State: HIMACHAL PRADESH
Contingency plan for the District: Sirmaur

1.0	**District Agriculture profile**			
1.1	**Agro-Climatic/Ecological Zone**	Western Himalayas, Warm Subhumid (To Humid With Inclusion Of Perhumid) Eco-Region. (14.2)		
	Agro-Climatic Region (Planning Commission)	Western Himalayan Region (I)		
	Agro Climatic Zone (NARP)	Sub- mountain and low hills, Sub-Tropical (HP-1)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Bilaspur, Hamirpur, Lahul & Spiti, Shimla, Kullu, Solan, Chamba, Mandi, Kangra and Sirmaur, Solan		
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Hill Agriculture Research & Extension Centre, Dhaulakuan (Sirmaur) HP 173001 Ph. & Fax 01704 257421		
	Mention the KVK located in the district with address	Krishi Vigyan Kendra, Dhaulakuan District Sirmaur (HP).Himachal Pradesh 173001 Phone : 01704257462 (O), Email: kvksirmaur@gmail.com		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Hill Agriculture Research & extension Centre, Dhaulakuan (Sirmaur) HP 173001 Ph & Fax: 01704 257421		
	Geographic coordinates of district	Latitude	Longitude	Altitude (m)
		30°22'30"- 31°01'20" N	77° 01'12" - 77°49'40" E	400 to 3647 m

*****Source: District Agriculture Plan Sirmaur Himachal Pradesh Department of Agriculture (H.P.), consulting agency CSK Himachal Pradesh Agricultural University Palampur-176 062

1.2	**Rainfall – (since 2005 - 2008)**	**Average(mm)**	**Normal onset**	**Normal cessation**
	SW monsoon (June – September)	1215.1	3rd week of June	2nd week of September
	NE Monsoon (October – December)	32.1	2nd week of October	3rd week of December
	Winter (January –Februray)	50.2		
	Summer (March – May)	123.4		
	Annual	1421.4		

* NE monsoon is not a phenomenon of Himachal Pradesh. The rainfall is bimodal and the second peak occurs during winter due to western disturbances. In order to maintain the uniformity over the states the split of the same is given as NE Monsoon, winter and summer rain.

1.3 Land use pattern of the district (latest statistics)-Area ('000 ha)**

Geographical Area	Net area sown	Forests	Land under non-agricultural uses	Permanent Pastures and other grazing land	Cultivable waste land	Land under misc. tree crops, etc.	Barren and uncultivable land	Current fallows	Other fallows
224.8	40.8	48.3	37.3	57.0	15.9	10.5	8.5	3.9	2.5

** Source: Statistical outline of Himachal Pradesh, 2008-09

1.4	SOILS OF SIRMAUR DISTRICT OF H.P.	
Soil Unit	**Description**	**Percent Area**
1	Shallow to medium shallow, loamy soils	1.3
2	Rock outcrops with shallow, loamy-skeletal soils	7.0
3	Deep, loamy soils	5.2
4	Medium deep, loamy, calcareous soils	15.9
5	Medium deep to deep loamy soils	20.6
6	Deep, loamy sandy soils	3.7
7	Medium deep, loamy-skeletal soils	5.1
8	Medium deep to deep, loamy-skeletal soils	30.8
9 & 10	Deep, loamy soils	7.6
11	Medium to deep, loamy, calcareous soils	0.3
12	Deep, loamy, stratified soils	2.6

Data source: Soil Resource Maps of NBSS & LUP, estimated values

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	40.8	185%
	Area sown more than once	34.9	
	Gross cropped area	75.7	

*State Statistical Abstract of HP, 2009-10, Deptt of Economics & Statistics, Himachal Pradesh

1.6	Irrigation	Area ('000 ha)
	Net irrigated area	13.6
	Gross irrigated area	25.7
	Rainfed area	26.8

	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	6	3.5	25.7
	Tanks	5	0	0
	Tube wells	272	1.9	14.3
	Bore wells	-	-	-
	Other wells	49	0.4	2.9
	Lift irrigation schemes	51	0.2	1.7
	Micro-irrigation	-	-	-
	Other sources :			
	Kuhls	1939	7.5	55.5
	Khatris	-	-	-
	Total Irrigated Area	-	13.6	100
	Pump sets	-	-	-
	No. of Tractors	3965	52.9**	-
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	-	-	-
	Critical	-	-	-
	Semi- critical	-	-	-
	Safe	-	18	Ground water is of good quality
	Wastewater availability and use	-	-	-
	Ground water quality	Good, EC<750m mhos/cm at 25^0 C		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

*Source: Season and Crop Report, Himachal Pradesh. Directorate of Land Records, Revenue Deptt, Himachal Pradesh; District Agriculture Plan Sirmaur Himachal Pradesh Department of Agriculture (H.P.) consulting agency CSK Himachal Pradesh Agricultural University Palampur-176 062;

1.7 Area under major field crops & horticulture

S.No.	Major field crops cultivated	Area ('000 ha)		
		Total	Irrigated	Rain fed (Total area- Irrigated area)
	Maize	23.1	5.6	17.4
	Paddy	5.2	4.2	1.06
	Wheat	25.2	9.6	15.6
	Barley	2.3	0.4	1.9
	Pulses			
	Mash	1.03	0.1	0.8

	Gram	0.1	0.04	0.1
	Lentil	0.3	0.09	0.2
	Oil seeds			
	i. Toria/Mustard	0.8	0.2	0.5
	ii. Sesame	0.08	0.02	0.06
	Horticultural Crops	**Total Area**		**% Area**
	Mango	2.5		19.1
	Citrus	0.8		6.2
	Apple	3.3		25.6
	Plum	1.3		9.9
	Walnut	1.2		9.5
	Pear	0.4		3.6
	Peach	2.9		22.7
	Orange	0.4		3.4
	Other Vegetables			
	Potato	1.4		26.5
	Peas	1.8		34.8
	Tomato	1.2		24.5
	Others	0.7		14.2
	Spices			
	Garlic	1.1		42.9
	Ginger	1.4		57.1
	Total Spices	2.5		-

