

**STATE: HIMACHAL PRADESH**  
**Agriculture Contingency Plan for District: MANDI**

<b>1.0 District Agriculture profile</b>				
<b>1.1</b>	Agro-Climatic/Ecological Zone	Western Himalayas, Warm Sub humid (To Humid With Inclusion Of Perhumid) Eco-Region. (14.3)		
	Agro-Climatic Region (Planning Commission)	West Himalayan Region (I)		
	Agro Climatic Zone (NARP)	Mid Hills Sub-Humid Zone (HP-2)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Mandi, Kangra, Bilaspur, Shimla, Hamirpur, Una		
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research Station, Bajaura (HP). Dr. J K Sharma, Associate Director (R & E), Ph. 01905 267235(O)		
	Mention the KVK located in the district	Krishi Vigyan Kendra, Mandi at Sundernagar (HP), Phone 01907-262547 (O)		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Department of Agronomy Forages and Grassland Management Palampur 176 062, CSKHPKV, Palampur (HP). INDIA.		
	Geographic coordinates of district	Latitude*	Longitude	Altitude (m)
	31 <sup>0</sup> 13'20'' to 32 <sup>0</sup> 04'30'' N	76 <sup>0</sup> 37'20'' to 77 <sup>0</sup> 23'15'' E	651 to 4000 m	

\* Source: District Agriculture Plan 2009, Mandi, Himachal Pradesh, Volume-III, Department of Agriculture (H.P.) consulting agency CSK Himachal Pradesh Agricultural University, Palampur, HP

<b>Rainfall</b>	<b>Rainfall</b>		
	<b>Average (mm)</b>	<b>Normal onset</b>	<b>Normal cessation</b>
SW monsoon (June – Sep)	947.2	3 <sup>rd</sup> week of June	1 <sup>st</sup> week of September
NE Monsoon (Oct – Dec)	37.1	2 <sup>nd</sup> week of December	4 <sup>th</sup> week of December
Winter (Jan – Feb)	107		
Summer (March – May)	158		
Annual	1250.3		

\*Source: District Mandi Statistical Report 2008-09

1.3	Land use pattern of the district (latest statistics)	Geographical Area	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)	397.8	85.8	175.2	16.9	96.2	4.5	0.3	8.1	10.3	40.1

Source: District Mandi Statistical Report 2008-09

#### 1.4 Major soils

1.4	Description	% Area
	Shallow, loamy-skeletal soils with severe erosion and strong stoniness; associated with: Rock outcrops	21.7
	Medium deep to deep loamy soils with moderate to severe erosion	19.0
	Shallow to medium deep, loamy soils with moderate to severe erosion and slight stoniness	18.2
	Medium deep to deep, loamy-skeletal soils moderate to severe erosion; associated with: Loamy soils with moderate erosion	17.9
	Deep, loamy soils with moderate erosion and moderate stoniness; associated with: Medium, deep, loamy soils	10.8
	Deep, loamy soils with severe erosion	3.9
	Shallow to medium shallow, loamy soils with severe erosion	2.4
	Medium deep, loamy, calcareous soils with moderate erosion; associated with: Loamy-skeletal soils with severe erosion	2.2
	Deep, loamy-skeletal soils with severe erosion and slight to moderate stoniness; associated with: Loamy soils	2.0
	Medium deep, loamy, calcareous soils with moderate to severe erosion	1.4
	Deep, loamy soils with moderate erosion	0.5

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

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	85.8	188 %
	Area sown more than once	75.2	
	Gross cropped area	161.1	

\*Source: District Mandi Statistical Report 2008-09

<b>1.6</b>	<b>Irrigation</b>	<b>Area ('000 ha)</b>		
	Net irrigated area	15.1		
	Gross irrigated area	25.8		
	Rain fed area	70.7		
	<b>Sources of Irrigation</b>	<b>Number</b>	<b>Area ('000 ha)</b>	<b>Percentage of total irrigated area</b>
	Canals		11.5	76.2
	Tanks		0.1	1.2
	Open wells		0.02	0.1
	Bore wells		0.45	2.9
	Lift irrigation		2.93	19.3
	Other sources			
	Total		15.1	97.7
	Pump-sets	208	0.02	0.2
	Micro-irrigation		0.3	2.1
	No. of Tractors	531	65.04**	
	<b>Groundwater availability and use*</b>	<b>No. of blocks</b>	<b>(%) area</b>	<b>Quality of water</b>
	Over exploited			
	Critical			
	Semi- critical			
Safe		22	Good	
Waste water availability and use				
Ground water quality	Good, EC <750 µmhos/cm at 25 <sup>0</sup> C			

\*Source: District Mandi Statistical Report 2008-09). \* Over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70% \*\* Rough estimate (70% of 92.925 ('000 ha) - net cultivated area

### 1.7 Area under major field crops & horticulture

Major Field Crops cultivated		Area ('000 ha)				Total
		<i>Kharif</i>		<i>Rabi</i>		
		Irrigated	Rainfed	Irrigated	Rainfed	
Maize	2.5	47.4	-	-	49.9	
Rice	10.9	8.6	-	-	19.5	

	Other Pulses	0.2	2.9	0.0	1.547	4.7
	Blackgram	0.07	1.3	-	-	1.4
	Soybean	0.1	0.3	-	-	0.4
	Wheat	-	-	11.3	56.3	67.6
	Barley	-	-	0.1	3.7	3.9
	Rapeseed & mustard	-	-	0.04	0.3	0.3
	Linseed	-	-	0.2	0.04	0.3
<b>Horticulture crops - Fruits</b>		<b>Irrigated</b>		<b>Rainfed</b>		<b>Total area</b>
	Apple			15.4		15.4
	Stone fruits			1.8		1.8
	Citrus fruits			4.3		4.3
	Mango	0.8		2.9		3.8
	Litchi	0.1		0.1		0.2
	Guava			0.6		0.6
	Papaya			0.02		0.02
	Walnut			1.01		1.01
<b>Horticultural crops - Vegetables</b>		<b>Irrigated</b>		<b>Rainfed</b>		<b>Total area</b>
	Potato	0.05		2.4		2.4
	Ginger	0.03		0.07		0.1
	Turmeric	0.003		0.01		0.01
	Garlic	0.03		0.2		0.2
	Chilli	0.01		0.13		0.1
	Peas	0.25		1.5		1.7
	Tomato	0.85		0.2		1.05
	Cole crops	0.53		0.2		0.7
	Cucurbits	0.3		0.01		0.3
	Other vegetables	0.44		1.5		1.9
<b>Medicinal and Aromatic crops</b>						
	Amla	0.0		0.02		0.02
<b>Plantation crops</b>						
	Tea	0.0		0.4		0.5
<b>Fodder crops</b>						

	Berseem	0.2	0.1	0.3
	Sorghum-Pearl millet	0.1	0.1	0.2
	Others	0.0	0.07	0.07
	<b>Total fodder crop area</b>	0.3	0.32	0.6
	<b>Grazing land</b>			96.2
	<b>Sericulture etc</b>	0.0	0.1	0.1

\*Source: District Mandi Statistical Report 2008-09

<b>1.8</b>	<b>*Livestock</b>	<b>Total number ('000)</b>	
	Cattle	485.8	
	Buffaloes total	81.6	
	Commercial dairy farms	-	
	Goat	226.4	
	Sheep	140.8	
	Rabbit (Angora)	2.5	
	Dogs	15.2	
	Equines etc.	7.5	
	Horses & Pony	2.1	
	Mule	4.3	
	Donkeys	0.2	

\*Source: Livestock Censes 2007.

