

State: Uttarakhand
Agriculture Contingency Plan for District: Haridwar

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone	Northern Plain, Hot Subhumid (Dry) Eco-Region (9.1)		
	Agro-Climatic Region (Planning Commission)	West Himalayan Region (I)		
	Agro Climatic Zone (NARP)	Hill Zone (UP-1)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	U.S.Nagar, Haridwar, Nainital, Almora, Bageshwar, Champawat, Pithoragarh, Pauri, Tehari, Uttarkashi, Dehradun, Chamoli, Rudrapur		
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Zonal Project Directorate, Zone IV, Indian Council of Agricultural Research, G T Road, Rawatpur Near Vikas Bhawan, Kanpur-208 002. Ph: 0512-2533560, 2554746		
	Mention the KVK located in the district with address	Dr. Purushottam Kumar, Krishi Vigyan Kendra, Dhanauri, Haridwar, Uttarakhand : Mob 9411177299, Email: kvkharidwar@gmail.com		
	Geographic coordinates of district	Latitude	Longitude	Altitude (m)
		29.58N	78.10 E	230
Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Indian Institute of Technology, Roorkee Haridwar, Uttarakhand			

Rainfall (Since 2000 - 2009)	Average (mm)	Normal onset	Normal cessation
SW monsoon (June – Sep)	905	3 rd week of June	
NE Monsoon (Oct – Dec)	46		
Winter (Jan – Feb)	70		
Summer (March – May)	35		
Annual	1054		

1.3	Land use pattern of the district	Geographical Area	Cultivable area (Give net cultivable area)	Forest area	Land under non-agricultural use	Permanent Pastures and other grazing land	Cultivable wasteland	Land under misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows

	Area ('000ha)	243.1	118.4	84.5	27.4	0.06	1.7	1.7	2.7	2.7	3.7
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*(Source: District Haridwar Statistical Report 2009-10)

1.4	Major Soils		Area ('000 ha)	Percent (%) of total
	Forest soils			
	Sandy calcareous soils		231.1	51.2
	Banger soils			
	Khaddar soils			
	Marshy/Petri forest soils			

* Mention color, depth and texture (heavy, light, sandy, loamy, clayey etc) and give vernacular name, if any, in brackets (data source: Soil Resource Maps of NBSS & LUP, estimated values)

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	118.4	136.3
	Area sown more than once	43.0	
	Gross cropped area	160.9	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	108.1		
	Gross irrigated area	155.3		
	Rainfed area			
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		13.1	12.1%
	Tanks			
	Open wells			
	Tube wells	26976	92.8	85.7%
	Lift irrigation			
	Other sources		2.3	2.1%
	Total			
	Pump-sets			
	Micro-irrigation			

No. of Tractors			
Groundwater availability and use* (Data source: State/Central Ground water Department /Board)		(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
Over exploited			
Critical			
Semi- critical			
Safe		22	Good

1.7 Area under major field crops & horticulture

Major Field Crops cultivated		Area ('000 ha)*				
		Kharif		Rabi		Total
		Irrigated	Rainfed	Irrigated	Rainfed	
Rice	17.1				17.1	
Wheat				48.3	48.3	
Lentil				0.6	0.6	
Groundnut	1.1				1.1	
Mustard				0.8	0.8	
Horticulture crops - Fruits		Irrigated	Rainfed		Total area	
Stone fruits					0.2	
Citrus fruits					1.3	
Mango					5.2	
Litchi					1.5	
Others					5.8	
Horticultural crops - Vegetables		Irrigated	Rainfed		Total area	
Potato					1.5	
Cabbage					0.5	
Tomato					0.6	
Cauliflower					0.4	
Brinjal					0.2	
Peas					0.3	
Other vegetables					0.6	
Medicinal and Aromatic crops		Irrigated	Rainfed		Total area	
Plantation crops		Irrigated	Rainfed		Total area	

	Fodder crops	Irrigated	Rainfed	Total area
	Total fodder crop area			
	Grazing land			
	Sericulture etc			

