State: Uttarakhand

Agriculture Contingency Plan: District: Nainital

1.0	**District Agriculture profile**			
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region	Western Himalayas, Warm Subhumid (To Humid With Inclusion Of Perhumid) Eco-Region. 14.5		
	Agro-Climatic Region (Planning Commission)	West Himalayan Region (I)		
	Agro Climatic Zone (NARP)	Zone -1 , Hill Zone		
	List all the districts falling under the NARP Zone	Haridwar, Nainital, Almora, Bageshwar, Champawat, Pithoragarh, Pauri, Tehari, Uttarkashi, Dehradun, Chamoli, Rudraprayag		
	Geographic Coordinates of	Latitude	Longitude	Altitude
		29º00’ and 29º05’ North Latitude	80º14’ and 78º80’ East Longitude	1,938 meter
	Name and address of the concerned ZRS/ZARS/ RARS/RRS/ RRTTS	Dr A K Singh, Zonal Project Director, GT Road, Rawatpur, Near Vikas Bhawan, Kanpur 0512-2550927(O)		
	Mention the KVK located in the district	Dr. Dr. V. K. Doharey, KVK, Jeolikote, Distt.- Nainital-263135, Phone No 05942-224547, 7500241504, 09412966838, email: kvknainital@rediffmail.com,vijaydoharey@gmail.com		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Dr H S Kushwaha, Professor, Agro meteorology, GBPUA&T, Pantnagar-263145 U S Nagar (UK) India		

1.2	**Rainfall**	**Average (mm)**	**Normal Onset (week and month)**	**Normal Cessation (week and month)**
	SW monsoon (June-Sep):	1522.3	3rd week of June	3rd week of September
	NE Monsoon(Oct-Dec):	95.1	4th week October	4th week of December
	Winter (Jan- March)	133.8		
	Summer (Apr-May)	80.0		
	Annual:	1831.2		

1.3	**Land use pattern of the district**	Total geographical area	Forests	Land under non-agri.use	Permanent pastures	Land under misc. tree crops & groves	Barren & uncultivable land	Current fallow	Other fallows
	Area ('000 ha)	406.12	298.37	9.83	0.12	21.82	22.2	2.51	1.77

http://nainital.nic.in/files/pdf/statmagzine2011.pdf

1. 4a	**Description of Soils**	**Area ('000 ha)**	**% Area**
	Medium deep, loamy soils		
	Medium deep, loamy-skeletal soils		
	Deep loamy soils		
	Total Area		

1. 4b	**Major Soil types**	Area ('000 ha)	% Area
	Brown Forest Soil		
	Red to Dark soil		
	Black Clay		

1.5	**Sown area ('000 ha)**		
	Net sown area	47.81	Cropping intensity %
	Area sown more than once	26.91	156.3
	Gross cropped area	74.72	

http://nainital.nic.in/files/pdf/statmagzine2011.pdf

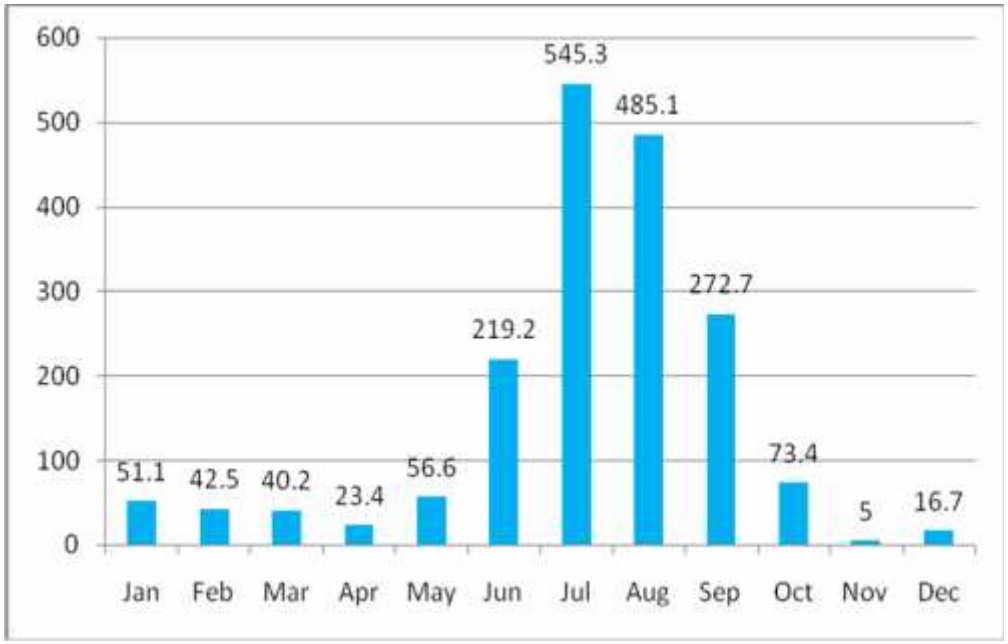
1.6	**Irrigation**	Area ('000 ha)			Percent	
	Gross irrigated area	41.7			55.8%	
	Net irrigated area	27.7			57.9%	
	Rainfed area	20.1			42.0%	
	Sources of irrigation	**Canals**	**Tanks & other minor irrigations**	**Open Wells**	**Borewell/tube wells**	**Others**
	Area ('000 ha)	20.51			6.78	0.4
	Percent	74.07%			24.48 %	1.4 %