<b>1.9</b>	<b>*Poultry</b>	
	Commercial	45,135
	Backyard	

\*Source: District Mandi Statistical Report 2008-09

<b>1.10</b>	<b>*Inland Fisheries</b>	Area ('000 ha)	Yield (t/ha)	Production (tones)
	Brackish water			
	Fresh water (Riverine)			608
	Others (commercial farming)			1.5

\*Source: District Mandi Statistical Report 2008-09

### 1.11 Production and productivity of major crops

Crops	Kharif		Rabi		Summer		Total	
	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
Maize	137.2	2820					137.2	2820
Rice	26.3	1258					26.3	1258
Wheat			121.193	1826			121.1	1826
Barley			8.621	2119			8.6	2119
Green pea			19.750	8273			19.7	8273
Potato			34.484	14300			34.4	14300
<b>Major Horticultural crops</b>								
Apple	46.0	3031					46.5	3031
Stone fruits	0.7	392					0.7	392
Citrus fruits					6.5	1591	6.5	1591
Mango	1.6	422					1.6	422
Litchi	0.2	887					0.2	887
Guava			0.9	1425			0.9	1425
Papaya					0.05	2009	0.05	2009
Walnut			0.2	256			0.26	256

\*Source: District Agricultural Plan, Mandi (Vol. III, 2009) Department of Agriculture (H.P.) consulting agency CSK Himachal Pradesh Agricultural University Palampur

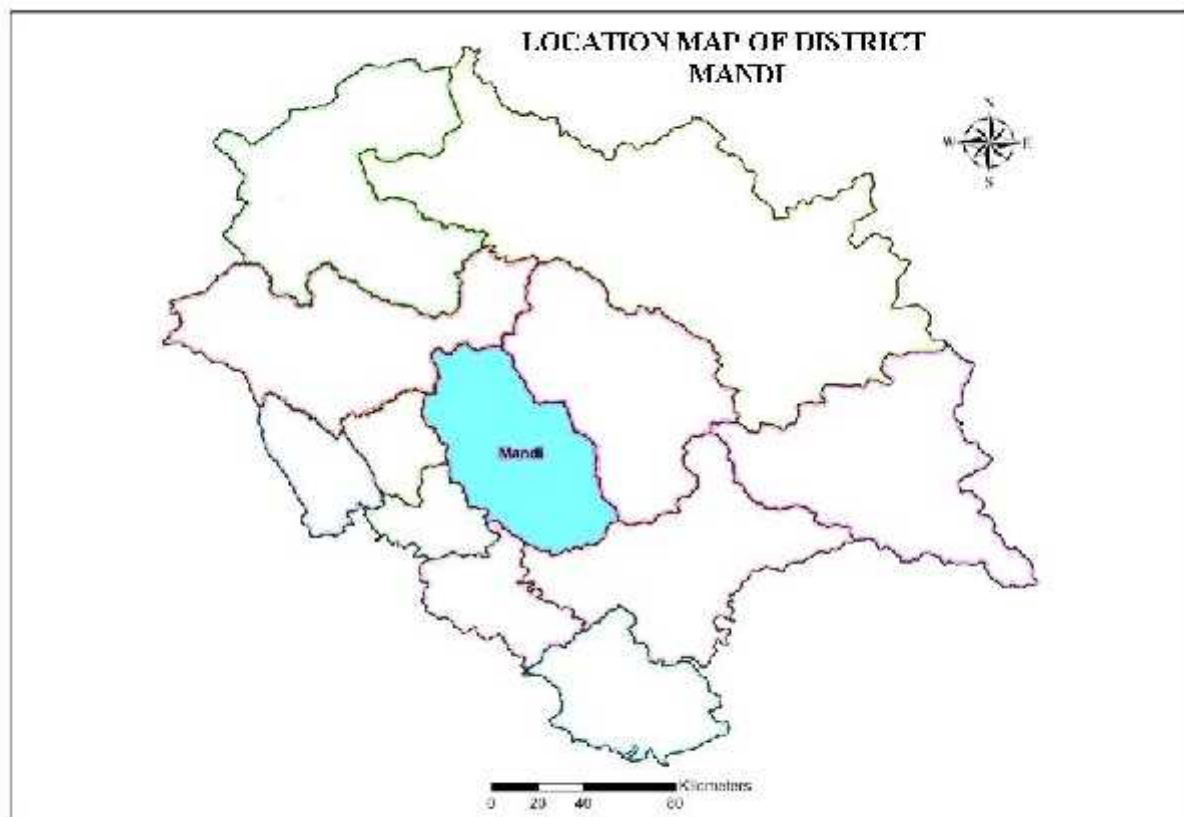
1.12	Sowing window for 5 major crops (start and end of sowing period)	Maize	Rice	Wheat	Barley	Blackgram
	Kharif- Rainfed	3 <sup>rd</sup> week of May to 3 <sup>rd</sup> week of June	3 <sup>rd</sup> week of May to 1 <sup>st</sup> week of June		-	3 <sup>rd</sup> week of June to 2 <sup>nd</sup> week of July
	Kharif-Irrigated	2 <sup>nd</sup> week of May to 3 <sup>rd</sup> week of June	3 <sup>rd</sup> week of May to 1 <sup>st</sup> week of June		-	3 <sup>rd</sup> week of June to 2 <sup>nd</sup> week of July
	Rabi- Rainfed		-	1 <sup>st</sup> week of October to 4 <sup>th</sup> week of November	4 <sup>th</sup> week of October to 2 <sup>nd</sup> week of November	-
	Rabi-Irrigated		-	1 <sup>st</sup> week of October to 2 <sup>nd</sup> week of	3 <sup>rd</sup> week of October to 2 <sup>nd</sup> week of November	-

