation (especially for coffee and pepper), Suppresses weed growth, Formation of Shelterbelts, Antitranspirant spray	Mulching, Sub-surface storing of ground water, Less exploitation of ground water, Drip irrigation, Terracing	

		Areca nut	Formation of Shelterbelts. Antitranspirant spray	Irrigate at 1 to 4 days after disappearance of ponded water, Insitu rainwater conservation, Collection and conservation of rain water, Intermittent flooding, maintaining the soil in sub-saturated condition, alternate drying and wetting.	
	Payalam series(Clay)	Coconut Arecanut Pepper Rubber Cashew			
	Kolathur series (Rock out crop)	Coconut Cashew	Formation of Shelterbelts. Antitranspirant spray		
Condition			**Suggested Contingency measures**		
Terminal drought	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
	Arathil Series (Gravelly clay loam)	Cashew Coconut Rubber	Establishment of leguminous cover crop, Shading, Pruning of coffee, Antitranspirant spray	Sub-surface storing of ground water, Less exploitation of ground water, Drip irrigation, Terracing, Husk burial, leaf cutting.	
	Meeyanganam Series (clay to clay loamy	Coconut Rubber Pepper Banana			
	Edanad Series (Moderately shallow clay loam to sandy clay loam soils)	Cashew Coconut Pepper Banana			
	Thekkila Series (Clay to clay loam	Rice-Rice	Terminate the irrigation 14 to 17 days before harvest, Harvesting at physiological maturity,	Maintaining the soil in sub-saturated condition, alternate drying and wetting.	
		Rice-Vegetables			
		Rice- Maize/Sweet potato			
		Areca nut	Establishment of leguminous	Sub-surface storing of	

	Payalam series(Clay)	Coconut Areca nut Pepper Rubber Cashew	cover crop, Shading, Pruning of coffee, Antitranspirant spray,	ground water, Less exploitation of ground water, Drip irrigation, Terracing, Husk burial, leaf cutting.	
	Kolathur series (Rock out crop)	Coconut Cashew			

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	NA				

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	NA				

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	NA				

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	NA				

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	Coconut	Mono cropping	-	Reduce frequency of irrigation Mulching with dried leaves Husk burial Mulching of the entire field for moisture conservation Other moisture conservation practices Micro-irrigation. Tree planting.	Drip and sprinkler irrigation may be practiced
		Intercropping	-	Reduce frequency of irrigation Mulching with dried leaves Husk burial Mulching of the entire field for moisture conservation Other moisture conservation practices Micro-irrigation Drought tolerant crops as intercrops	-
	Banana	Mono cropping	-	Mulching, Spraying anti-transpirants Covering the plant with dried leaves Reduce frequency of irrigation	-

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**
Rice	Improve drainage facility	Improve drainage facility	Improve drainage facility, Cultivation of varieties having seed dormancy, Harvest the crop at physiological maturity.	Improve storage facility/ godowns
Horticulture				
Coconut	Provide proper drainage, Cover crops, Strips cropping with fodder grasses, Collection and conservation of rainwater, Delay harvest			Improve storage facility/ godowns. Use of Copra dryers, use of dryers
Pepper				
Banana				
Arecanut				
Heavy rainfall with high speed winds in a short span				
Rice	Improve drainage facility, Shelter belts, alley cropping.			Improve storage facility/ godowns
Horticulture				
Coconut	Provide proper drainage	Propping of Banana, Improve drainage facility, shelter belts,		Improve storage facility/godowns . Use of Copra Dryers Use of dryers
Pepper	Provide proper drainage Provide wind breaks			
Banana	Propping, Provide wind breaks			
Cashew	Deep planting			
Vegetable	Proper drainage, Provide wind breaks			
Arecanut	Improve drainage facility, shelter belts			

