State: KERALA

Agriculture Contingency Plan for District: WAYANAD

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)	Central Zone (KE-3) Northern Zone (KE-1)			
	List all the districts or part thereof falling under the NARP Zone	Wayanad, Trissur, Ernakulam, Palakkad, Malappuram			
	Geographic coordinates of district	Latitude		Longitude	Altitude
		11° 27' and 15° 58'		75°47' and 70° 27'	700-1200 msl
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RARS, Ambalavayal, Wayanad, Kerala Pin- 673593			
	Mention the KVK located in the district	Krishi Vigyan Kendra, Ambalavayal, Wayanad, Pin- 673593			
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):	1230	82	June first week	September second week
	NE Monsoon(October-December):	321	20	October First week	November second week
	Winter (January- February)	72	2		
	Summer (March-May)	269	20		
	Annual	1892	124		

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 (‘000ha)	212.9	78. 7	10. 0	0.04	1. 03	0	0.2	1. 8	1. 0

1. 4	**Major Soils (common names like shallow red soils etc.,)**	**Area (‘000 ha)**	**Percent (%) of total Geographical area**
	Sandy clay loam soils	115. 2	55.0
	Clay loam soils	49. 0	23.4
	Sandy clay soils	28. 2	13.5
	Sandy loam soils	10. 5	5.0
	Clay soils	5. 0	2.4
	Loamy sand soils	1. 5	0.7
1.5	**Agricultural land use**	**Area (‘000 ha)**	**Cropping intensity % (GCA/NSA)**
	Net sown area	117.9	180%
	Area sown more than once	94.4	
	Gross cropped area	212.3	

1.6	**Irrigation**	Area (‘000 ha)
	Net irrigated area	10.3
	Gross irrigated area	117.9
	Rainfed area	111.9

	Sources of Irrigation	Number	Area (000ha)	Percentage of total irrigated area
	Canals		1.2	11.06
	Tanks	-	0.2	1.5
	Open wells	-	0.1	0.8
	Bore wells	-	0.04	0.3
	Lift irrigation	-	0.4	3.8
	Micro-irrigation	-	-	-
	Other sources	-	9.0	82.5
	Total Irrigated Area	-	**10.9**	-
	Pump sets	-	-	-
	No. of Tractors	-	-	-
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	
	Over exploited	Nil		
	Critical	Nil		
	Semi- critical	One	36.4%	
	Safe	Two	63.6%	
	Wastewater availability and use			
	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)**					
			Kharif		**Rabi**		**Summer**	**Total**
			Irrigated	**Rainfed**	**Irrigated**	**Rainfed**		
	1	Rice			5.9	3.5	2.9	12.4
	2	Pulses					0.3	0.3

		Horticulture crops - Fruits	**Total area**
	1	Banana	12.8
	2	Jack	12.4
	3	Mango	5.6
	4	Plantain	1.7
	5	Cashew	1.3
	6	Other fruits	0.5
		Horticultural crops - Vegetables	**Total area**
	1	Elephant foot yam	3.1
	2	Tapioca	2.6
	3	Drumstick	0.7
	4	Pumpkin	0.2
	5	Bitter gourd	0.1
	6	Ash gourd	0.1
	7	Other vegetables	0.5
		Medicinal and Aromatic crops	**Total area**
	1	Ginger	7.3
	2	Turmeric	0.4
	3	Lemon Grass	0.3
		Plantation crops	**Total area**
	1	Coffee	67.4
	2	Arecanut	12.7
	3	Coconut	11.5
	4	Rubber	8.1
	5	Tea	5.8
	6	Pepper	4.5
		Fodder crops	**Total area**
	1	Fodder Grass	0.3
		Total fodder crop area	-
		Grazing land	-
		Sericulture etc	0.3
		Others (Specify)	-

1.8	Livestock	Male (‘000)	Female (‘000)	Total (‘000)
	Non descriptive Cattle (local low yielding)	12.8	33.2	46.1
	Crossbred cattle	14.2	106.3	120.5
	Non descriptive Buffaloes	8.6	3.8	12.4
	Graded Buffaloes	-	-	-
	Goat	18.6	51.8	70.4
	Sheep	-	-	3.0
	Pig	-	-	11.8
	Commercial dairy farms (Number)			NA