			November		
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1.13	What is the major contingency the district is prone to?	Regular	Occasional	None
	Drought	✓		
	Flood			✓
	Cyclone			✓
	Hail storm	✓		
	Heat wave		✓ (May-June)	
	Cold wave	✓ (Dec.-Feb)		
	Frost	✓ (Dec.-Feb)		
	Sea water inundation			✓
	<b>Pests and disease outbreak</b> (Borers, Fungal, Bacterial and Viral diseases)			
	Fruit fly of tomato and cucurbits	✓		
	Yellow rust of wheat	✓		
	Bacterial wilt of tomato/capsicum	✓		
	Powdery mildew of peas	✓		

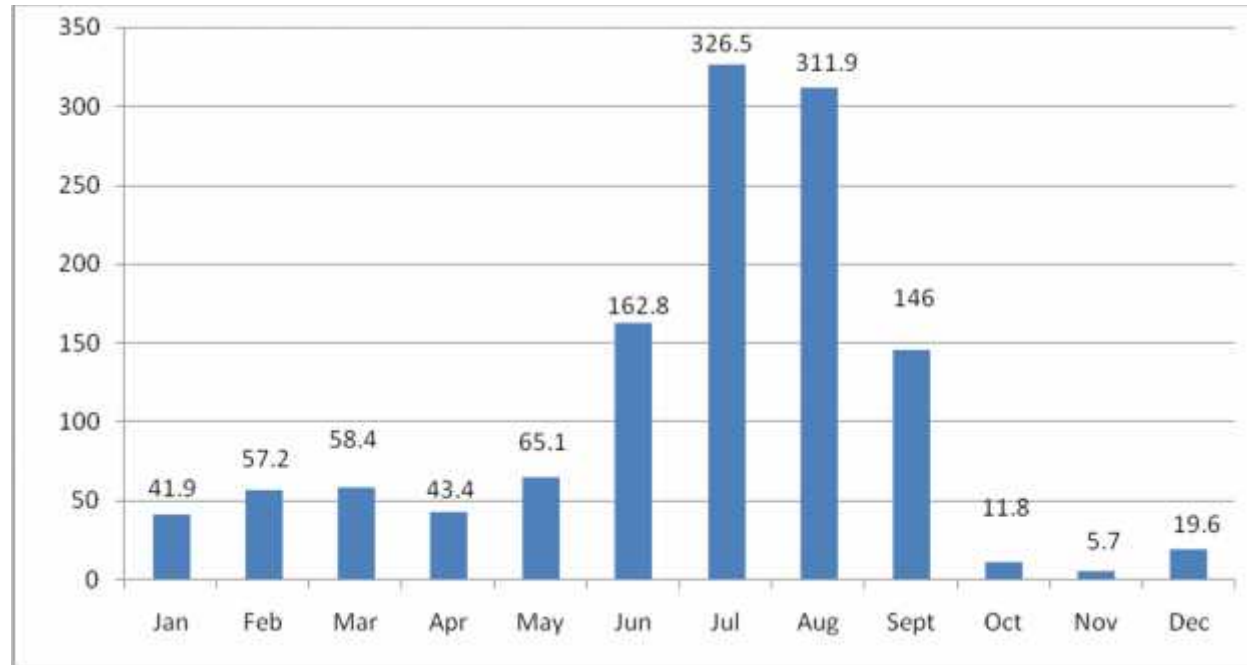
1.14	Include Digital maps of the district		
		Location map of district within State as Annexure- I	Enclosed: Yes
		Mean annual rainfall as Annexure- II	Enclosed: Yes
		Soil map as Annexure- III	Enclosed: Yes