*Source: Season and Crop Report, Himachal Pradesh. Directorate of Land Records, Revenue Deptt, Himachal Pradesh

1.8	**Livestock**	**Number (‘000) census**	
Sr. No.	**Type of animals**	**Status**	**Total Number (‘000)**
	Crossbred cows	Male	8.7
		Female	36.6
	Local cows	Male	97.03
		Female	119.9
	Total Cattle	Male	105.7
		Female	156.6
	Buffaloes	Male	5.2
		Female	44.5

	Goats	-	168.4
	Sheep	-	40.2
	Pack Animal	-	2.9
	Others	-	0.8
	Total Livestock	-	5246.03
1.9	**Poultry**	-	36.2

*State Statistical Abstract of Himachal Pradesh, 2009-10, Deptt of Economics & Statistics, Himachal Pradesh

1.10	**Inland Fisheries ***			
		Water Spread Area (ha)	**Yield (t/ha)**	**Production ('000 M tons)**
	i) Brackish water	-	-	-
	ii) Fresh water	-		0.7
	Total area estimated	-		

*State Statistical Abstract of HP, 2009-10, Deptt of Economics & Statistics, HP

1.11 Production and Productivity of major crops

Name of crop	***Kharif***		***Rabi***		**Summer**		**Total**	
	Production ('000 MT)	**Productivity (kg/ha)**	**Production ('000 MT)**	**Productivity (kg/ha)**	**Production ('000 MT)**	**Productivity (kg/ha)**	**Production ('000 MT)**	**Productivity (kg/ha)**
Maize	53.6	2327	-		-		53.6	2327
Rice	5.2	1001	-		-		5.2	1001
Wheat	-		34.2	1346	-		34.0	1346
Barley	-		3.7	1589	-		3.7	1589
Chickpea	-		0.1	1076	-		0.1	1076
Blackgram	0.5	380	-		-		0.5	380
Lentil	-		0.01	526	-		0.01	526
Oil seeds								
Toria	0.4	531	-		-		0.4	531
Sesame	0.06	471	-		-		0.06	471
Other Temperate fruits								
Mango	2.09	837	-		-		2.09	837
Peach	3.6	1224	-		-		3.6	1224

Lime	0.3	485	-	-	0.3	485
Plum	0.4	352	-	-	0.4	352
Apple	0.2	72	-	-	0.2	72
Walnut & Dry Fruits	0.4	400	-	-	0.4	400
Other Vegetables						
Peas	2.06	1289	-	-	2.06	1289
Ginger	10.06	9278	-	-	10.06	9278
Potato	16.5	11785	-	-	16.5	11785
Garlic	1.3	927	-	-	1.3	927

*Source: District Agriculture Plan, Sirmaur Himachal Pradesh Department of Agriculture (H.P.) consulting agency CSK Himachal Pradesh Agricultural University Palampur -176 062

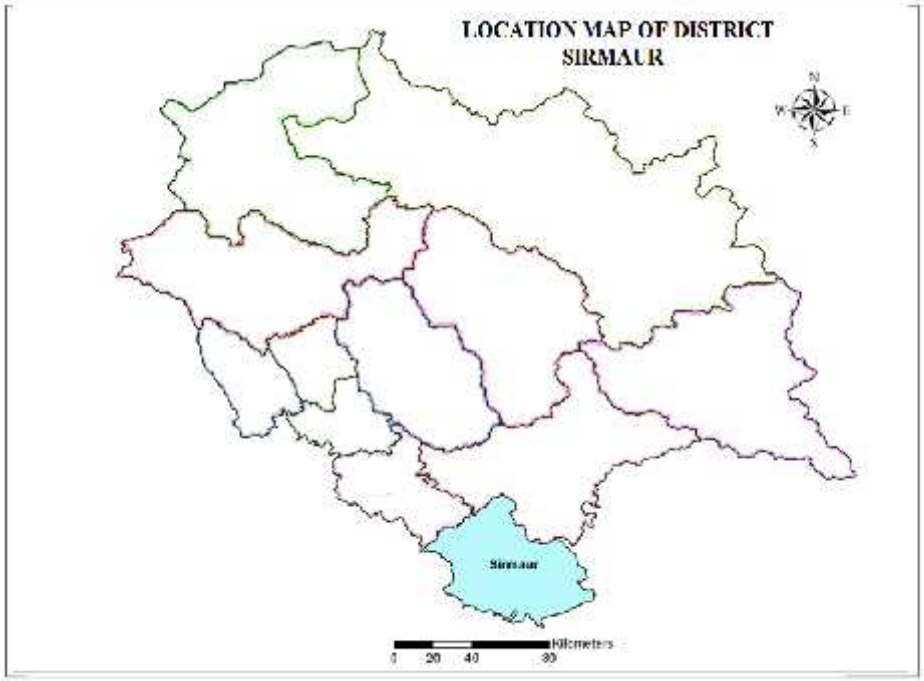
1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	**Maize**	**Rice**	**Wheat**	**Barley**	**Blackgram**
	Kharif- Rain fed	1st week of June to 4th week of July	-			1st week of June to 4th week of July
	Kharif-Irrigated	1st week of May to 4th week of June	1st week of June to 4th week of July	-		-
	Rabi- Rain fed	-		1st week of October to 4th week of January	1st week of October to 4th week of January	-
	Rabi-Irrigated	-		1st week of November to 4th week of November	1st week of November to 4th week of November	-

1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	***Kharif* season**			
	Drought		√	
	Flood			√
	Cyclone			√
	Hail storm			√
	Heat wave	√		
	Cold wave	√		