1.8 Livestock status

1.8	Livestock	Number ('000)
	Indigenous	102.3
	Crossbreed	25.7
	Buffalo	268.5
	Sheep indigenous	2.1
	Sheep crossbreed	0.125
	Goats	21.3
	Horses	1.6
	Pigs indigenous	12.8
	Pigs crossbreed	3.1
	Poultry	63.3

1.9	Poultry
	Commercial
	Backyard

1.10	Inland Fisheries	Area ('000 ha)	Yield (t/ha)	Production (tones)
	Brackish water			
	Fresh water (Riverine)			
	Others (commercial farming)			

1.11 Production and Productivity of major crops (Average of last 5 years: 2005-2010)

Crops	Kharif		Rabi		Summer		Total	
	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity	Production ('000 t)	Productivity	Production ('000 t)	Productivity (kg/ha)
Rice	28.7	2150					28.7	2150
Wheat			109.1	2590			109.1	2590
Lentil			0.3	450			0.3	450

Groundnut	0.5	490					0.5	490
Mustard			0.6	910			0.6	910
Major Horticultural crops								
Stone fruits							0.6	49264
Citrus fruits							5.4	40646
Mango							23.6	45689
Litchi							3.9	26540
Sugarcane							4665.5	623
Potato							6.4	295

Source:www.usnagar.nic.in

1.12	Sowing window for 5 major crops (start and end of sowing period)	Rice	Wheat	Lentil	Mustard	Groundnut
	Kharif- Rainfed					2 nd week of June to 3 rd week of July
	Kharif-Irrigated	2 nd week of June to 2 nd week of July				
	Rabi- Rainfed					
	Rabi-Irrigated		2 nd week of November to 4 th week of December	October to November	2 nd week of October to 2 nd week of November	

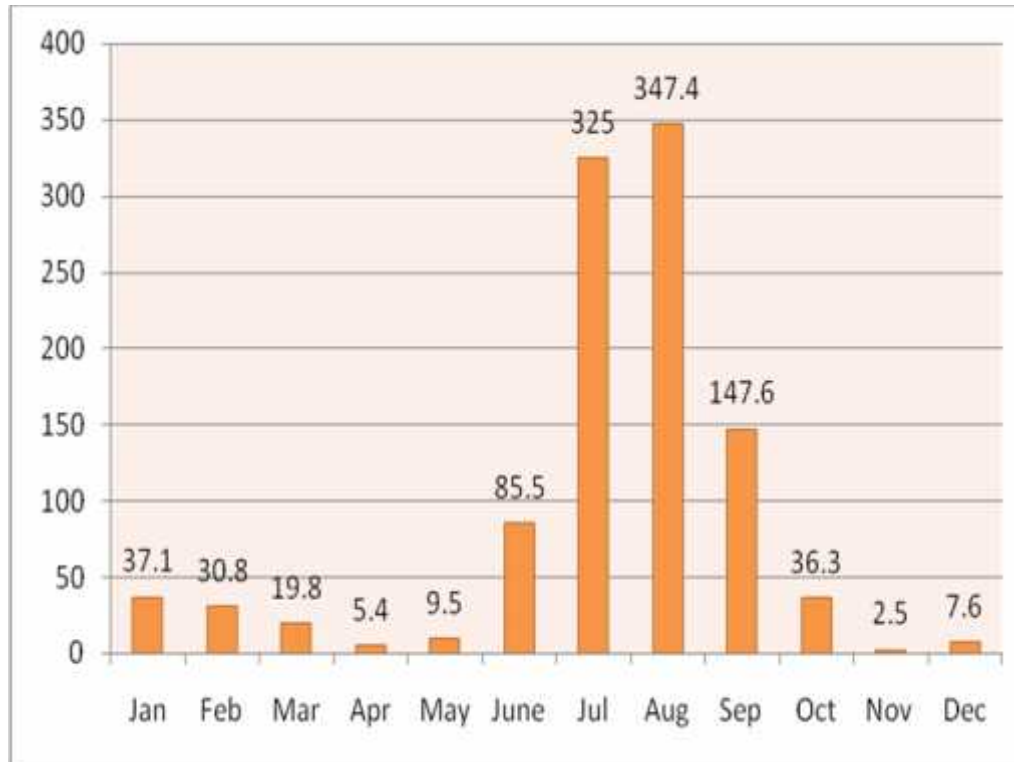
1.13	What is the major contingency the district is prone to? (Tick mark)	Regular	Occasional	None
	Drought		✓	
	Flood		✓	
	Cyclone			✓
	Hail storm			✓
	Heat wave		✓	
	Cold wave		✓	
	Frost		✓	
	Sea water inundation			✓
	Pests and disease outbreak (Borers, Fungal, Bacterial and Viral diseases)		✓	