**Annexure-I**  
**Location map of district**

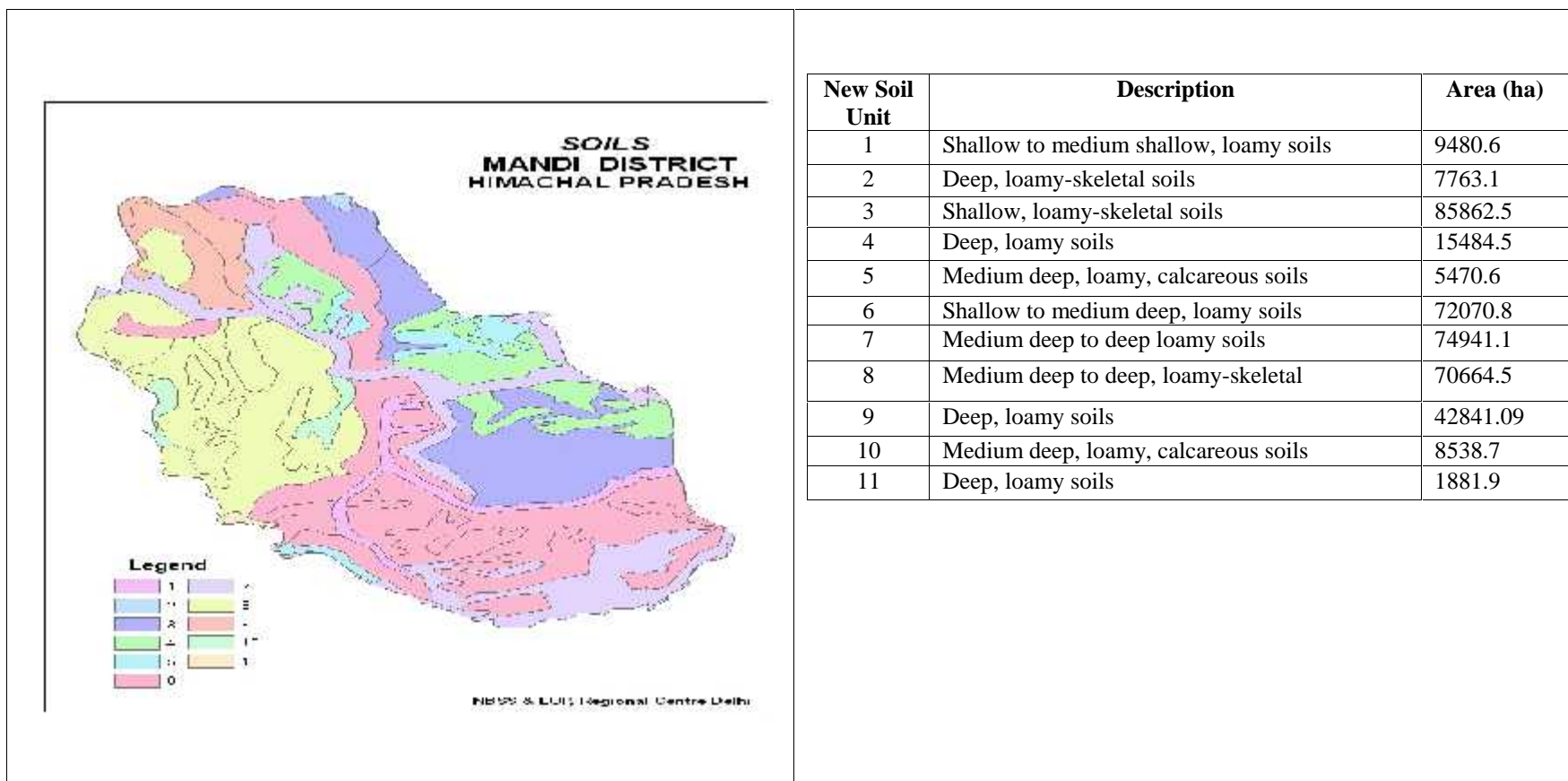




**Annexure-II: Mean Monthly Rainfall (mm)**



### ANNEXURE-III: Soil Classification Map



## 2.0 Strategies for weather related contingencies

### 2.1 Drought

#### 2.1.1 Rain fed situation (*Kharif* season)

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
<p><b>Delay by 2 weeks</b></p> <p>Normal onset on 20<sup>th</sup> June ±10 days</p> <p>1<sup>st</sup> week of July</p> <p>(sowing is done generally by 20<sup>th</sup> of June with pre monsoon showers)</p>	<b>Upland</b>	Rice (Transplanted / Direct seeded) (Rice-wheat system)	No change	Increase the seed rate (25%) Addition of organic manures(FYM/compost) @ 5-10 t/ha	Dept. of Agriculture, ISOPOM
			Maize (Double Decalb, PSCL-4642, PSCL-4640, PSCL-3438, HQPM-1, Early Composite, Girija)	Increase the seed rate (25%) Addition of organic manures(FYM/compost) @ 5-10 t/ha	
			Baby Corn: VL 78/ Early Composite		
		Maize (Maize-wheat system)	Maize + Soybean (Harit soya)	Re-sowing & intercropping	
			Cowpea (C-475, C-519), Soybean (Harit soya), Black gram (Himachal Mash-1, UG-218)	-	
			Cowpea (C-475, C-519), Soybean (Harit soya) Black gram (Himachal Mash-1, UG-218)	-	
	<b>Lowland</b>	Rice (Transplanted /Direct seeded) (Rice-wheat system)	Rice (Direct seeded: VL-221/HPR-1156)	Increase the seed rate (25%)	
			Maize (Double Decalb, PSCL-4642, PSCL-4640, PSCL-3438, HQPM-1, Early Composite, Girija), Baby Corn ( up to 15 <sup>th</sup> Aug): VL	Proper drainage Increase the seed rate (25%) Addition of organic manures(FYM/compost) @ 5-10 t/ha	
	Shallow to deep loamy soils				
	Deep loamy skeletal soils to deep loamy soils				

			78/ Early Composite		
			Maize + Soybean (Harit Soya)	Re-sow maize if germination is less than 20%. & Intercropping	
			Soybean (Harit soya)	-	
			Black gram (UG-218, Himachal Mash-1, Palampur-93)	-	

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
<b>Early season drought (delayed onset)</b>					
<b>Delay by 4 weeks</b>  <b>3<sup>rd</sup> week of July</b>	Upland  Shallow to medium deep loamy soils	Rice (Direct seeded) (Rice-wheat system)	Rice (Direct seeded: VL-221)	Increase the seed rate (25%) Addition of organic manures (FYM/compost) @ 5-10 t/ha	Dept. of Agriculture, ISOPOM
		Maize (Maize-wheat system)	Maize (Double Decalb, PSCL-4642, PSCL-4640, PSCL-3438, HQPM-1, Early Composite, Girija) Baby Corn: VL 78/ Early Composite	Increase the seed rate (25%) Addition of organic manures (FYM/compost) @ 5-10 t/ha	
			Black gram (UG-218, Himachal Mash-1)	Increase the seed rate (25%)	
		Cowpea, Finger-millet (Finger millet/pulse-wheat system)	Black gram (Himachal Mash-1, UG-218)	Increase the seed rate (25%)	
	Lowland  Deep loamy skeletal soils to deep loamy soils	Rice (Direct seeded) (Rice-wheat system)	Maize (Double Decalb, PSCL-4642, PSCL-4640, PSCL-3438, HQPM-1, Early Composite, Girija)	Proper drainage, higher seed rate, addition of organic manures (FYM/compost) @ 5-10 t/ha	
		Cowpea (C-475, C-519)	Increase the seed rate		

			(25%)	
		Black gram (UG-218, Himachal Mash-1)	Increase the seed rate (25%)	

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 2 <sup>nd</sup> week of Aug	Upland	Rice (Direct seeded)	Early pea (Arkel, Matar Ageta, Palam Triloki) Radish (Pusa Chetki, Pusa Himani) French bean (Laxmi, Arka Komal) Kharif onion (AFDR, N-53) Cauliflower (Pusa Dipali, Improved Japani) Broccoli (Palam Vichitra, Palam Samridhi) Cabbage (Golden Acre/Pusa Mukta) Tomato (Palam Pink, Palam Pride, Solan Sindhur)	-	Dept. of Agriculture, ISOPOM, RKVY  ----Dept of horticulture
	Shallow to medium deep loamy soils	(Rice-wheat system)	Maize, finger-millet, Blackgram, cowpea	Early pea (Arkel, Matar Ageta, Palam Triloki) Radish (Pusa Chetki, Pusa Himani) French bean (Laxmi, Arka Komal) Kharif onion (AFDR, N-53) Cauliflower (Pusa Dipali, Improved Japani) Broccoli (Palam Vichitra, Palam Samridhi) Cabbage (Golden Acre/Pusa Mukta) Tomato (Palam Pink, Palam Pride, Solan Sindhur)	
	Lowland	Rice (Direct	Early pea (Arkel, Matar Ageta, Palam	-	