	Frost	√		
	Sea water intrusion			√
	Pests and disease outbreak (Borers, Fungal, Bacterial and Viral diseases) (Specify only those pests and diseases that are triggered due to unusual wet weather conditions)	Fruit fly of guava, mango, peach, tomato and cucurbits, stem borer and leaf folder of rice, powdery mildew and leaf miner of peas, rhizome rot of ginger, buckeye rot of tomato, brown and false smut of rice, loose smut of wheat, Erwinia stalk rot, maydis leaf blight in maize, yellow rust and Karnal bunt in wheat, ginger fly	Wheat aphid, mustard aphid, cabbage butter fly of mustard, maize stem borer, brown plant hopper, aphids and white butterfly of cole crops, mealy bug and hoppers of mango, blast and bacterial leaf blight Brown leaf spot ,false smut in rice, bacterial stalk rot and leaf sheath blight of maize, Late and early blight of potato, yellow rust, loose smut and covered smut of wheat and barley, alternaria blight and white rust of mustard, powdery and downy mildew of cucurbits, stalk rot of cole crops, bacterial wilt and phytophthora blight of Solanaceous crops, Yellow rust, helminthosporium leaf blight in barley, pea leaf miner, blister beetle in mash (pulses)	Not applicable

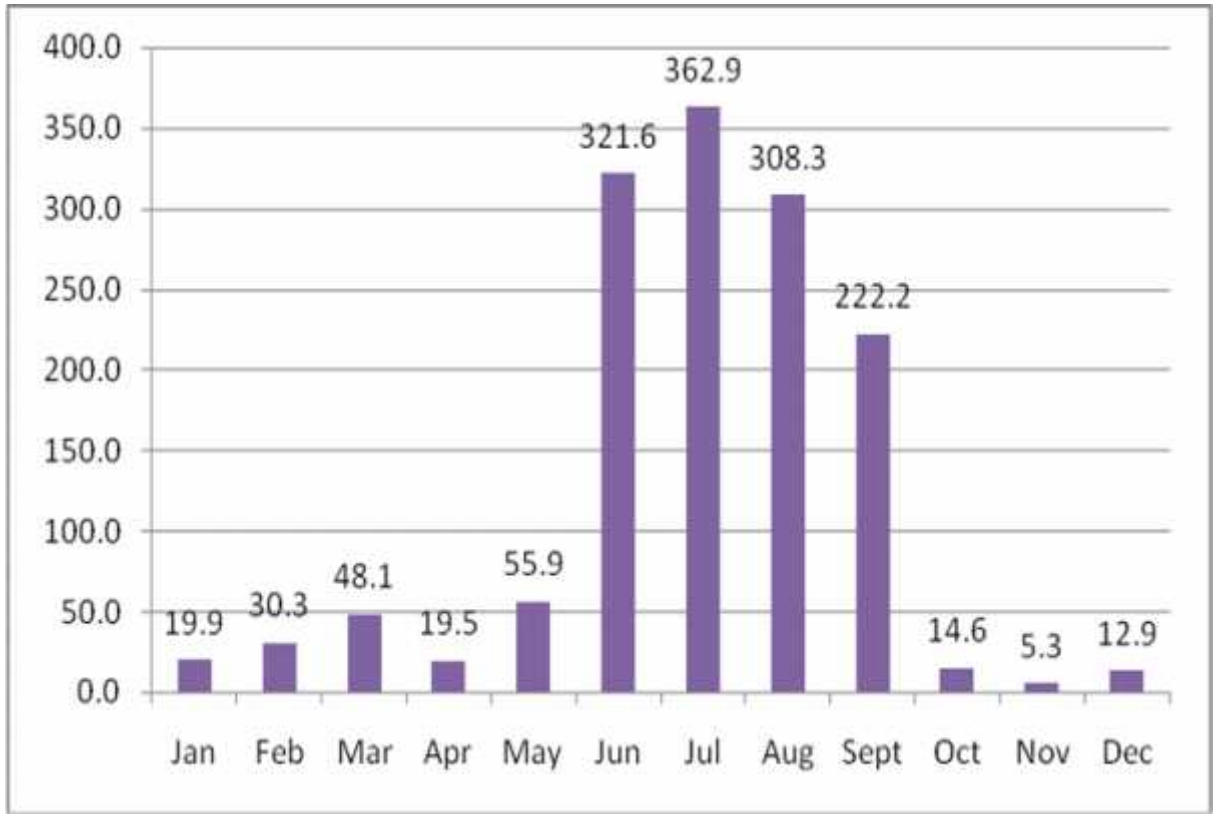
1.14	**Include Digital maps of the district for**	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure II	Enclosed: Yes
		Soil map as Annexure III	Enclosed: Yes

Annexure I

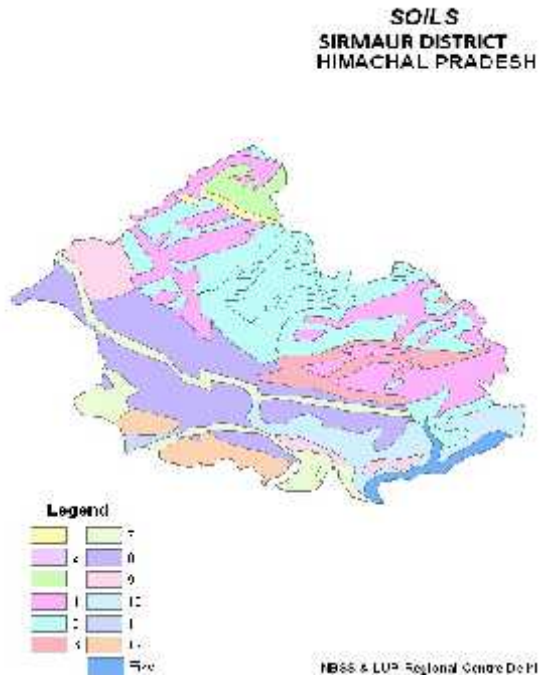

LOCATION MAP OF DISTRICT
SIRMAUR
N
W
E
S
Sirmaur
Kilometers
0 20 40 80

Annexure II

Mean annual Rainfall(mm)