http://nainital.nic.in/files/pdf/statmagzine2011.pdf

1.7	**Area under major field crops (000 ha)**	**Kharif**		**Rabi**		**Summer**		**Total**
	Crop	Total	Irrigated	Total	Irrigated	Total	Irrigated	
	Wheat	--	-	23.9	18.3	-	-	23.9
	Rice	13.2	11.9	-	--	0.1	0.1	13.3
	Soybean	5.0	0.06	-	-	-	-	5.0
	Maize	4.4	0.03	-	-	-	-	4.4
	Sugarcane	-	-	--	-	4.0	4.0	4.0
	Potato	-	-	3.8	0.15	-	-	3.8
	Barnyard millet	0.9	-	-	-	-	-	0.9
	Barley	-	-	0.9	0.1	-	-	0.9
	Lentil	-	-	0.8	0.2	-	-	0.8
	Mustard	-	-	0.7	0.44	-	-	0.7
	Gram	-	-	0.3	0.3	-	-	0.3
	Pea	-	-	0.1	0.06	-	-	0.1
	Horticulture crops	**Area ('000 ha)**						
	Fruits	**Total**		**Irrigated**		**Rainfed**		
	Mango	3.0						
	Litchi	1.1						
	Citrus	2.2						
	Peach	5.7						
	Pear	1.8						

Annexure 01 : Location map of the Uttarakhand state and district Nainital

Annexure 02 : Mean annual rainfall (mm) of district Nainital



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[a]**	**Normal Crop / Cropping system[b]**	**Change in crop / cropping system[c] including variety**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 2 weeks 1st week of July	Rain fed lower hills	**Cropping system 1:** Rice- Wheat	Normal Crop / Cropping system can be followed. varieties like PD-6,VL-81, VL-82, VL-85 may be included	Soaking seed with water before sowing. Increase seed rate	Supply of seeds through TDC/ NSC Seed given by under RKVY Supply of seeds through TDC/ NSC/ VPKAS Supply of potato seeds through state Hort. dept.
		Cropping system 2: Soybean- Wheat	Normal Crop / Cropping system can be followed Soybean: PS-1092, PS-1241,PS-1024, PS-1225,VLS-47	Line sowing. Seed treatment with culture	
		Cropping system 3: Maize-wheat	Maize + Soybean – Wheat Maize- Naveen, Sartaz	One row of soybean in between two rows of Maize	
	Rain fed mid hill	**Cropping system 1:** Upland Rice- Wheat	Rice can be replaced by horse gram or soybean Horse gram: Local, VLG-1 Soybean – PRS-1, PS-1225	Water conservation measures like terrace bunding and drainage of excess water.	
		Cropping system 2: French bean -Wheat	Frenchbean Frenchbean: Pant Anupma, VL bean- 2	-	
	Rain fed High hills	**Cropping system 1:** Finger millet- wheat	Delayed sowing of Finger millet VLM-324, VLM-149	maintain the population by uprooting and transplanting plants with in the field	
		Cropping system 2: Potato-Wheat	Delayed sowing of potato Potato: Kufri Jyoti, Kufri Giriraj, Kufri Himalani	-	

Condition			**Suggested Contingency measures**		
Early season drought	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**