	Deep loamy-skeletal soils to deep loamy soils	seeded) (Rice-wheat system)	Triloki) Radish (Pusa Chetki, Pusa Himani) French bean (Laxmi, Arka Komal) Kharif onion (AFDR, N-53) Cauliflower (Pusa Dipali, Improved Japani) Broccoli (Palam Vichitra, Palam Samridhi) Cabbage (Golden Acre/Pusa Mukta) Tomato (Palam Pink, Palam Pride, Solan Sindhur)		
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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 8 weeks 4 <sup>th</sup> week of Aug	Upland  Shallow to medium deep loamy soils	Rice (Direct seeded) (Rice-wheat system)	Green fodder (Barley)) Early pea (Arkel, Matar Ageta, Palam Triloki) Radish (Pusa Chetki, Pusa Himani) French bean (Laxmi, Arka Komal) Kharif onion (AFDR, N-53) Cauliflower (Pusa Dipali, Improved Japani) Broccoli (Palam Vichitra, Palam Samridhi) Cabbage (Golden Acre/Pusa Mukta) Tomato (Palam Pink, Palam Pride, Solan Sindhur) Chinese cabbage (Palampur Green)		Dept. of Agriculture, ISOPOM, RKVY
		Maize, finger-millet, Blackgram, cowpea	Early pea (Arkel, Matar Ageta, Palam Triloki), Radish (Pusa Chetki, Pusa Himani), French bean (Laxmi, Arka Komal) Kharif onion (AFDR, N-53) Cauliflower (Pusa Dipali, Improved Japani)	-	

			Broccoli (Palam Vichitra, Palam Samridhi) Cabbage (Golden Acre/Pusa Mukta) Tomato (Palam Pink, Palam Pride, Solan Sindhur)	
			Toria (Bhawani), Spinach (Pusa Harit), Chinese cabbage (Palampur Green)	
			Green fodder (Barley), Green fodder (Berseem, Oats)	
			Wheat (VL-829, HPW-251), Barley (Vimal), Barley (HBL-276)	Delayed sowing of early wheat & barley
			Garlic : GHC 1 Fodder oats : Palampur-1, & Kent	
	Lowland  Deep loamy-skeletal soils to deep loamy soils	Rice (Direct seeded) (Rice-wheat system)	Toria (Bhawani) Green fodder (Chari, bajra) Early pea (Arkel, Matar Ageta, Palam Triloki) Radish (Pusa Chetki, Pusa Himani) French bean (Laxmi, Arka Komal) Kharif onion (AFDR, N-53) Cauliflower (Pusa Dipali, Improved Japani) Broccoli (Palam Vichitra, Palam Samridhi) Cabbage (Golden Acre/Pusa Mukta) Tomato (Palam Pink, Palam Pride, Solan Sindhur) Green fodder (Berseem, Oats, Barley), Chinese cabbage (Palampur Green)	
			Green fodder (Barley) Green fodder (Berseem, Oats)	Sowing of fodder crops
			Wheat (VL-829, HPW-251), Barley (Vimal), Barley (HBL-276)	Delayed sowing of early wheat & barley

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
<b>(Normal date of onset of monsoon 1<sup>st</sup> week of July) followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.</b>	<b>Upland</b> Shallow to medium deep loamy soils	Rice (Transplanted/direct seeded) (Rice-wheat system)	Gap filling/re-sowing	Top dressing of N application should coincides with rain splashes Rain water harvesting of surrounding fields	Construction of rain water harvesting ponds through IWMP and MNREGS
		Maize (Maize-wheat system)	Intercropping/mixed cropping of black gram, soybean	Rain water harvesting of surrounding fields Use local available plant material for mulch	
		Finger-millet (Finger millet-wheat system)	Gap filling through seedlings	Rain water harvesting of surrounding fields Use local available plant material for mulch	
	<b>Lowland</b> Deep loamy-skeletal soils to deep loamy soils	Rice (Transplanted/direct seeded) (Rice-wheat system)	Gap filling	Top dressing of N application should coincides with rain splashes Rain water harvesting of surrounding fields Use local available plant material for mulch	

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	Remarks on implementation
<b>At vegetative stage</b>	Shallow to medium deep loamy soils	Rice (Transplanted/Direct seeded) (Rice-wheat system)	Gap filling, use anti-transpirants, life saving irrigation if available	Foliar N management (1% urea spray) instead of top dressing of N	Construction of rain water harvesting ponds through IWMP and MNREGS
		Maize (Maize-wheat system)		Efficient weed management and their	
		Finger-millet			



		(Finger millet-wheat system)		<i>in-situ</i> mulching Use local available plant material for mulch	
		Cowpea, blackgram (Rice-wheat system)			
	<b>Lowland</b> Deep loamy-skeletal soils to deep loamy soils	Rice (Transplanted/Direct seeded) (Rice-wheat system)	Gap filling, use anti-transpirants, life saving irrigation if available	Foliar N management (1% urea spray) instead of top dressing of N Efficient weed management and their <i>in-situ</i> mulching Use local available plant material for mulch	

Condition	Suggested contingency measures				
Mid season drought (long dry spell)	Major Farming situation	Crop/cropping system	Crop management	Soil nutrient & moisture conservation measure	Remarks on Implementation
<b>At reproductive stage</b>	<b>Upland</b>  Shallow to medium deep loamy soils	Rice (Transplanted/Direct seeded) (Rice-wheat system)	Site-specific crop management technologies: <ul style="list-style-type: none"> <li>• If crop stand is poor then use of crop as fodder.</li> <li>• If grain setting has occurred in maize, the tassels can be cut down to reduce transpiration</li> <li>• Cowpea and Blackgram can be incorporated as green manure &amp; conserve moisture for <i>Rabi</i> crops,</li> <li>• If rain comes Toria can be sown, in mid September</li> <li>• Thinning, life saving irrigation from rain</li> </ul> water harvest ponds,	Foliar N management (1 % urea spray) instead of top dressing of N, if the crop stand is still better Use local available plant material for mulch	Construction of rain water harvesting ponds through IWMP and MNREGS
		Maize, Finger-millet (maize/fingermillet-wheat system)			
		Cowpea, Blackgram (Pulse-wheat system)			

			Weeding and Weed mulching <ul style="list-style-type: none"> <li>• Anti-transpirant spray</li> <li>• Harvesting at physiological maturity</li> </ul>		
	<b>Lowland</b>  Deep loamy-skeletal soils to deep loamy soils	Rice (Transplanted/Direct seeded) (Rice-wheat system)	Site-specific crop management technologies: <ul style="list-style-type: none"> <li>• Life saving irrigation, if available</li> <li>• Toria can be sown, in mid September (If rainfall receives)</li> <li>• Anti-transpirant spray</li> <li>• Harvesting at physiological maturity</li> </ul>	Foliar N management (1 % urea spray) instead of top dressing of N application. Efficient weed management and their <i>in-situ</i> mulching Use local available plant material for mulch	Construction of rain water harvesting ponds through IWMP and MNREGS