Annexure III



New Soil Unit	Description	Area (ha)
1	Shallow to medium shallow, loamy soils	3518
2	Shallow, loamy-skeletal soils	19433
3	Deep, loamy soils	14572
4	Medium deep, loamy, calcareous soils	44441
5	Medium deep to deep loamy soils	57388
6	Deep, loamy over sandy soils to Shallow, loamy soils	10215
7	Medium deep, loamy-skeletal soils	14097
8	Medium deep to deep, loamy-skeletal soils	85787
9	Deep, loamy soils *associated with*: Medium, deep, loamy soils	8360
10	Deep, loamy soils	12790
11	Medium to deep, loamy, calcareous soils to deep loamy-skeletal soils	952
12	Deep, loamy, stratified soils	7321
	Total	278875

2.0 Strategies for Weather related contingencies

2.1 Drought

Condition	**Suggested contingency measures**				
Early season drought (delayed onset) Zone-I (Nahan, Paonta block)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks (Normal onset of monsoon 3rd week of June ±10 days) 1st week of July	Medium deep to deep loamy soils	1.Maize – wheat	No change Maize- Normal Vts Wheat-VL-829, PBW-502	Summer ploughing. Gap filling with Improved seeds of maize if the plant population of crops around 70% than optimum. Timely weed control, mulching if possible Plough the field just after harvesting of *Kharif* crop. Conserve residual moisture for sowing of wheat	Link SAU, NSC, Department of Agriculture for getting good quality seed Link RKVY for getting seed drills Create awareness and improve technical skills among the farmers through trainings in KVK
		2 Paddy-wheat	No change Paddy- Wheat Wheat : HPW211, HPW236, PBW502	SRI method for paddy Gap fill with transplanted seedlings raised from community nurseries. Conserve residue moisture Plough the field just after harvesting of Paddy or zero till sowing for wheat to moisture for sowing of wheat	
		3.Maize- Toria - wheat	No change Maize- Wheat Wheat : Raj-3765, Raj-3777, HS-295	Summer ploughing Gap filling with Improved seeds of maize if the plant population of crops around 70% than optimum. Timely weed control, mulching. Plough the field just after harvesting of *Kharif* crop. Conserve residual moisture for sowing of wheat	
		4.Maize+Mash - Barley	No change	Gap filling with Improved seeds of maize if the plant population of crops around 70% than optimum. mulching	
		5.Mash-wheat	Mash UG-218/ Him mash 1, Cowpea c-475, C-519 Wheat-HPW211, HPW236,	Plough the field just after harvesting of *Kharif* crop Conserve residual moisture for sowing of wheat	

			PBW502		
		1.Ginger-Potato	No change	Summer ploughing, heavy mulch with leaves for Ginger. Plough the field just after harvesting of ginger crop Conserve residual moisture for sowing of Potato.	
		2. Maize/mash-Garlic.	No change Mash UG-218/ Him mash 1, Cowpea c-475, C-519	Summer ploughing, Gap filling with Improved seeds of maize if the plant population of crops around 70% than optimum. Timely weed control, mulching Plough the field just after harvesting of *Kharif* crop Conserve residual moisture for sowing of garlic	
(Normal onset of winter rains 20th December ±30 days) Onset on 1st week of January Zone II&III (Shillai, Sangrah, Pachhad & Rajgarh block)	Medium deep to deep loamy soils	3.Maize-pea/ bean-Potato	No change	Summer ploughing , Plough the field just after harvesting of pea/bean crop. Conserve residual moisture for sowing of Potato	Link SAU, NSC, Department of Agriculture for good quality seed
		4.Tomato/capsicum-wheat	No change Wheat Raj-3765, Raj-3777, HS-295	INM, IWM, Water harvesting storage.	

Condition	**Suggested contingency measures**				
Early season drought (delayed onset) zone –I (Nahan & Paonta block)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in cropping systems including variety**	**Agronomic measures**	**Remarks on Implementation**
	Medium deep to deep loamy	1.Maize – wheat	Sowing of mash/Sesame Wheat- HPW 236,HPW155 and HPW 42	1.Prepare field for mash/ sesame sowing 2.Conserve residual moisture for sowing of wheat Plough the field just after harvesting of *Kharif* crop	Link SAU, NSC, Department of Agriculture for getting good quality

	soils	2 Paddy-wheat	Late sown varieties of Paddy /Wheat HPW 236, HPW155 and HPW 42	1.Adopt SRI method for paddy, 2.Conserve residual moisture for sowing of wheat or toria 3. Plough the field just after harvesting of Paddy or zero till sowing for wheat	seed Link RKvY for seed drills
		3.Maize- Toria - wheat	Sowing of mash or Sesame /late sown varieties of wheat	Conserve residual moisture for sowing of Toria Plough the field just after harvesting of Maize crop	
		4.Maize+Mash - Barley	Sowing of mash/Sesame/ late sown varieties of wheat	Conserve residual moisture for Plough the field just after harvesting of *Kharif* crop sowing of barley	
		5.Mash-wheat	Mash UG-218/Him mash 1, cowpea c-475, C-519, late sown varieties of wheat	Conserve residual moisture for sowing of wheat Plough the field just after harvesting of Mash crop	

Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in cropping systems including variety**	**Agronomic measures***	**Remarks on Implementation**
Zone II&III IShillai, Sangrah, Pachhad & Rajgarh)					
Delay by 4 weeks (Normal onset 22nd June ±10 days) 3rd week of July		Ginger-Potato	No change	Summer ploughing, mulch with leaves for Ginger. Plough the field just after harvesting of ginger crop conserve residual moisture for sowing of Potato.	Training skills for farmers through KVK
(Normal onset of winter rains 20th December ±30 days) 3rd week of January		Maize/mash-Garlic.	No change Blackgram: UG-218/ Him mash 1, **Cowpea:** c-475, C-519 **Pea:** -Arkal	Prepare field for mash/Sesame/Pea sowing Conserve residual moisture for sowing of wheat Plough the field just after harvesting of *Kharif* crop Plough the field just after harvesting of *Kharif* crop conserve residual moisture for sowing of garlic	

		Maize-pea/ bean-Potato	No change Sowing of **Mash** UG-218/ Him mash 1, **Cowpea** c-475, C-519 **Pea**-arkal	Summer ploughing, mulch with leaves for Ginger. Plough the field just after harvesting of ginger crop conserve residual moisture for sowing of Potato	
		Tomato/capsicum -wheat	No change **Wheat**- Raj-3765, Raj-3777, HS-295	Gap filling of crop to maintain plant population, stacking of tomato plants.	