1.9	**Poultry**	**No. of farms**	**Total No. of birds (‘000)**
	Commercial		8301.1
	Backyard		

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)	
	Nil	**Nil**	**Nil**	**Nil**	**Nil**	**Nil**

ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**	**No. of Reservoirs**	**No. of village tanks**
	2179	**2**	**Nil**

B. Culture

		Water Spread Area (ha)	Yield (t/ha)	Production (‘000 tons)
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	**Nil**	**Nil**	**Nil**
	ii) **Fresh water** (Data Source: Fisheries Department)	65	2.5	0.1625
	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		-	-	23.1	2495	7.6	2963	30.7	2729	-
Major Horticultural crops (Crops to be identified based on total acreage)										
Coffee		-	-	-	-	-	-	49.0	727.1	-
Pepper		-	-	-	-	-	-	9.8	235.9	-
Coconut		-	-	-	-	-	-	44.9*	3906*	-
Arecanut		-	-	-	-	-	-	5.6	441	-
Tea		-	-	-	-	-	-	12.9	2229.6	-
Rubber		-	-	-	-	-	-	6.2	1077	-

Ginger	-	-	-	-	-	-	23.4	3217.1	-
Banana	-	-	-	-	-	-	95.2	7410	-

* Yield in Million nuts and productivity in number of nuts per hectare

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	Rice	Ginger	Banana
	Kharif- Rainfed	-	March/April to Jan/Feb	April/May to Dec/Jan
	Kharif-Irrigated	-	-	-
	Rabi- Rainfed	June/July to Dec/Jan	-	-
	Rabi-Irrigated		-	August/Sept to July/August
	Summer	Jan/Feb to May/June	-	-

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		✓	
	Floods	✓		
	Cyclone			✓
	Hail storm		✓	
	Heat wave			✓
	Cold wave			✓

	Frost			✓
	Sea water intrusion			✓
	Pests and diseases (specify)	✓		
	Wildlife	✓		

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 3rd Week)	Battuvady Series-Sandy clay loam soils	Rice-Rice	No change	Direct seeding of Rice for the first crop	-
		Rice-Vegetables	No change		
		Rice - Sesamum	Rice - Sesamum + Cowpea		
	Pulpally Series Clay loam soils	Coffee	No change	Mulching Buck organic manuring Sprinkler Irrigation	RKVY
		Pepper			
		Arecanut + Coffee+ Pepper			
		Coconut-+Coffee +Pepper			
	Mananthavady Series	Coffee			RKVY
		Pepper			

	Sandy clay soils	Coffee+ Pepper			
		Coconut+ Coffee +Pepper			
		Arecanut + Coffee+ Pepper			
	Sulthan bathery Series Sandy loam	Coffee			
		Pepper			RKVY
		Coconut +Pepper			
		Coffee+ Pepper			
	Periya Series Sandy clay loam	Coffee		Mulching Buck organic manuring	RKVY
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 1st Week)	Battuvady Series- Sandy clay loam soils	Rice-Rice	No change	Direct seeding, Irrigate at 1 to 4 days after disappearance of stagnant water	NREGS
		Rice-Vegetables	No change		
		Rice- Sesamum	Rice- Sesamum +Cowpea		
	Pulpally Series Clay loam soils	Coffee	No change	Mulching, Bulk organic manuring, Collection and conservation of rainwater, Make the field weed free, Desilting, repairing and renovation of irrigation channels.	RKVY NREGS
		Pepper			
		Arecanut + Coffee+ Pepper			
		Coconut-+Coffee +Pepper			
	Mananthavady Series Sandy clay soils	Coffee			
		Pepper			
		Coffee-Pepper			
		Coconut-+Coffee +Pepper			
		Arecanut + Coffee+ Pepper			
	Sulthan bathery Series Sandy loam soils	Coffee			
		Pepper			
		Coconut +Pepper			
		Coffee+ Pepper			