Delay by 4 weeks 3rd week of July	Rain fed lower hills	**Cropping system 1:** Rice- Wheat	Rice can be replace by grain cowpea/ bhindi/ corriander Cowpea- Pusa Komal, lobia- 1042 Bhindi- Prabhani kranti, Pusa Sawani Coriander: Pant Haritima	Overnight Seed soaking with water before sowing. Control measure for white fly in cowpea by 0.2% monocrotophos.	Supply of seeds through TDC/ NSC/ VPKAS Seed given by under RKVY
		Cropping system 2: Soybean- Wheat	Soybean can be replace by grain cowpea/ bhindi/ corriander Cowpea- Pusa Komal, lobia- 1042 Bhindi- Prabhani kranti, Pusa Sawani Coriander: Pant Haritima	Overnight Seed soaking with water before sowing. Control measure for white fly in cowpea by 0.2% monocrotophos	
		Cropping system 3: Maize-wheat	Maize can be replaced by grain cowpea/ bhindi/ corriander Cowpea- Pusa Komal, lobia- 1042 Bhindi- Prabhani kranti, Pusa Sawani Coriander: Pant Haritima	Overnight Seed soaking with water before sowing. Control measure for white fly in cowpea by 0.2% monocrotophos	
	Rain fed mid hills	**Cropping system 1:** Upland Rice- Wheat	Upland Rice can be replaced by horse gram or Buck wheat Horse gram: Local, VLG-1 Buck wheat: PRB-3	Water conservation measures like terrace bunding and drainage of excess water.	
		Cropping system 2: French bean -Wheat	Frenchbean can be replaced by bhindi/ corriander Cowpea- Pusa Komal, lobia- 1042 Bhindi- Prabhani kranti, Pusa Sawani Coriander: Pant Haritima	-	Seed given by under RKVY
	Rain fed High hills	**Cropping system 1:** Finger millet- wheat	Delayed sowing of Finger millet VLM-324, VLM-149	maintain the population by uprooting and transplanting plants with in the field	Supply of seeds through TDC/ NSC/ VPKAS
		Cropping system 2: Potato-Wheat	Potato can be replaced by vegetable pea PSM-3, VLM-10, VLM-7	-	Supply of potato seeds through state Hort. dept.
Condition			**Suggested Contingency measures**		
Early season drought (delayed	**Major Farming**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**

onset)	**situation[a]**				
Delay by 6 weeks (~~2nd~~ 1st week of Aug)	Rain fed Lower hills	**Cropping system 1:** Rice- Wheat	Rice can be replaced by grain cowpea/ bhindi/ corriander Cowpea- Pusa Komal, lobia- 1042, lobia-1111 Bhindi- Prabhani kranti, Pusa Sawani Coriander: Pant Haritima	Overnight Seed soaking with water before sowing. Control measure for white fly in cowpea by 0.2% monocrotophos.	Supply of seeds through TDC/ NSC/ VPKAS Seed given by under RKVY
		Cropping system 2: Soybean- Wheat	Soybean can be replace by grain cowpea/ bhindi/ corriander Cowpea- Pusa Komal, lobia- 1042, lobia-1111 Bhindi- Prabhani kranti, Pusa Sawani Coriander: Pant Haritima	Overnight Seed soaking with water before sowing. Control measure for white fly in cowpea by 0.2% monocrotophos	
		Cropping system 3: Maize-wheat	Maize can be replaced by grain cowpea/ bhindi/ corriander Cowpea- Pusa Komal, lobia- 1042, lobia-1111 Bhindi- Prabhani kranti, Pusa Sawani Coriander: Pant Haritima	Overnight Seed soaking with water before sowing. Control measure for white fly in cowpea by 0.2% monocrotophos	
	Rain fed Mid hills	**Cropping system 1:** Upland Rice- Wheat	Upland Rice can be replaced by horse gram / Buck wheat Horse gram: Local, VLG-1 Buck wheat: PRB-3	Water conservation measures like terrace bunding and drainage of excess water.	
		Cropping system 2: French bean -Wheat	French bean can be replaced by coriander / Radish/ Veg. Pea Coriander: Pant Haritima Radish : Dunagiri gol Veg.pea; PSM-3, VLM-10	-	
	Rain fed High hills	**Cropping system 1:** Finger millet- wheat	Finger millet can be replaced by Rajmash/ radish Rajmash: VL-63 Radish : Dunagiri gol	Ridge sowing	
		Cropping system 2: Potato-Wheat	Potato can be repaced by Rajmash/ radish Rajmash: VL-63 Radish : Dunagiri gol	Ridge sowing	
Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**