Condition	**Suggested contingency measures**				
Early season drought (delayed onset) (Zone-I)	**Major Farming situation[a]**	**Normal Crop / Cropping system[b]**	**Change in cropping systems including variety**	**Agronomic measures***	**Remarks on Implementation[e]**
Delay by 6 weeks (Normal onset 22nd June ±10 days) Onset on 1st week of August	Medium deep to deep loamy soils	1.Maize – wheat	Sowing of mash/ late sown varieties of wheat	Prepare land for mash/ Toria+gobhi sarson Conserve residual moisture for sowing of wheat Plough the field just after harvesting of *Kharif* crop	KVK, Sirmour
		2.Paddy-wheat	Sowing of mash/ late sown varieties of wheat	Prepare land for mash/Toria Conserve residual moisture for sowing of wheat or Toria+gobhi sarson Plough the field just after harvesting of Paddy or zero till sowing for wheat	
		3. Maize- Toria - wheat	Sowing of mash/ late sown varieties of wheat	Prepare land for mash/Toria for sowing of Toria	
(Normal onset of winter rains 19th December ±30 days) 1st week of February		4. Maize+Mash - Barley	Sowing of mash/ late sown varieties of barley	Conserve residual moisture for sowing of Barley Plough the field just after harvesting of *Kharif* crop	
		5.Mash-wheat	Mash UG-218/Him mash1, late sown varieties of wheat	Plough the field just after harvesting of Mash/Toria+gobhi sarson crop	

Early season drought (delayed onset)	Major Farming situation[a]	Normal Crop / Cropping system[b]	Change in cropping systems including variety	Agronomic measures*	Remarks on Implementation[e]
Zone II&III		1.Ginger-Potato	No change	Heavy mulch with leaves for Ginger. Plough the field just after harvesting of ginger crop. Conserve residual moisture for sowing of Potato.	KVK, Dhaulakuan will be implementing agency.
		2. Maize/mash-Garlic.	No change Mash UG-218/ Him mash 1, Cowpea c-475, C-519	Sowing of mash, Plough the field just after harvesting of *Kharif* crop. Conserve residual moisture for sowing of garlic	
		3.Maize-pea/ bean-Potato	No change	Prepare field for Pea/beans Conserve residual moisture for sowing of Potato	
		4.Tomato/capsicum-wheat	No change Wheat Raj-3765, Raj-3777, HS-295	Gap filling of crop to maintain plant population ,Training of plants	

Condition	Suggested contingency measures				
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop / Cropping system[b]**	**Change in cropping systems including variety**	**Agronomic measures***	**Remarks on Implementation[e]**
Delay by 8 weeks (Normal onset 22nd June ±10 days) Onset on 3rd week of August	Medium deep to deep loamy soils	1.Maize – wheat	Maize, sorghum and berseem may be grown as fodder crop, as fodder. Go for Toria, Cowpea and late sown varieties of wheat	Conserve residual moisture for sowing of wheat. Plough the field just after harvesting of fodder crop.	KVK, Dhaulakuan will be implementing agency.
		2. Paddy-wheat	Maize, sorghum and berseem may be grown as fodder crop, as fodder. Go for Toria, Cowpea and late sown varieties of wheat	Conserve residual moisture for sowing of wheat Plough the field just after harvesting of fodder crop	
		3. Maize- Toria - wheat	Maize, sorghum and berseem may be grown as fodder crop, as fodder. Go for Toria, Cowpea and late sown varieties of wheat	Conserve residual moisture for sowing of Toria Plough the field just after harvesting of fodder crop.	

		4.Maize+Mash - Barley	Maize, sorghum and berseem may be grown as fodder crop, as fodder. Go for Toria, Cowpea and late sown varieties of wheat	Conserve residual moisture for sowing of wheat Plough the field just after harvesting of fodder crop.	
		5.Mash-wheat	Maize, Sorghum may be grown as fodder crops, Berseem as fodder. Go for Toria, Cowpea and late sown varieties of wheat.	Conserve residual moisture for sowing of wheat. Plough the field just after harvesting of fodder crop.	

Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop / Cropping system[b]**	**Change in cropping systems including variety**	**Agronomic measures***	**Remarks on Implementation**
Zone II&III (Normal onset of winter rains 19th December ±30 days) 3rd week of February		1.Ginger-Potato	No change Go for Pea/Bean	Plough the field for Pea/Bean crop Conserve residual moisture for sowing of Potato.	KVK, Dhaulakuan will be implementing agency.
		2. Maize/mash-Garlic.	No change Go for Pea/Bean	Plough the field for Pea/Bean crop Conserve residual Conserve residual moisture for sowing of garlic	
		3.Maize-pea/ bean-Potato	No change Go for Pea/Bean	Plough the field for Pea/Bean crop Conserve residual moisture for sowing of Potato.	
		4.Tomato/capsicum-wheat	No change Wheat Raj-3765, Raj-3777, HS-295	Plough the field for Pea/Bean crop Conserve residual moisture for sowing of wheat.	