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: Yes

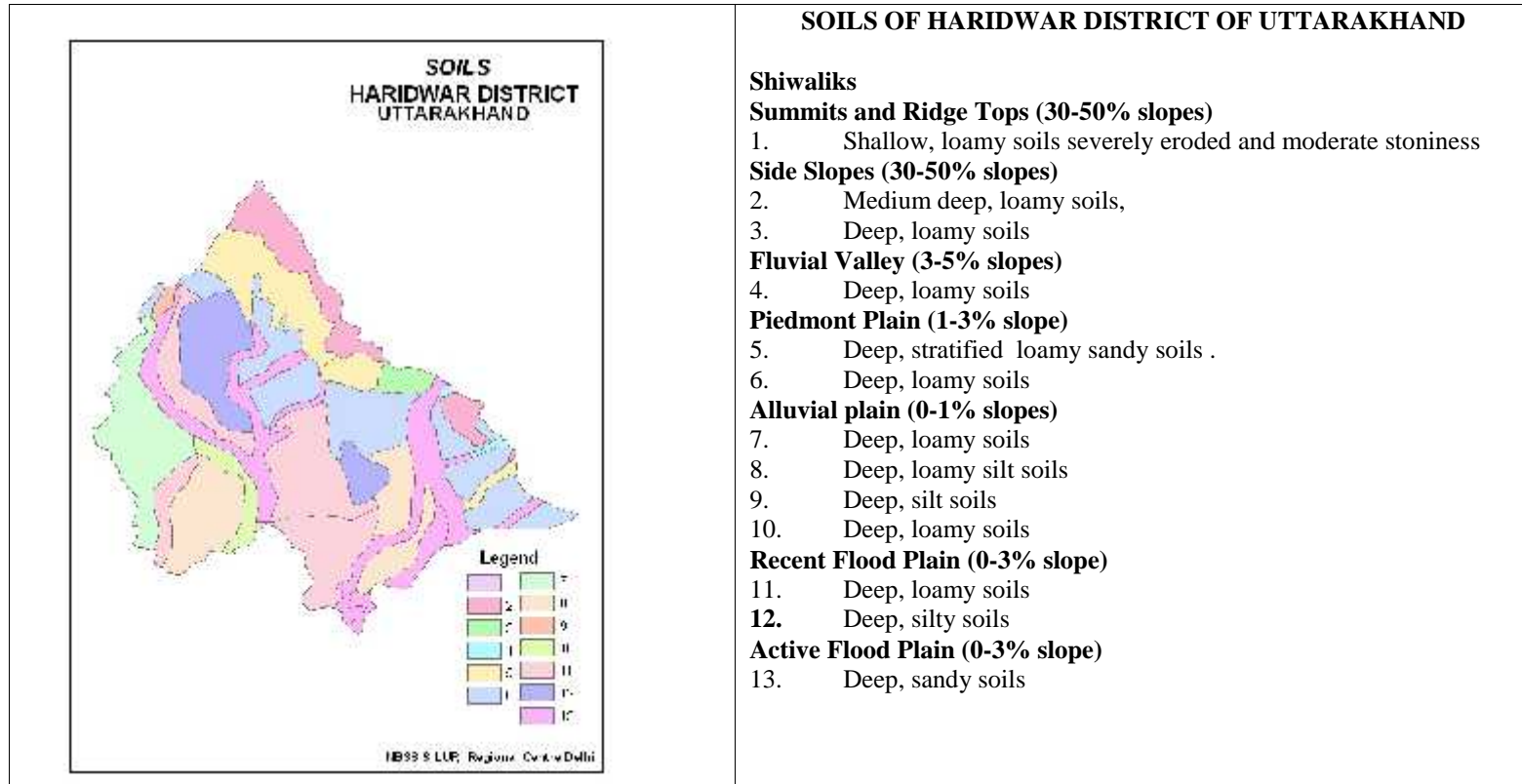
Annexure-I



Annexure-II



Annexure-III



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rain fed situation: Kharif

Condition	Suggested Contingency measures				
	Major farming situation	Crop/cropping system	Change in crop/cropping system including variety	Agronomic measures	Remarks on implementation
Early season drought (delayed onset) Delay by 2 weeks July 1 st week	Low land	Rice/ Groundnut	Rice/ Groundnut	Life saving water, Direct seeded rice Application of water through low cost drip/ sprayer/sprinkler Dust mulching,	

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 4 weeks 3 rd week of July	Upland	Groundnut	Blackgram	Recommended package of practices	Link NSC, SAU, Department of agriculture, other related agencies for good quality seed

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 6 weeks 2 nd week of August	Upland	Groundnut	Blackgram, Cowpea for vegetable	Recommended package of practices	Link NSC, SAU, Department of agriculture, other

			fodder		related agencies for good quality seed
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Condition	Suggested Contingency measures				
Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system including variety	Agronomic measures	Remarks on Implementation
Delay by 8 weeks 4 th week of August	Upland	Groundnut	Toria can be sown in 1 st week of September	Recommended package of practices	Link NSC, SAU, Department of agriculture, other related agencies for good quality seed

Condition	Suggested contingency measures				
Early season drought (Normal onset)	Major farming situation	Crop/cropping system	Crop management	Soil nutrient & moisture conservation measure	Remarks on implementation
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Low land	Rice	Re-sowing with Blackgram or Sesame	Recommended package of practices	Link NSC, SAU, Department of agriculture, other related agencies for good quality seed

Condition	Suggested contingency measures				
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major farming situation	Crop/cropping system	Crop management	Soil nutrient & moisture conservation measure ^s	Remarks on implementation
At vegetative stage	Not applicable				

Condition	Suggested contingency measures				
Mid season drought (long dry spell)	Major Farming situation	Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