	Periya Series Sandy clay loam soils	Coffee	No change	Mulching, Buck organic manuring, Make the field weed free, Collection and conservation of rainwater, Micro Irrigation	Micro Irrigation Scheme and RKVY
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)	Battuvady Series- Sandy clay loam soils	Rice-Rice	Prefer short duration upland varieties	• Direct seeding of Rice, Rainwater storage in farm tank or ponds, Drought tolerant varieties, • Irrigate at 1 to 4 days after disappearance of ponded water	NREGS, RKVY, BRGF
		Rice-Vegetables	No change		
		Rice- Sesamum	Rice- Sesamum +Cowpea		
	Pulpally Series Clay loam soils	Coffee	No change	• Mulching, • Bulk organic manuring, • Sprinkler Irrigation • Collection and conservation of rainwater, • Make the field weed free, Desilting, repairing and renovation of irrigation channels, Sub surface storing of ground water, Husk burial, Provide life saving irrigation, Effective reclining of used water	Micro Irrigation Scheme and RKVY NREGS
		Pepper			
		Arecanut + Coffee+ Pepper			
		Coconut-+Coffee +Pepper			
	Mananthavady Series Sandy clay soils	Coffee			
		Pepper			
		Coffee-Pepper			
		Coconut-+Coffee +Pepper			
		Arecanut + Coffee+ Pepper			
	Sulthan bathery Series Sandy loam soils	Coffee			
		Pepper			
		Coconut +Pepper			
		Coffee+ Pepper			

	Periya Series Sandy clay loam soils	Coffee			

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.	Battuvady Series-Sandy clay loam soils	Rice-Rice	Dry spell 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.	-
		Rice-Vegetables			
		Rice- Sesamum			

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 measure**	**Remarks on Implementation**
At vegetative stage	Battuvady Series-Sandy clay loam	Rice-Rice	Suppresses weed growth, Make Shelterbelts, spraying potassium chloride**,** thinning of 33–50% population	• Irrigate at 1 to 4 days after disappearance of ponded water, • Insitu rainwater conservation,	

		Rice-Vegetables	Anti-transpirant spray	• 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.	
		Rice- Sesamum			
	Pulpally Series Clay loam soils, Mananthavady Series Sandy clay soils and Sulthan bathery Series Sandy loam	Coffee	• 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.	
		Pepper			
		Arecanut-+Coffee+ Pepper			
		Coconut+Coffee+Pepper			
At flowering/ fruiting stage	Battuvady Series- Sandy clay loam soils	Rice-Rice	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.	
		Rice-Vegetables			
		Rice- Sesamum			
	Pulpally Series Clay loam soils Mananthavady Series Sandy clay soils and Sulthan bathery Series	Coffee	• Sprinkler irrigation (especially for coffee and pepper) • Weeding • Formation of Shelterbelts,	Mulching, Sub-surface storing of ground water, Less exploitation of ground water, Drip irrigation, Terracing,	
		Pepper			
		Arecanut+ Coffee+Pepper			

	Sandy loam soils	Coconut+ Coffee+Pepper	• Antitranspirant spray		
Terminal drought	Battuvady Series- Sandy 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- Sesamum			
	Pulpally Series Clay loam,/ Mananthavady Series Sandy clay and Sulthan bathery Series Sandy loam	Coffee	• 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.	
		Pepper			
		Arecanut- Coffee-Pepper			
		Coconut- Coffee-Pepper			

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	Battuvady Series- Sandy clay loam soils	Rice-Rice	Rice (SD)-Rice	Mulching, Strip cropping Selection of suitable cropping systems	NREGS
		Rice-Vegetables	Rice(SD)-Vegetables		

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	Battuvady Series-Sandy clay loam soils	Rice-Rice	Rice (SD)-Rice	Mulching, Strip cropping, , Increase spacing	NREGS, RKVY
		Rice-Vegetables	Rice(SD)-Pulses		

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	Battuvady Series-Sandy clay loam soils	Rice-Rice	Rice (single crop)/Pulses	Rain water harvesting, Direct sowing, Delayed sowing	NREGS, RKVY
		Rice-Vegetables			

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	Battuvady Series-Sandy clay loam soils	Rice-Rice	Rice-Rice	Check dams, Percolation pits, Rain water harvesting, Water conservation measures	NREGS, RKVY
		Rice-Vegetables	Rice-Vegetables		