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 measures**	**Remarks on Implementation**
At vegetative stage	Medium deep to deep loamy soils	1.Maize – wheat	Dust mulch through frequent interculture	Dust mulch through frequent interculture 0r Spray 2% urea or 1% NPK (Soluble fertilizer) during the dry spell Formation of ridges and furrows	Link NSC,SAU, Department of agriculture for good quality seed

				Life saving irrigation from water harvesting structures	Linkage with watershed, MGNREGA for the support of water harvesting technologies
		2 Paddy-wheat	Dust mulch through frequent interculture	Dust mulch through frequent interculture 0r Spray 2% urea or 1% NPK (Soluble fertilizer) during the dry spell Formation of ridges and furrows Life saving irrigation from water harvesting structures	
		3.Maize- Toria - wheat	Dust mulch through frequent interculture	Dust mulch through frequent interculture 0r Spray 2% urea or 1% NPK (Soluble fertilizer) during the dry spell Formation of ridges and furrows Life saving irrigation from water harvesting structures	
		4.Maize+Mash - Barley	Dust mulch through frequent interculture	Dust mulch through frequent interculture 0r Spray 2% urea or 1% NPK (Soluble fertilizer) during the dry spell Formation of ridges and furrows Life saving irrigation from water harvesting structures	
		5.Mash-wheat	Dust mulch through frequent interculture	Dust mulch through frequent interculture 0r Spray 2% urea or 1% NPK (Soluble fertilizer) during the dry spell Formation of ridges and furrows Life saving irrigation from water harvesting structures	

Condition	**Suggested contingency measures**				
Mid season drought	**Major Farming situation**	**Normal Crop / Cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At flowering/ fruiting stage	Medium deep to deep loamy soils	1. Maize – wheat	Life saving irrigation from water harvesting structures	Spray 2% urea or 1% NPK (Soluble fertilizer) during the dry spell	Link watershed , MGNREGA for the support of water harvesting technologies
		2. Paddy-wheat	Life saving irrigation from water harvesting structures	Spray 2% urea or 1% NPK (Soluble fertilizer) during the dry spell	
		3. Maize- Toria -wheat	Life saving irrigation from water	Spray 2% urea or 1% NPK	

			harvesting structures	(Soluble fertilizer) during the dry spell	
		4. Maize+ Mash - Barley	Life saving irrigation from water harvesting structures	Spray 2% urea or 1% NPK (Soluble fertilizer) during the dry spell	
		5. Mash-wheat	Life saving irrigation from water harvesting structures	Spray 2% urea or 1% NPK (Soluble fertilizer) during the dry spell	

Condition	**Suggested contingency measures**				
Terminal drought (Early withdrawal of monsoon) Terminal drought	**Major Farming situation**	**Normal Crop / Cropping system**	**Crop management**	***Rabi* crop planning**	**Remarks on Implementation**
	Medium deep to deep loamy soils	1. Maize – wheat	Life saving irrigation from water harvesting structures If the damage is severe, harvest for fodder or Harvest at physiological maturity	Plan for land preparation of *Rabi* crops like wheat, Barley, or mustard	
		2. Paddy-wheat	Life saving irrigation from water harvesting structures If the damage is severe, harvest for fodder or Harvest at physiological maturity	Plan for land preparation of *Rabi* crops like wheat, Barley, or mustard	
		3. Maize- Toria - wheat	Life saving irrigation from water harvesting structures If the damage is severe, harvest for fodder or Harvest at physiological maturity	Plan for land preparation of *Rabi* crops like wheat, Barley, or mustard	
		4. Maize+Mash - Barley	Life saving irrigation from water harvesting structures If the damage is severe, harvest for fodder or Harvest at physiological maturity	Plan for land preparation of *Rabi* crops like wheat, Barley, or mustard	
		5. Mash-wheat	Life saving irrigation from water harvesting structures If the damage is severe, harvest for fodder or Harvest at physiological maturity	Plan for land preparation of *Rabi* crops like wheat, Barley, or mustard	

2.1.2 Drought - Irrigated situation (through *Kuhls/Tube wells/canal/natural springs*)

Condition	**Suggested contingency measures**				
	Major Farming situation[f]	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Low water availability in *kuhl/* ***natural springs***	Medium to deep loamy soils	Assured irrigation supply by tube well available, hence, not applicable However, provide protective irrigation. Irrigate the crop keeping in view the physiological stage of crop. Use sprinkler method to increase WUE in case of limited release of water due to low rainfall. Follow soil moisture conservation measures			
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Medium to deep loamy soils	Not applicable			
Insufficient groundwater recharge due to low rainfall	Medium to deep loamy soils	Not applicable			

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**	**Maturity stage**	**Post harvest**
Rice	Drain the excess water as early as possible Apply 20 kg urea + 10 kg MOP /acre after draining excess water Take up gap filling either with available nursery or by splitting the tillers from the surviving hills. Take up proper weed control Measures	Drain the excess water as early as possible. Apply 20 kg urea+ 15 kg MOP/acre after draining excess water. Take up suitable plant protection measures in anticipation of pest & disease outbreaks (BPH, Blast)	Drain the excess water as early as possible Take up suitable plant protection measures in anticipation of pest & disease outbreaks	Drain out water and spread sheaves loosely in field or field bunds where there is no water stagnation Spray common salt at 3% on panicles to prevent sprouting and moulds Thresh after drying the

	Take up suitable plant protection Measures in anticipation of pest & disease outbreaks			sheaves properly Ensure proper grain moisture before storing (means drying)
Maize	Drain excess water with proper drainage system Interculture with hoe to control weeds and to loosen the soil and to improve aeration Top dressing 20-30kg N/ha at optimum soil moisture to regain better vegetative growth	Drain excess water with proper drainage system Interculture with hoe to control weeds and to loosen the soil and to improve aeration Top dressing 20-30kg N/ha at optimum soil moisture to regain better vegetative growth Apply Calcium hypochlorite (bleaching powder @ 16.5kg/ha) to manage Erwinia stalk rot	Drain excess water with proper drainage system Harvest green cobs from dislodged plants for immediate marketing	Harvest the cobs after they are dried up properly Dry the grain to optimum moisture (10-12% before storage and bagging)
Wheat	Complete drainage of water Additional dose of nitrogen (25kg/ha) to remove deficiency of nitrogen (yellowing) caused due to leaching Yellow mosaic :Spray the crop with Propiconazole @0.1%	Complete drainage of water Spray the crop with Propiconazole @0.1% for the management karnal bunt and rusts.	After the harvest complete drying process has to be taken ensure that the fungus development has not taken on the seeds and if rains are continuing take to safe storage pace and before winnowing ensure that the moisture is 12-14%)	
Chickpea	Drain excess water Foilar spray with 2% urea after cessation of rains	Drain excess water Foilar spray with 2% urea after cessation of rains Spray of monocrotophos for the management of pod borer@0.15%.	Drain excess water Timely harvest of produce on a clear sunny day	Shifting to safer place and drying the produce before bagging and storage
Lentil	Drain excess water Foilar spray with 2% urea after cessation of rains	Drain excess water Foilar spray with 2% urea after cessation of rains Spray of monocrotophos for the management of pod	Drain excess water Timely harvest of produce on a clear sunny day	Shifting to safer place and drying through produce before bagging and storage