At reproductive stage	Not applicable				

Condition			Suggested contingency measures		
Terminal drought	Major Farming situation	Crop/cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
	Not applicable				

2.1.1 Rainfed situation: Rabi

Condition	Suggested Contingency measures				
Early season drought (delayed onset)	Major farming situation	Crop/cropping system	Change in crop/cropping system including variety	Agronomic measures	Remarks on implementation
Delay by 2 weeks November 2 nd week	Rainfed	Wheat /Lentil/ Chickpea/ Mustard	Wheat (DBW-17, UP-2684 PL-4 PG-186, PYS-1)	Line sowing, wilt resistant varieties	

Condition	Suggested Contingency measures				
Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system including variety	Agronomic measures	Remarks on Implementation
Delay by 4 weeks 4 th week of November	Rainfed	Wheat /Lentil/ Chickpea/ Mustard	UP-2565, PG-114, Vaibhav PL-406	Line sowing Recommended package of practices, life saving irrigation	Link NSC, SAU, Department of agriculture, other related agencies for good quality seed

Condition	Suggested Contingency measures				
Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 6 weeks	Rainfed	Wheat/ Maize Local	WR-544	Line sowing, increased seed rate	Link NSC, SAU, Department of

2 nd week of December					agriculture, other related agencies for good quality seed
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Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 8 weeks 4 th week of December	Rainfed	Wheat/ Cowpea/ vegetables/ fodder, Maize local/ Sorghum	WR-544	Line Sowing, increased seed rate for late sown wheat Recommended package of practices	Link NSC, SAU, Department of agriculture, other related agencies for good quality seed

2.1.2 Irrigated situation

Condition	Suggested contingency measures				
	Major farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on implementation
Delayed/ limited release of water in canals due to low rainfall	Not applicable				
Non release of water in canals under delayed onset of monsoon in catchment	Not applicable				
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Not applicable				
Insufficient groundwater recharge due to low rainfall	Not applicable				

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Heavy rainfall with high speed winds in a short span ²				
Outbreak of pests and diseases due to unseasonal rains				
Rice				Storage at safe place to protect from fungi growth.