Delay by 8 weeks (~~4th~~ 3rd week of Aug)	Rain fed Lower hills	**Cropping system 1:** Rice- Wheat	Rice can be replaced by French bean/ Bhindi / corriander Frenchbean: Pant Anupma, VL bean- 2 Bhindi: Pusa sawni, VL Bhindi-1 Coriander- Pant Haritima	Ridge bed sowing	Supply of seeds through TDC
		Cropping system 2: Soybean- Wheat	Soybean can be replaced by French bean/ Bhindi / corriander Frenchbean: Pant Anupma, VL bean- 2 Bhindi: Pusa sawni, VL Bhindi-1 Coriander- Pant Haritima		
		Cropping system 3: Maize-wheat	Maize can be replaced by French bean/ Bhindi / corriander Frenchbean: Pant Anupma, VL bean- 2 Bhindi: Pusa sawni, VL Bhindi-1 Coriander- Pant Haritima		
	Rain fed Mid hills	**Cropping system 1:** Upland Rice- Wheat	Upland rice can be replaced by veg. pea/ Veg. rye/cow pea/ radish Veg. Pea: PSM-3, VLM-10 Cow pea: Pant lobia-1 Veg. rai: Hathi Kan, Jhurmuri Radish: Dunagiri local, Japani white, Pusa Himani	Ridge sowing Inter culture operation	
		Cropping system 2: French bean -Wheat	French bean can be replaced by veg. pea/ Veg. rye/cow pea/ radish Veg. Pea: PSM-3, VLM-10 Cow pea: Pant lobia-1 Veg. rai: Hathi Kan, Jhurmuri Radish: Dunagiri local, Japani white, Pusa Himani		
	Rain fed High hills	**Cropping system 1:** Finger millet- wheat	Finger millet can be replaced by Rajmash/ radish/ Veg. Pea/ Veg. Rye Rajmash: VL-63 Veg. Pea: PSM-3, VLM-10 Veg. Rye: Hathi Kan, Jhurmuri Radish: Dunagiri local, Japani white, Pusa Himani	Ridge sowing	
		Cropping system 2: Potato-Wheat	Potato can be repaced by Rajmash/ radish/ Veg. Pea/ Veg. Rye Rajmash: VL-63 Veg. Pea: PSM-3, VLM-10	Ridge sowing	

			Veg. Rye: Hathi Kan, Jhurmuri Radish: Dunagiri local, Japani white, Pusa Himani		

2.1.2 Irrigated situation

Condition			**Suggested Contingency measures**		
	Major Farming situation[f]	**Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Delayed release of water in canals due to low rainfall.	Bhabhar area, sandy clay with gravels, highly percolating soils, Zn deficient along with N PK. Flat lands, boring is not possible due to hard rocks.	• Rice - wheat • Rice – toria/yellow sarsoon -wheat • Rice – Lentil • Rice – vegetable pea – sugarcane- ratoon- wheat • Soybean- Wheat- Moong	• DSR / SRI – vegetable pea – green gram • DSR – autumn cane + vegetable pea/ garlic/ potato- ratoon – wheat • DSR – lentil/ gram/mustard/field pea • Urd/ cowpea/ green gram – wheat –green gram • DSR - Zero till wheat	Use of sprinkler irrigation, Furrow irrigation, intercultural operations, Mulching, Crop planting on raised beds like wheat, Land leveling	Vegetables (cucumber), Cowpea

2.2 Un-timely (un-seasonal) rains

Condition	**Suggested contingency measure**			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage[k]**	**Flowering stage[l]**	**Crop maturity stage[m]**	**Post harvest[n]**
Rice	Improve drainage, N top dressing & foliar spray of 0.5%Zn. Uprooting of weeds. management of insect & pest	Improve drainage , N top dressing. management of insect & pest	Improve drainage , management of insect & pest	Store the produce under shed and dry using artificial sources like large fans
Wheat	Improve drainage, N top dressing	Improve drainage, N top dressing	Remove excess water	Store the produce under shed
Sugarcane	Improve drainage, N top dressing, earthing up	Propping and tying, Drainage	Removing of lower dead leaves ie. Detrashing of lower leaves	Keep produce on dry place and cover with trash or tripal
Soybean	Intercultural operations	Two Foliar spray of 0.1 %B	Safe removal of excess	Keep produce at dry