		borer@0.15%.		
Black gram	Drain the excess water as early as possible Apply 10-55 kg N /ha after draining excess water Spray KNO_3 1 % or water soluble fertilizers at 1% to support nutrition Spray fungicides like hexaconazole/propiconazole/Carbendazim 0.1 % or difenconazole @.05% to manage web blight,anthracnose etc Take up timely control measures against the outbreak of pests like *Spodoptera* etc.	Drain the excess water as early as possible Apply 4-5 kg N /acre after draining excess water. spray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Spray fungicides like hexaconazole/propiconazole/ Carbendazim 0.1 % or difenconazole @.05% to manage web blight,anthracnose etc Take up timely control measures against the out break of pests like Leaf cum pod webber (*Maruca*).	Drain the excess water as early as possible Allow the crop to dry completely before harvesting	Spread the bundles drenched in rain on field bunds or drying floors to quicken the drying. Thresh the bundles after they are dried properly. Dry the grain to proper moisture per cent before bagging and storing to prevent deterioration in quality during storage
Sesame	Drain excess water with proper drainage Take up interculture to improve soil aeration and to control weeds. Apply 20-30 kg N/ha as top dress after draining excess water for better growth. Spray the crop with Metalaxyl @0.2% to manage phytophthora blight.	Drain excess water with proper drainage Take up interculture to improve soil aeration and to control weeds- Apply 20-30 kg N/ha as top dress after draining excess water for better growth Spray the crop with carbendazim @0.1% to manage Cercospora leaf spot and other foliar diseases	Drain excess water with proper drainage Harvest the produce on clear sunny day	Shift the produce to the safer place Maintain the moisture of grain 10-12% after thorough drying
Rape seed and mustard	Remove excess water from the field. Maintain plant population Balance fertilizer Used wind brake.	Remove excess water from the field Spray the crop with mancozeb 0.25% hexaconazole to manage	Remove excess water from the field	Well dry the produce up to 10- 12 %moisture before storage

		Alternaria leaf spot		
Potato (Late and early blight)	Drain excess water with proper drainage system Mancozeb M-45@ 0.25% as foliar spray for early blight	Drainage and follow the spray schedule at earliest with Mancozeb M-45@ 0.25% and Metalaxyl l@ 0.2% if not under control	Drainage be maintained and a spray of Metalaxyl @ 0.2% be given and if the late blight is severe in patch remove that patch	Take the harvest to a safe storage place and allow to dry before packaging
Peas	• Drain excess water with proper drainage • Staking of plants • Urea 2% spray to reduce yellowing and for better growth • Interculture at optimum moisture to improve the soil aeration and o control weeds	• Drain excess water with proper drainage • Staking of plants • Urea 2% spray to reduce yellowing and for better growth	• Drain excess water with proper drainage • Staking of plants • Urea 2% spray to reduce yellowing and for better growth	Storage and immediate transportation to market
Tomato	• Drainage of excess water • Need based disease and pest management • Gap filling with seedlings • Apply 10-20kg N/ha to regain lost vigor	• Drainage of excess water • Need based disease and pest management • Staking of plants • Apply 20-30 kg N/ha after draining excess water	• Drainage of excess water • Need based disease and pest management • Harvesting of produce on clear sunny day • Staking of plants	• Drainage of excess water • Shifting produce to safer places • Grading & packing

Condition	**Suggested contingency measure**			
Heavy rainfall with high speed winds in a short span	**Vegetative stage**	**Flowering stage**	**Maturity stage**	**Post harvest**
	Not applicable			

Condition	**Suggested contingency measure**			
Out break of pests and diseases due to unseasonal rains	**Vegetative stage**	**Flowering stage**	**Maturity stage**	**Post harvest**

Rice				
Maize	Apply Calcium hypochlorite (bleaching powder @ 16.5kg/ha) to manage Erwinia stalk rot Banded leaf & sheath blight: Spray the crop with Propiconazole /Bavistin @0.1% or Spray the crop with Dithane –M-45 @ 0.25%			
Wheat	Rust and Blight: Spray the crop with Propiconazole @0.1% Karnal bunt and Yellow rust :Spray the crop with Propiconazole @0.1%			
Black gram	Web blight, Anthracnose, Cercospora leaf spot : Spray the crop with Hexaconozole @ 0.1%	Complete drainage of water Spray the crop with Propiconazole or Hexaconozole @ 0.1%		
Sesame	Cercospora leaf spot, Phytopathora leaf blight: Spray the crop with Metalaxyl MZ 72 WP @ 0.25%	Spray the crop with carbendizim @0.1%		
Rape seed and mustard	Alternaria leaf spot, white rot, downy mildew: Spray the crop with Dithane M -45 @0.25% or Metalaxyl @ 0.2%	Spray the crop with Propiconazole @ 0.1% or Dithane M-45 @ 0.25%		
Potato (Late and early blight)	Late and early blight: Spray the crop with Metalaxyl MZ 72 WP @ 0.25 %.	Spray the crop with Metalaxyl @ 0.2%		
Peas	Powdery mildew, rust, Ascochyta blight, white rot)- Spray the crop with Hexaconozole /Propiconazole @ 0.1%	Powdery mildew, rust, Ascochyta blight, white rot: Spray the crop with Hexaconozole / Propiconazole @0.1%		
Tomato	Late and early blight, Septoria leaf spot, Buckeye rot **:** Spray the crop with Metalaxyl @ 0.25%	Spray the crop with @0.25% or Metalaxyl @ 0.25%		