Condition	Suggested contingency measures				
Terminal drought	Major Farming situation	Crop/cropping system	Crop Management	Rabi crop planning	Remarks on Implementation
	<b>Upland</b>  Shallow to medium deep loamy soils	Rice (Transplanted/Direct seeded) (Rice-wheat system)	Site-specific crop management technologies: <ul style="list-style-type: none"> <li>• If crop stand is poor use crop as fodder.</li> <li>• Cowpea and blackgram can be incorporated as green manure &amp; conserve moisture for <i>Rabi</i> crops,</li> <li>• Weeding and weed mulching</li> <li>• Anti-transpirant spray</li> <li>• Harvest whatever crop is available and immediately conserve the soil moisture for <i>Rabi</i> crops</li> </ul>	<i>In-situ</i> moisture conservation and sowing of <i>Zaid</i> toria/Frenchbean if possible otherwise <i>Rabi</i> crops sowing would be done after the receiving of rainfall spell	Construction of rain water harvesting ponds through IWMP and MNREGS
Maize (Maize-wheat system)					
Cowpea (Pulse-wheat system)					
Blackgram (Pulse-wheat system)					
Finger-millet (Finger millet-wheat system)					
	<b>Lowland</b>	Rice (Transplanted/Direct seeded)	Site-specific crop management:	<i>In-situ</i> moisture conservation and sowing of toria/ French	

	Deep loamy-skeletal soils to deep loamy soils	(Rice-wheat system)	<ul style="list-style-type: none"> <li>Harvesting at physiological maturity</li> <li>Harvest whatever crop is available and immediately conserve the soil moisture for <i>Rabi</i> crops</li> </ul>	bean if possible otherwise.  <i>Rabi</i> crops sowing should be done after the rainfall spells are received	
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### 2.1.2 Rain fed situation (*Rabi* season)

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 2 weeks  1 <sup>st</sup> week of January  (Normal onset 20 <sup>th</sup> December $\pm$ 31 days)	Shallow to medium deep loamy soils, and deep loamy-skeletal soils to deep loamy soils	Wheat (Rice/maize-wheat cropping system)	No change Late sown wheat (VL892, HS-420, HPW-42, Raj 3777),	Addition of organic manures (FYM/compost) @ 5-10 t/ha, increase seed rate by 25%, reduce N fertilizer dose by 25% Adopt soil moisture conservation measures with locally available mulch materials	
Barley (Maize-barley system)		Change of crop Late sown wheat (VL892, HS-420, HPW-42, Raj 3777)	Addition of organic manures (FYM/compost) @ 5-10 t/ha, increase seed rate by 25%, reduce N fertilizer dose by 25% Adopt soil moisture conservation measures with locally available mulch materials		
Wheat (Rice/maize-wheat system)		Intercropping	Intercropping with Gobhi sarson/brown sarson,		

				addition of organic manures (FYM/compost) @ 5-10 t/ha, reduce N fertilizer dose by 25%, adopt soil moisture conservation measures with locally available mulch materials	
		Wheat (Rice/maize-wheat system)	Change of crop like Gobhi Sarson (Sheetal, Neelam, ONK-1), Brown sarson (KBS-3), Peas (AP-1), potato (Kufri Jyoti)	Addition of organic manures (FYM/compost) @ 5-10 t/ha, reduce N fertilizer dose by 25%, adopt soil moisture conservation measures with locally available mulch materials	
		Wheat (Rice/maize-wheat system)	Change of crop Gram (HC-1, HC-2, GPF-2), lentil (Vipasha, Markandey)	Increase the seed rate (25%)	

<b>Condition</b>	<b>Suggested Contingency measures</b>				
<b>Early season drought (delayed onset)</b>	<b>Major Farming situation</b>	<b>Crop/cropping system</b>	<b>Change in crop/cropping system</b>	<b>Agronomic measures</b>	<b>Remarks on Implementation</b>
Delay by 4 weeks  3 <sup>rd</sup> week of January	Shallow to medium deep loamy soils, and deep loamy-skeletal soils to deep loamy soils	Wheat (Rice/maize-wheat system)	No change  Late sown wheat (VL892, HS-420, HPw-42, Raj 3777)	Increase the seed rate (25%) Addition of organic manures(FYM/compost) @ 5-10 t/ha, reduce N fertilizer dose by 25%, adopt soil moisture conservation measures with locally available mulch materials	
		Barley (Maize-barley system)	Change of crop Late sown wheat (VL892, HS-	Increase the seed rate (25%)	

			420, HPw-42, Raj 3777)	Addition of organic manures (FYM/compost) @ 5-10 t/ha, reduce N fertilizer dose by 25%, adopt soil moisture conservation measures with locally available mulch materials	
		Wheat (Rice/maize-wheat system)	Intercropping with gobhi sarson/brown sarson	Intercropping, Increase the seed rate (25%), addition of organic manures (FYM/compost) @ 5-10 t/ha, reduce N fertilizer dose by 25%, adopt soil moisture conservation measures with locally available mulch materials	
		Wheat, sarson, gram, lentil	Peas (AP-1), potato (Kufri Jyoti), fodder oat	Adopt soil moisture conservation measures with locally available mulch materials	

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 1 <sup>st</sup> week of February	Shallow to medium deep loamy soils, and deep loamy-skeletal soils to deep loamy soils	Wheat, barley, gram, sarson	Change of crop  Potato (Kufri Jyoti)/green coriander/Spinach	Adopt soil moisture conservation measures with locally available mulch materials	

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 8 weeks 3 <sup>rd</sup> week of February	Shallow to medium deep loamy soils, and deep loamy-skeletal soils to deep loamy soils	Wheat (Rice/maize-wheat system)	Change of crop Potato, green coriander, Spinach	Adopt soil moisture conservation measures with locally available mulch materials	
		Wheat (Rice/maize-wheat system)	Change of crop/farming system	Fodder oats	

Condition	Suggested contingency measures				
Early season drought (Normal onset)	Major farming situation	Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on implementation
	Shallow to medium deep loamy soils, and deep loamy-skeletal soils to deep loamy soils	Wheat (Rice/maize-wheat system)	Intercropping with <i>Brassica</i>	Top dressing of N should be recommended and should coincides with rain splashes, adopt soil moisture conservation measures with locally available mulch materials	
		Wheat (Rice/maize-wheat system)	Inter cropping with Gram	Top dressing of N should be recommended and should coincides with rain splashes, adopt soil moisture conservation measures with locally available mulch materials	
		Barley (Maize-barley system)	Shift of crop as fodder	Top dressing of N should be recommended and should coincides with rain splashes, adopt soil moisture conservation measures with locally available mulch materials	
		Potato, Gram, <i>Brassicas</i>	Site-specific crop management technologies	Efficient weed management and their <i>in-situ</i> mulching, adopt soil moisture	

				conservation measures with locally available mulch materials	
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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 measures	Remarks on implementation
At vegetative stage	Shallow to medium deep loamy soils, and deep loamy-skeletal soils to deep loamy soils	Wheat, Barley (Maize-barley/wheat system)	Site-specific crop management technologies	Foliar N management (1% urea spray) Efficient weed management and their <i>in-situ</i> mulching, adopt soil moisture conservation measures with locally available mulch materials	
		Peas, Potato, Gram, <i>Brassicac</i> s	Site-specific crop management technologies	Efficient weed management and their <i>in-situ</i> mulching, adopt soil moisture conservation measures with locally available mulch materials	