Outbreak of pests and diseases due to unseasonal rains				
Rice	Adopt prophylactic and curative measures, Cultivation of resistant varieties, Application of bio-control agents, Use of disease free seeds, Proper seed treatment, Balanced application of fertilizers, Phyto-sanitation.		Harvest the crop at physiological maturity	Improve storage facility. Control measures against post harvest diseases Storage facility in cold storage
Horticulture				
Coconut	Prophylactic and Control measures against bud rot and red palm weevil			
Pepper	Prophylactic and Control measures against Foot rot. 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.	Application of control measures against fungal pollu using Bordeaux mixture 1% and Copper oxy chloride fungicides	Application of control measures against Pollu	
Cashew		Control measures against TMB attack as per POP schedule		
Banana	Control measures against Sigatoka. 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,	Control measures against Sigatoka	Control measures against Sigatoka	
Vegetables	Control measures against fungal infections of vegetables.		Control measures against foot rot, anthracnose and other fungal infections	
Arecanut	Grow cover crops in the garden and apply *in situ*. 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.			

2.3 Floods

Condition	Suggested contingency measures			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Rice	River embankments, Improve drainage facility, scientific and proper land utilization, cultivation flood tolerant varieties, Crop insurance		Spray NaCl Early harvest	Harvest the crop at physiological maturity, Cultivation of varieties having seed dormancy
Horticulture				
Coconut	Proper drainage. Drench soil with Bordeaux Mixture for pepper, Timely cleaning, de-silting and deepening of natural water reservoir and drainage channels, Construction and protection of all the flood protection embankments, ring bunds and other bunds. Dams and levees can also be constructed which can be used as temporarily storing space which reduces the chances of lower plains getting flooded.			
Cashew				
Pepper				
Banana				
Arecanut				
Continuous submergence for more than 2 days				
Rice	Cultivation flood tolerant varieties, Crop insurance, Improve drainage facility			
Horticulture	Timely cleaning, de-silting and deepening of natural water reservoir and drainage channels, Construction and protection of all the flood protection embankments, ring bunds and other bunds. Dams and levees can also be constructed which can be used as temporarily storing space which reduces the chances of lower plains getting flooded.			
Coconut				
Pepper				
Banana				
Arecanut				
Sea water intrusion				

Coconut	• Reduction of soil salinity by copious irrigation • Cultivation on mounds for providing way for leaching of salts • Sea Wall protection, • Mangrove forest establishment • establishment of bioshield • Prophylactic spraying of Bordeaux Mixture	Reduction of soil salinity by copious irrigation	Reduction of soil salinity by copious irrigation	Paddy land conservation for general reduction of sea water intrusion

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone: Not applicable in Kasargod District

Extreme event type	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave	**Not applicable**			
Cold wave				
Frost				
Hailstorm				
Cyclone				

Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Feed and fodder availability	Promote utilization of unconventional feed ingredients and tree fodders, Effective utilization of slurry , storage of feed and fodder ,	Provide vitamin supplements	Management of nutritional disease and special care on reproduction
Drinking water	Storage of drinking water	Careful utilization of water	
Health and disease	Vaccination and regular de-worming	Feed supplements (Vitamins and	

management		minerals, vitamin B complex, A and D_3)	
Floods			
Feed and fodder availability	Harvesting and proper storage of existing fodder	Proper drainage to prevent spoilage of fodder (Earthing up and drainage)	
Drinking water	Protection of water source from flood	Quality inspection Waterborne diseases	
Health and disease management	Preventive vaccinations	Treatment to control the disease	Management of disease
Cyclone	**No such situations occurred so far in Kasaragod district**		
Feed and fodder availability			
Drinking water			
Health and disease management			
Heat wave and cold wave			
Shelter/environment management	Planting of protective trees for shade purpose, install sprinklers/fans, proper animal spacing should be provided,	Use of fans, sprinkler, provide clean drinking water, vitamin supplementation	
Health and disease management	Vaccination/ regular de-worming, protect against stress borne diseases like HS pneumonia etc	Protect young /neonatal livestock from exposure to direct cold /hot winds	

2.5.2 Poultry

	Suggested contingency measures			**Convergence/linkages with ongoing programs, if any**
	Before the event	**During the event**	**After the event**	No programmes or schemes have taken up in Kasaragod District. A disaster