2.3 Floods

Condition	Suggested contingency measure[0]			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Transient water logging/ partial intrusion [1]	Not applicable			
Continuous submergence for more than 2 days	Proper drainage must be assured at least once in two days			
Apple, Mango, Peach, Lime, Plum and walnut	All horticultural crops are sensitive to continuous submergence hence, proper drainage must be assured at least once in two days			
Sea water intrusion[3]	Not applicable			

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

Extreme event type	Suggested contingency measure[r]			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Hailstorm				
Rice	Not applicable			Harvest the crop according to weather condition and weather forecast, stake the produce in the safe or sheltered places in the event of unseasonal hailstorm /rainfall
Wheat	Not applicable			Harvest the crop according to weather condition and weather forecast, stake the produce in the safe or sheltered places in the event of unseasonal hailstorm /rainfall
Sesame	Not applicable			Harvest the crop according to weather condition and weather forecast, stake the produce in the safe or sheltered places in the event of unseasonal hailstorm /rainfall
Rapeseed and mustard	Not applicable			Harvest the crop according to weather condition and weather forecast, stake the produce in the safe or sheltered places in the event of unseasonal hailstorm /rainfall
Heat Wave				
Wheat	Irrigation if available may be applied to combat the effect of high temperature			

Mustard	Irrigation if available may be applied to combat the effect of high temperature			
Horticulture				
Mango	Irrigation if available may be applied to combat the effect of high temperature			
Cold wave				
Wheat	Apply irrigation using sprinklers if available, smoking during night	Apply irrigation using sprinklers if available, smoking during night	Apply irrigation using sprinklers if available, Burning of crop residue around the crop, Spray of H_2SO_4 @0.1%	Not applicable
	Light frequent irrigation may be practiced wherever irrigation facilities are available			
Mustard	Light frequent irrigation may be practiced wherever irrigation facilities are available			
Horticulture				
Mango	Light frequent irrigation may be practiced wherever irrigation facilities are available, mulching, thatching and creating smoke screens and lighting of fire is also practiced where irrigation facilities are not available			
Litchi	Light frequent irrigation may be practiced wherever irrigation facilities are available, mulching, thatching and creating smoke screens and lighting of fire is also practiced where irrigation facilities are not available			
Frost				
Wheat	Apply irrigation using sprinklers if available, smoking during night	Apply irrigation using sprinklers if available, smoking during night	Apply irrigation using sprinklers if available, Burning of crop residue around the crop, Spray of H_2SO_4 @0.1%	Not applicable
Mustard	Apply irrigation using sprinklers if available, smoking during night	Apply irrigation using sprinklers if available, smoking during night	Apply irrigation using sprinklers if available, Burning of crop residue around the crop, Spray of H_2SO_4 @0.1%	Not applicable
Mango	Light frequent irrigation may be practiced wherever irrigation facilities are available, mulching, thatching and creating smoke screens and lighting of fire is also practiced where irrigation facilities are not available			
Litchi	Light frequent irrigation may be practiced wherever irrigation facilities are available, mulching, thatching and creating smoke screens and lighting of fire is also practiced where irrigation facilities are not available			
Cyclone	Not applicable			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

Condition	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Feed and fodder availability	Storage of wheat straw and paddy straw. Growing fodder crops. Preserve the fodder in shape of silage and complete feed block preparation. Makes silage and hay.	Providing high energy feeds like UMMB and supply of straw. Judicious use of water for cleaning of animals and sheds.	Maintain the already constructed structures for storage and drinking water arrangement
Drinking water	Rainwater harvesting for each household, groundwater provision	Supply of water through tanks, sheds and groundwater	Rejuvenate the water resources and keep them clean
Health and disease management	Vaccination against FMD, HS & BQ diseases. Supply of deworming medicines	Regular deworming for ecto and endo parasites Regular checks for outbreaks of contagious diseases	-Cull the unproductive stock -Avail any insurance of livestock if applicable -Supplement good quality green fodder
Floods			
Feed and fodder availability	Storage of fodder, silage, hay.	Ensure feed and fodder availability regularly	Supply good quality fodder
Drinking water	Provision for groundwater sources and their maintenance	Ensure clean drinking water	Supply clean drinking water
Health and disease management	Preventive animal health measures	Contact local veterinarian in the event of any disease	Vaccination, deworming treatment of sick animal etc. Thoroughly clean and disinfect animal sheds.
Cyclone	Not applicable		
Cold wave			
Shelter/environment management	Provide the animals nutritious feed and fodder and keep them free from diseases. Preserve the fodder in shape of silage and complete feed block preparation.	Protect the newly born calves and milch animals from morning and evening cold and provide them carbohydrate rich diet	Provide the animals nutritious feed and fodder and keep them free from diseases
Health and disease management	Provide the animals nutritious feed and fodder and keep them free from diseases	Provide the animals nutritious feed and fodder and keep them free from diseases	Provide the animals nutritious feed and fodder and keep them free from diseases

2.5.2 Poultry

Poultry	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
Drought			
Shortage of feed ingredients	Poultry feed are purchased as per requirement.	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 Department of Animal Husbandry .	Surveillance and management by Department of Animal Husbandry	Surveillance and management by Department of Animal Husbandry
Floods			
Shortage of feed ingredients	-	Ensure feed availability regularly	-
Drinking water	-	Ensure clean drinking water	-
Health and disease management	Provide the animals nutritious feed and fodder and keep them free from diseases	Contact local veterinarian in the event of any disease	Provide the animals nutritious feed and fodder and keep them free from diseases
Cyclone	-		
Shortage of feed ingredients	-		
Drinking water	-		
Health and disease management			
Heat wave and cold wave			
Shelter/environment management	Adequate ventilation during night in summer and adequate protection from cold is exercised during winter		
Health and disease management			

2.5.3 Fisheries/ Aquaculture

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	Impounding of water through departmental 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			
Heat wave and cold wave			