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,	Improve storage facility/godowns

			• Harvest the crop at physiological maturity.	
Horticulture				
Coffee	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			Improve storage facility/godowns
Horticulture				
Coffee	Propping of banana plants, Improve drainage facility, shelter belts			-do-
Pepper				
Banana				
Arecanut				

Condition	**Suggested contingency measure**			
Outbreak of pests and diseases due to unseasonal rains	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Rice	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
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% BM, 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 buildup 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	
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			Harvest the crop at physiological maturity, Cultivation of varieties having seed dormancy
Horticulture				
Coffee	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.			
Pepper				
Banana				
Arecanut				
Continuous submergence				

for more than 2 days	
Rice	Cultivation flood tolerant varieties, Crop insurance, Improve drainage facility,
Horticulture	
Coffee	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.
Pepper	
Banana	
Arecanut	

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

Condition	**Suggested contingency measures**
Heatwave	NA
Coldwave	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 availability	Feed can be stored and fodder converted to silage & hay	Fodder converted to silage and Hay can be used. Straw also can be used for feeding.	When rain starts fodder cuttings can be planted and seed can be sown for getting enough fodder.
Drinking water	Storage of water in tanks	Stored water can be used and cold water used for drinking	Rain water harvesting should be done.
Health and disease management	Vaccination of animals Planting of trees should be done around the shed	Shed should be clean. Allow cool air to flow inside shed. Proper ventilation of shed.	Construction of sheds with proper ventilation-cleaning of shed everyday.

Floods			
Feed and fodder availability	Storage of feed and fodder in air tight containers fungal attack.	Feeding good quality feed and fodder with	Feed and fodder - dry in sunlight
Drinking water	Storage of clean drinking water	Provide hot water for drinking	Storage of clean water - digging of wells.
Health and disease management	Provide balanced feed and vaccination of animals at proper time.	Provide dry atmosphere for the sheds.	Mineral mixture feed additives should be given.
Cyclone			
Feed and fodder availability	Storage of feed and fodder	Use the conserved fodder.	Provide balanced feed and fodder
Drinking water	Storage of water	Provide clean water for drinking	Construction of tanks for storing water

Health and disease management	Vaccination of animals	Provide balanced feed and other feed additives	Provide clean sheds for animals
Heat wave and cold wave	When heat wave is more cold water spraying. When cold wave is more light full covering of shed.		
Shelter/environment management	Construction of sheds with proper ventilation. Planting trees around sheds.	And feed additives can be given	Dung should be removed from pits. Cleaning of surroundings.
Health and disease management	Vaccination providing adequate feed for animals	Mineral mixture and feed additives can be given	Proper feeding of 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				
Storage of feed ingredients	Storing of feed and ingredients	Provide kitchen waste and feed additives	Cultivation of maize and other feed ingredients	Can be linked with ATMA, NREGS, RKVY

		vitamin mineral mixtures		
Drinking water	Storage of clean drinking water	Provide cold clean water	Digging of bore wells for drinking water	
Health and disease management	Vaccination of birds	Medicated water and Balanced feed should be given	Provide clean coops for shelter	
Floods				
Storage of feed ingredients	Storing of feed and ingredients	Provide balanced feed	Cultivation of maize and fodder	
Drinking water	Storage of clean drinking water	Provide clean water	Construction of tanks and wells	
Health and disease management	Vaccination of birds	Provide medicated water and feed additives	Provide clean coops for shelter	
Cyclone				
Storage of feed ingredients	Storing of feed and ingredients	Provide feed and clean water	Cultivation of maize and other fodder	
Drinking water	Storage of water	Provide clean feed and water	Construction of wells	
Health and disease management	Vaccination of birds	Medicated water and feed additives	Provide clean shelter	
Heat wave and cold wave				
Shelter/environment management	Planting of trees around shed. Exhaust fan should be fitted on the hoof.	Put gunny bags dipped water in the direction of wind.	Provide proper ventilation	Can be linked with ATMA, NREGS, RKVY
Health and disease management	Vaccination of birds. Provide water and feed	Close the door and ventilation when cold wind comes, during day and night	Provide clean coops and balanced feed	