Drought				management committee has been formed at district level by Animal Husbandry Dept. However, No programmes or schemes have taken up in Kasaragod District
Shortage of feed ingredients	Store feed ingredients import if needed	Import feed ingredients, reduce population size		
Drinking water	Develop various water storage mechanism like rain water harvesting	Reduce population size		
Health and disease management	Standard health and disease management practices may followed	Stress management using vitamins, minerals etc.	Standard health and disease management practices may followed	
Floods				
Shortage of feed ingredients	Construct flood resistant feed storages	Import feed in case of shortage	Check feed quality for fungus and toxins	
Drinking water	Construct above ground level water tanks	Check water quality	Check for water quality for TDS, Micro biological quality	
Health and disease management	Standard health and disease management practices may followed	Stress management using vitamins, minerals etc.	Standard health and disease management practices may followed	
Cyclone				
Shortage of feed ingredients	Cyclones are not a problem in Kasaragod district			
Drinking water				
Health and disease management				
Heat wave and cold wave				
Shelter/environment management	Planting of protective trees for shade purpose, install sprinklers and fans	Use of fans, sprinklers		
Health and disease management	Standard health and disease management practices may	Provide clean drinking water, vitamins,	Standard health and disease management practices may	

	followed	electrolytes, ice. Reduce housing density	followed	

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine	Not applicable	Support for fisher men community	Support for fisher men community
Inland			
(i) Shallow water depth due to insufficient rains/inflow	Early harvest and disposal	Support the farmers. Storage of Brooder stock.	Intensive culture operations
(ii) Changes in water quality	Early harvest and disposal	Support the farmers. Storage of Brooder stock	Intensive culture operations
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Promote short term culture species. Early harvest and disposal	Support the farmers. Storage of Brooder stock. Soil treatment, river water pumping wherever feasible	Intensive culture operations Controlled release of brooder stock
(ii) Impact of salt load build up in ponds / change in water quality	NA	NA	Not applicable
2) Floods			
A. Capture			
Marine	NA	NA	NA
Inland	Usual practices may be followed	Replace suitable gears for flood situation	--
(i) Average compensation paid due to loss of human life	--	Rupees 3 lakhs insurance coverage for accidental death while fishing.	Compensation to be paid by Fisheries Department.
(ii) No. of boats / nets/damaged		2 – 3 boats per year	Compensation to be paid by Fisheries

			Department.
(iii) No.of houses damaged		100 – 150 houses damaged per year	Compensation to be paid by Fisheries Department.
(iv) Loss of stock	Loss of stock due to change in water quality – due to oxygen depletion because of algal bloom during post monsoon	Loss of stock due to change in water quality – due to oxygen depletion because of algal bloom during post monsoon	Drainage and Cleaning of flood water and replacing new stocks.
(v) Changes in water quality			
(vi) Health and diseases			
B. Aquaculture			
(i) Inundation with flood water	Mussel culture is usually observed in some parts of Kasaragod District	Flood not seen during culture period which falls during post monsoon period	
(ii) Water continuation and changes in water quality		Change in water with respect to colour, odor observed during flood season for a week which is a temporary phenomenon. No special measure is need	
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)		Growth retardation seen during continued flood situations.	
(v) Infrastructure damage (pumps, aerators, huts etc)		Damages to raft are seen. No special measures recommended	
3. Cyclone / Tsunami			
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives		Not applicable	
(ii) Avg. no. of boats / nets/damaged		Nets, raft losses. 5 – 6 families	

		affected	
(iii) Avg. no. of houses damaged		Damages observed. Number not available	
Inland			
B. Aquaculture		No affected so far in Kasaragod District from Cyclone or tsunami	
(i) Overflow / flooding of ponds			
(ii) Changes in water quality (fresh water / brackish water ratio)			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)			
4. Heat wave and cold wave			
A. Capture	NA		
Marine			
Inland			
B. Aquaculture			
(i) Changes in pond environment (water quality)		Slight changes in water quality due to increased water temperature may affect growth of mussels	
(ii) Health and Disease management		--	