		before flowering and at pod setting stage. management of insect & pest	water	place.
Lentil	Drainage excess water. Intercultural operations.	2% spray of urea before flowering	Safe removal of excess water	Keep produce at dry place
Horticulture				
Mango	Remove excess water	30-40 ppm NAA/ 10 – 20 ppm 2 4 D spray, to improve fruit set	Ethylene spray to advance the maturity	Store at cool dry ventilated place, avoid heaping, Package in wooden boxes
Litchi	Remove excess water	30-40 ppm NAA/10 – 20 ppm 2 4 D spray, , to improve fruit set	Ethylene spray to advance the maturity	Conditioned fruits in cool dry ventilated place and package in cart board boxes
Guava	-	30-40 ppm NAA spray, , to improve fruit set	-	Wipe out the excess moisture with muslin cloth and Package in wooden boxes
Heavy rainfall with high speed winds in a short span[2]				
Horticulture				
Mango	• Planting of wind breaks on east and west sides (pre- planning) • Staking of saplings during pre bearing phase • Selection of dwarf varieties			
Litchi	• Planting of wind breaks on east and west sides (pre- planning) • Staking of saplings during pre bearing phase			
Guava	• Staking of saplings during pre bearing phase			
Outbreak of pests and diseases due to unseasonal rains				
Rice	Zn spray, Insecticide application	Remove excess water, delay N top dressing	Remove excess water	Dry the produce up to 14% moisture,
Wheat	Remove excess water	Remove excess water, fungicide spray	Remove excess water	Dry the produce up to 12-14% moisture,

Sugarcane	Remove excess water, Insecticide application	Remove older leaves	Remove excess water	-
Vegetable pea	Insecticide application, remove excess water	Fungicide spray for downy mildew	Remove excess water	-
Potato	M-45 spray for early blight	M-45 spray for early blight	Remove excess water	Store in cold storage
Horticulture				
Mango	-	For Powdery mildew Control- spray of wettable sulphur		
Litchi	-	-do-	-	
Guava	-	-		

2.3 Floods, (not applicable)

Condition	**Suggested contingency measure[o]**			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Crop1 (specify)				
Horticulture				
Crop1 (specify)				
Continuous submergence for more than 2 days[2]				
Crop1				
Horticulture				
Crop1 (specify)				
Sea water inundation[3]				
Crop1				

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone (For Bhabhar Area)

Extreme event type	Suggested contingency measure[r]			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave[p]				
Wheat			Light and frequent irrigation at evening hours, N topdressing	
Sugarcane	Light irrigation, Intercultural operations	Frequent irrigation	Light and frequent irrigation at evening hours,	
Mustard			Light and frequent irrigation at evening hours,	
Mango	• Planting of wind breaks on east and west sides (pre- planning) • Frequent irrigations	Frequent irrigations	Frequent irrigations	
Litchi	• Planting of wind breaks on east and west sides (pre- planning) • Frequent irrigations	Frequent irrigations	Frequent irrigations	
Guava	• Planting of wind breaks on east and west sides (pre- planning) • Frequent irrigations	Frequent irrigations	Frequent irrigations	
Cold wave[q]				
Wheat		Light irrigation, N top dressing		Not common
Vegetable pea		Sprinkler irrigation, hormone spray		do
Potato		Light irrigation, N top dressing		do
Mustard		Light irrigation		do
Horticulture				
Mango	Planting of wind breaks on east and west sides (pre- planning) Smudging/smoking	Smudging/smoking	Smudging/smoking	
Litchi	Planting of wind breaks on east and west sides (pre- planning) Smudging/smoking	Smudging/smoking	Smudging/smoking	