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	Shallow to medium deep loamy soils, and deep loamy-skeletal soils to deep loamy soils	Wheat, barley (Maize-barley/wheat system)	Site-specific crop management technologies and if crop stand is poor then use of crop as fodder	Foliar N management (1% urea spray) instead of Top dressing of N, if the crop stand is still better, life saving irrigation, adopt soil moisture conservation measures with locally available mulch materials	

		Gram, <i>Brassicas</i> , potato, peas	Site-specific crop management technologies	Efficient weed management and their <i>in-situ</i> mulching, life saving irrigation, adopt soil moisture conservation measures with locally available mulch materials	
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Condition			Suggested contingency measures		
Terminal drought	Major Farming situation	Crop/cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
	Shallow to medium deep loamy soils, and deep loamy-skeletal soils to deep loamy soils	Wheat, barley (Maize-barley/wheat system)	If crop stand is poor then use of crop as fodder	<i>In-situ</i> moisture conservation and sowing of <i>summer</i> crop if possible after the rainfall spells are received, life saving irrigation, adopt soil moisture conservation measures with locally available mulch materials	
		Gram, <i>Brassica</i> , Potato, peas	Site-specific crop management technologies	Efficient weed management and their <i>in-situ</i> mulching, life saving irrigation, adopt soil moisture conservation measures with locally available mulch materials	

### 2.1.3 Irrigated situation (Kharif Season)

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	Shallow to medium deep loamy soils,	Rice (Direct seeded/Transplanted)	Direct seeded rice (Varietal intervention: VL-221/HPR-	Foliar N management (1% urea spray)	



Condition	Suggested contingency measures				
	Major farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on implementation
canals due to low rainfall	and deep loamy-skeletal soils to deep loamy soils (Irrigated)		1156 in mid hill areas)		
			Direct seeded rice (Varietal intervention: Bharigu-dhan/ Varun dhan above 1500 m amsl)	Foliar N management (1% urea spray)	
		Maize (Maize-wheat system)	Maize + soybean, maize + cowpea, maize + black gram; Baby Corn: VL 78/ Early Composite	Intercropping	
		Cowpea, Blackgram (Pulse-wheat system)	No change	<i>In-situ</i> moisture conservation, weeding/mulching, life saving irrigation	
		Finger-millet	No change	<i>In-situ</i> moisture conservation, weeding/mulching, life saving irrigation	
		Okra	Adjustment of sowing dates	<i>In-situ</i> moisture conservation, weeding/mulching, life saving irrigation	

Condition	Suggested contingency measures				
	Major farming situation	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	Shallow to medium deep loamy soils, and deep loamy-skeletal soils to deep loamy soils (Irrigated)	Rice (Direct seeded/Transplanted) (Rice-wheat system)	Direct seeded rice (Varietal intervention: VL-221/HPR-1156 in mid hill areas)	Adjustment in sowing dates, foliar N management (1% urea spray)	
			Direct seeded rice (Varietal intervention: Bharigu-dhan/ Varun dhan above 1500 m amsl)	Adjustment in sowing dates, foliar N management (1% urea spray) instead of top N	

Condition	Suggested contingency measures				
	Major farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on implementation
				dress	
		Maize (Maize-wheat system)	Maize + soybean, maize + cowpea, maize + black gram; Baby Corn: VL 78/ Early Composite	Intercropping, <i>In-situ</i> moisture conservation, weeding/mulching	
		Cowpea, Blackgram (Pulse-wheat system)	No change in crop' Adjustment in sowing dates	<i>In-situ</i> moisture conservation, weeding/mulching	
		Finger-millet, okra	No change in crop, adjustment in sowing dates		

Condition	Suggested contingency measures				
	Major farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Shallow to medium deep loamy soils, and deep loamy-skeletal soils to deep loamy soils (Irrigated)	Rice (Direct seeded/Transplanted)  (Rice-wheat system)	Direct seeded rice (Varietal intervention: VL-221/HPR-1156 in mid hill areas)	<ul style="list-style-type: none"> <li>• Adjustment in sowing dates,</li> <li>• Foliar N management (1% urea spray)</li> <li>• <i>In-situ</i> moisture conservation, weeding/mulching</li> <li>• Limited irrigation</li> <li>• Alternate furrow irrigation/ drip irrigation for upland crops</li> </ul>	-
			Direct seeded rice (Varietal intervention: Bharigu-dhan/ Varun Dhan above 1500 m amsl)		
		Maize (Maize-wheat system)	Maize + soybean, maize + cowpea, maize + black gram; Baby Corn: VL 78/ Early Composite		
		Cowpea, blackgram	No change Adjustment in sowing dates		
		Finger-millet, okra	No change Adjustment in sowing dates		
			Green fodder (Jowar, Bajra)		

Condition	Suggested contingency measures				
	Major farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on implementation
Insufficient groundwater recharge due to low rainfall	Shallow to medium deep loamy soils, and deep loamy-skeletal soils to deep loamy soils (Irrigated)	Rice (Direct seeded/Transplanted) (Rice-wheat system)	Direct seeded rice (varietal intervention: VL-221/HPR-1156 in mid hill areas)	Adjustment in sowing dates, Foliar N management (1% urea spray), Intercropping, <i>In-situ</i> moisture conservation, weeding/mulching, limited irrigation, alternate furrow irrigation, drip irrigation, anti-transpirant spray	-
			Direct seeded rice (Varietal intervention: Bharigu-dhan/Varun Dhan above 1500 m)		
		Maize (Maize-wheat system)	Maize + soybean, maize + cowpea, maize + black gram; Baby Corn: VL 78/ Early <i>Composite</i>		
			Green fodder (Chari, Bajra), maize (African Tall )		
			Cowpea, blackgram		
Finger-millet, okra	No change Adjustment of sowing dates				

#### 2.1.4 Irrigated situation (Rabi season)

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	Shallow to medium deep loamy soils, and deep loamy-skeletal soils to deep loamy soils (Irrigated)	Wheat (Rice-wheat system)	Wheat + gram or Wheat + Gobhi sarson	Intercropping, <i>In-situ</i> moisture conservation, life saving irrigation	-
		Pea, Barley	Sowing of late sown pea cultivars	<i>In-situ</i> moisture conservation, life saving irrigation	
		Potato	Adjustment in potato sowing dates	<i>In-situ</i> moisture conservation, life saving irrigation	