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation ¹				
Continuous submergence for more than 2 days ²	Not applicable			
Sea water inundation ³				

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave				
Wheat	Life saving irrigation	Life saving irrigation	Life saving irrigation	
Cold wave				
Mango		Provision of Shelter belt and wind break at the time of orchard establishment	Pruning of dead shoots/burned shoots followed by light irrigation	
Frost				
Mango		Irrigation, Fuming in the orchard	Pruning of dead shoots/burned shoots followed by light irrigation	
Hailstrom				
Apple			Anti hail netting at fruit	

		bearing stage/Anti hail guns installation at Departmental level	
Cyclone	Not applicable		

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1. Livestock

Livestock	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	Increasing area under fodder crops; collect crop residues, collect tree fodder, use mangers, use chaff cutters, hay storage, fodder banks, drought resistant verification.	Utilization of fodder from Perennial & reserve sources, open grazing in forests and alpine slopes/ community lands and feeding of crop residues; use of mangers and chaff cutters, feeding of household waste, Use UMMB and complete feed blocks.	Availing Insurance, Drought resistant vegetation culling undesirable livestock ; raising of fodder trees, replacement of Unproductive animals with improved ones, Prominent forecasting of drought.
Drinking water	Storage of water in tanks , traditional water ponds , rivers	Utilization of stored water, stall drinking, rivers, traditional water ponds	Rejuvenation of water sources
Health and disease management	Advance preparation with medicines and vaccination, local ethno pharmaceutical and modern medicines	Treatment of affected livestock by mass campaign, modern veterinary care , veterinary camps , insulation	Proper veterinary care , awareness , capacity building of locals, health care management, disposal of carcass.
Floods			
Feed and fodder availability	Raised floor housing management, community management.	Use of UMMB and complete feed blocks, storage of feed and green fodder in silo towers.	Feed productive stock, pregnant and lactating animals preferentially
Drinking water	Storage of clean water	Utilization of stored water	Clean water
Health and disease management	Vaccination and deworming of livestock	Hygienic measures	Proper vaccination, awareness, capacity building, health care management, hygienic measures.
Cyclone	Not applicable		
Cold wave			
Shelter/environment management	Temporary modifications to check cold strokes		

Health and disease management	Vaccination and deworming, dry fodder storage,	Feed dry fodder during night hours.	
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^s based on forewarning wherever available

2.5.1 Poultry

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Shortage of feed ingredients	Storage of feed at the farm	Supply of feed from the adjoining areas through Departmental interventions	Promotion of feed resources
Drinking water	Not a major problem, though construction of small rain harvesting storage structures for contingent plans.	Supply of water through Departmental interventions	Construction of small rain harvesting storage structures for contingent plans.
Health and disease management	Surveillance and management by animal husbandry dept.	Surveillance and management by animal husbandry dept.	Surveillance and management by animal husbandry dept.
Floods			
Shortage of feed ingredients	Locally available feed maize etc.	Least cost ration formulation with locally available material.	Discard mould feed, ration formula, clean drinking water, vaccination, use antibiotics and multi vitamins and mineral mixture.
Drinking water	Storage of clean drinking water	Use water with antibiotics.	
Health and disease management	Vaccination and sanitary measures Housing at raised floor.	Keep stock on raised floor.	
Cyclone	Not applicable		
Heat wave and cold wave	Not applicable		
Shelter/environment management	Reduce shelter height.	Avoid floor raising	
Health and disease management	Temperature control device. Temporary modification.	Increase energy level in feed. Use temperature device.	Increase energy level in feed, multivitamins and mineral, vaccination and deworming.

^a based on forewarning wherever available

2.5.3 Fisheries

	Suggested contingency measures		
	Before the event	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	Impounding of water through deptt. Interventions to save fish germplasm	Water harvesting structures with rain water impounding from catchment areas; watershed development planning and implementations.
Impact of heat and salt load build up in ponds / change in water quality			
Floods	Not applicable		
Cyclone	Not applicable		