Guava	Planting of wind breaks on east and west sides (pre- planning) Smudging/smoking	Smudging/smoking	Smudging/smoking	
Frost				
Wheat	Not common	Light irrigation, smoke	Not common	Not common
Potato	do	Light irrigation, smoke	do	do
Vegetable pea	do	Sprinkler irrigation, smoke	do	do
Mustard	do	Light irrigation	do	do
Horticulture				
Mango	• Planting of wind breaks on east and west sides (pre- planning) • Thatching with straw • Frequent irrigations • Smudging/smoking	• Thatching with straw • Frequent irrigations • Smudging/smoking	• Frequent irrigations • Smudging/smoking	
Litchi	• Planting of wind breaks on east and west sides (pre- planning) • Thatching with straw • Frequent irrigations • Smudging/smoking	• Thatching with straw • Frequent irrigations • Smudging/smoking	• Frequent irrigations • Smudging/smoking	
Guava	• Planting of wind breaks on east and west sides (pre- planning) • Thatching with straw • Frequent irrigations	• Frequent irrigations	• Frequent irrigations	
Hailstorm				
Rice	Replanting and gap filling as per severity	N top dressing		Early harvesting and disposal of produce
Wheat	Re-sowing (short duration variety) / gap filling as per severity	N top dressing		Early harvesting and disposal of produce
Sugarcane	Gap filling and N top dressing	Earthing, N top dressing, Tying	Tying	
Vegetable pea	Hormone spray	Hormone spray	Early picking	
Potato	N top dressing/ Earthing up	Earthing up	Remove upper portion	
Horticulture				
Mango			Anti hailstorm net	Anti hailstorm net
Litchi			Anti hailstorm net	Anti hailstorm net
Guava			Anti hailstorm net	Anti hailstorm net
Cyclone				

Horticulture

2.4 Extreme events: Heat wave/ Cold wave/ Frost/ Hailstorm/ Cyclone (Hill condition)

Extreme event type	Suggested contingency measure			
	Seedling/ nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat wave	-	-	-	
Upland rice	-			
Transplanted rice	Light irrigation	Irrigation		
Finger millet	-	Irrigation		
Horticulture				
Fruit crop	Irrigation in the evening hours	Irrigation and mulching in tree basin	Mulching in tree basin	
Veg crop (Tomato, Capsicum, Caulifower etc.)	Irrigation	Life saving irrigation in evening hours	-	
Cold wave				
Horticulture				
Frost				
Wheat	-	Light irrigation, Smoking around the field		
Oilseed		Light irrigation, Smoking around the field		
Pulse		Light irrigation, Smoking around the field		
Horticulture				
Veg pea		Light irrigation and spray of karathane 1 ml/lt water in January		
Potato		Light irrigation and two spray of Indofill M-45		
Mango		Light irrigation, Smoking around the orchard during Jan. in evening hour.		
Hailstorm				
Horticulture				

Apple			Cover the tree with hail net	
Pear			Cover the tree with hail net	
Peach			Cover the tree with hail net	
Plum			Cover the tree with hail net	
Cyclone	NA	NA	NA	NA
Horticulture				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event[s]	**During the event**	**After the event**
Drought			
Feed and fodder availability	Preparation of compact feed block for Storage. Establishing fodder banks at block levels. Plantation of perennial grass/fodder crops for livestock. on bunds, wasteland and penchant land on community basis.	Use of compact feed block for feeding animals From fodder bank reserves. Utilizing fodder from perennial trees. Use of feed mixture while feeding the animals.	• Building up fodder bank reserves. • Planning of fodder crop for plantation in wastelands, punchiest lands or in irrigated lands.
Drinking water	Preserving water in the tanks. Provision of conventional house, With plantation nearby, good ventilation.	Using water from preserves. Using ground water resources for maintains community in drinking water supply.	Continue rain water harvest. Use of water treatments for cleaning of water
Health and disease management	Ensure regular health checkup of animals to check incidences of any disease annoy live stocks. Veterinary preparedness with medicines and vaccines and using mobile vans. Identification and recording in	Organization of animal health camp and distribution of medicine in case of outbreak of any epidemic. Awareness Campaigns for farmers to judge general health of animals	camps to judge health status of animals. Segregation of introduction sick/animals. Discarding of unproductive animals. Culling of sick animals.
Floods	Growing water logging resistant fodder plants and trees.	Ensuring proper supply of the fodder to the livestock	Planning of fodder crop for plantation wastelands, punchiest lands or in irrigated lands
Feed and fodder availability	Planning appropriate ignore streusel for fodder bank as well as for holding animals hers.	Holding thawed livestock at appropriate place for proper claming of the place holding animal herds to privet out break	Maintenance of infrastructure. Expansion in physical .

		of diseases.	
Drinking water	Preparation of overhead water reservoirs. Installation of appropriate channels for distastes ablution of clean drinking water	Using of chambers for prosing & feeding animals with clean drinking water.	Cleaning of water. Water treatment
Health and disease management	Preparedness with medicines & vaccines for checking the spread of water borne diseases Identification and recorded of information on indigenous/alternative medicines for water brogue diseases. Preparation of vaccination schedules	Regular checking of animal herds for invoice g any disease to prevent out break of any epidemic Vaccination of animals . Treatment of disease affected animals .	Organization Segregate Discarding of animals
Cyclone			
Feed and fodder availability			
Drinking water			
Health and disease management			
Heat wave and cold wave			
Shelter/environment management	Proper infrastructure planning and construction for preparedness & towards adverse conditions. Identification of the alternatives for modifying existing infrastructures according to environmental conditions and their communications to farmers.	Effective impanation of plans for environment might doting adverse conditions.	Maintenance of infrastructure. Evaluation of implemented plans & modifying existing plans.
Health and disease management	Veterinary preparedness in term of vaccines & medicine stocking . Planning for mobile services of sick animals through vans. Identifivtion of indigenous/ herbal /alternative medicines from local resources for use during adverse conditions.	Organization of healthy camps for. Vaccination . Treatment of the animals. Awareness among the farmers on general health	Health camps for establishing health status of live animals. Segregation of animas . Discarding. animals Culling animals

[s] based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
Drought			
Shortage of feed ingredients	Establishing of feed reserve banks. Identifying alterative feed ingredients and their storage. Identifying sources for procurement of feed in case of acute shortage.	Utilizes feed from reserves. Ensuring supply of feed by procumbent from adjudge areas. Portman from adjuring area.	Building up of though emptied reserves.
Drinking water	Building infrastructure for water harvesting and building up water reservoirs.	Supply of clean drinking water from reservoir.	Clearing of warder reservoir. Water treatment to ensure clean & safe water.
Health and disease management	Minting the health profile of poultry. Vet. pureness with medicines vaccination to bird duds during enrages	Campaign for creation awaking for proper vaccination of birds . Mass vaccination. Treatment of disease	Animal camp for Judging the health profile of birds. Segregation treatment of affected birds.
Floods			
Shortage of feed ingredients	Stabilization of feed reserve banks. Identifying alternative feed ingrains & there stringy	Utilizing feed from reserves. Ensuing supply of feed by procure meant from adjuring areas.	Building up used up reservoirs for future.
Drinking water	Building information for over storage of water. Treatment of water to ensure clean and safe water for birds.	Utilizing water from overhead reservoirs.	Cleaning of tanks. Treatment of waters
Health and disease management			
Cyclone			
Shortage of feed ingredients	Planning of makeshift alternation adjustment in existing intrastate. Building infrastructure for prevention of birds from drawing.	Implementation of makeshift altermentive adjustment in existing infrastructures. Shifting birds to neuter crested structure	Maintenance of existing of structure. Expansion of prevention infrastructure
Drinking water			
Health and disease management	Minting the health profile of poultry. Vet. pureness with medicines vaccination to bird duds during enrages	Campaign for creation awaking for proper vaccination of birds . Mass vaccination. Treatment of disease	Animal camp for Judging the health profile of birds. Segregation treatment of affected birds.
Heat wave and cold wave			
Shelter/environ	Proper planning for infrastructure alternation .in	Effective implementation of plans for	Maintains of infrastructure.

ment management	existing structures during extreme condition and their communication to bird rear.	interior environment during heat and cold wave.	Evaluation of implemented phase altering the existing plans.
Health and disease management	Maintain health profile of birds though regular check up. Planning of mobile veterinary van.	Organization of camps for Vaccination. Treatment of birds. General health status of the birds	Health camp to establish health status of living birds. Culling of the infected birds.

2.5.3 Fisheries

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
Drought			
Shallow water in ponds due to insufficient rains /inflows	Water harvesting structures with rain water impounding from catchment areas Keep a deeper portion as a refuge pond/depression/trench preferably at lower side of pond	Up to 50% of pond surface area may be covered with floating algae like azolla to reduce evaporation. Water to supplement at least 20% of the impoundment of pond to safeguard the stocked fish biomass may be arranged if available. Partial or complete fish harvesting may be done in extreme conditions to reduce the density & stress.	Water harvesting structures with rain water impounding from catchment areas; watershed development planning and implementations with focus on renovation and de-silting of pond
Heat wave and Cold wave			
Management of pond environment	Water exchange	Water exchange up to 50%	Water level maintenance and quality checking
Health and disease management	Preventive measures	Liming and $KMNO_4$ treatment	Liming and stock treatment