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

### 2.2.1 Unusual rains (untimely, unseasonal etc) (for both Rain fed and irrigated situations) Kharif season

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
<b>Continuous high rainfall in a short span leading to water logging</b>				
Rice	Strengthening of field bunds, In water logged condition, arrange the open drains about 60cm in depth and 45cm width across the field	Drain out excess water through drainage channels, top dressing of N after water draining	Drain out excess water Harvesting at physiological maturity	Storage at safer farmer warehouse/tent covering of produce, proper drying and storage of grains, use mechanical drier
Maize, Cowpea, Blackgram, Finger-Millet, Okra	Construct open drainage channels across the field	Drain out excess water through drainage channel	Cob harvesting from standing crop, drain out excess water, Harvesting at physiological maturity	Proper drying and storage of grains
Green fodder	Form open drainage channels	Drain out excess water through	-	-

	across the field	drainage channel		
<b>Horticulture</b>				
Apple	-	-	-	Proper storage and immediate transportation to market/godown
Mango	-	-		Proper storage and immediate transportation to market/godown
Pea, potato, tomato, cucurbits	Form open drainage channels across the field	Drain out excess water through drainage channel	Harvesting at proper stage	Storage and immediate transportation to market
<b>Heavy rainfall with high speed winds in a short span<sup>2</sup></b>				
Rice, maize, cowpea, black gram, finger-millet	In water logged condition, form open drains across the field	Drain out excess water through drainage channel	Drain out excess water Harvesting at physiological maturity	Storage at safer warehouse, Proper drying and storage of grains
<b>Horticulture</b>				
Pome Fruits (Apple & Pear)	<ul style="list-style-type: none"> <li>• Complete drainage</li> <li>• Drain excess water from the basin of the tree</li> <li>• Till the soil within the basin to improve soil aeration and to control weeds</li> <li>• Apply 40-50 kg FYM/ tree or recommended nutrients to avoid deficiencies of nutrients due to leaching losses for better growth</li> </ul>	<ul style="list-style-type: none"> <li>• Complete drainage</li> <li>• Drain excess water from the basin of tree</li> <li>• Till the soil within the basin to improve soil aeration and to control weeds</li> <li>• Apply 40-50 kg FYM/ tree or recommended nutrients to avoid deficiencies of nutrients due to leaching losses for better growth</li> <li>• Hormonal or multi nutrient spray to promote flowering and fruit set.</li> <li>• Use supplementing pollination techniques to improve pollination and fruit set.</li> </ul>	<ul style="list-style-type: none"> <li>• Complete drainage</li> <li>• Till the soil within the basin to improve soil aeration and to control weeds</li> <li>• Apply 40-50 kg FYM/ tree or recommended nutrients to avoid deficiencies of nutrients due to leaching losses for better growth</li> </ul>	<ul style="list-style-type: none"> <li>• Complete drainage, Channelization of excess water</li> <li>• Harvest the fruit on clear sunny day</li> <li>• Proper storage and immediate transportation to market/godown</li> </ul>
Mango	<ul style="list-style-type: none"> <li>• Complete drainage</li> <li>• Drain excess water from</li> </ul>	<ul style="list-style-type: none"> <li>• Complete drainage</li> <li>• Drain excess water from</li> </ul>	<ul style="list-style-type: none"> <li>• Complete drainage</li> <li>• Till the soil within</li> </ul>	Proper storage and immediate transportation

	<p>the basin of the tree</p> <ul style="list-style-type: none"> <li>• Till the soil within the basin to improve soil aeration and to control weeds</li> <li>• Apply 40-50 kg FYM/ tree or recommended nutrients to avoid deficiencies of nutrients due to leaching losses for better growth</li> </ul>	<p>the basin of the tree</p> <ul style="list-style-type: none"> <li>• Till the soil within the basin to improve soil aeration and to control weeds</li> <li>• Apply 40-50 kg FYM/ tree or recommended nutrients to avoid deficiencies of nutrients due to leaching losses for better growth</li> <li>• Hormonal or multi nutrient spray to promote flowering and fruit set.</li> <li>• Use of supplementing pollination techniques to improve pollination and fruit set.</li> </ul>	<p>the basin to improve soil aeration and to control weeds</p> <ul style="list-style-type: none"> <li>• Apply 40-50 kg FYM/ tree or recommended nutrients to avoid deficiencies of nutrients due to leaching losses for better growth</li> </ul>	to market/godown
Walnut & Dry Fruits	Complete drainage, Channelization of excess water	Complete drainage, Channelization of excess water	Complete drainage, Channelization of excess water	Complete drainage, Channelization of excess water
Vegetables (Pea, Tomato, Cucurbits)	Proper Staking/Drainage	Staking	Field drainage	Storage and immediate transportation to market
<b>Outbreak of pests and diseases due to unseasonal rains</b>				
Rice	<p>Brown plant hopper</p> <p>Drain the water before use of insecticides and direct the spray towards the base of the plants.</p> <p>Monocrotophos @ 1250 ml/ha (or) Acephate 500 g/ha</p>	<p>Brown plant hopper</p> <p>Drain water before use of insecticides and direct the spray towards the base of the plants.</p> <p>Monocrotophos @ 500 ml/ac. (or) Acephate 200 g /ac.</p> <p><i>Blast</i>: Spray after observing initial infection of the disease, Carbendazim @ 1 g/l.</p>	<p>Cutworm: Prolonged dry spell followed by heavy downpour leads to cutworm outbreak. Spray Chloropyriphos 2.5 ml/lit or Thiodicarb 75 WP 1.25 g/lit.</p> <p>False smut : Spray copper hydroxide 0.25 %</p>	Not applicable
Maize	Drainage	Top N dress after rain spells	Field drainage	Not applicable
Cowpea, Blackgram, Kidneybean	<p><u>Wilt</u> in low lying water logged patches:</p> <p>Drench Carbendazim 1.0 g/l at the base of plants</p>	<p><u>Root rot</u>: Soil drenching with carbendazim 0.1 %, <u>Powdery mildew</u>: Spray carbendazim 0.1 %</p>		

<b>Horticulture</b>				
Apple	Apple scab : Follow the recommended schedule for the control of Apple scab  White root rot : Drain out excess water from the basin and drench the basin with Carbendazim 200g, or copper sulphate 100 g / 200 l water (3-4 time at an interval of 15-20 days)	Apple scab : Follow the recommended schedule for the control of Apple scab White root rot : Drain out excess water from the basin and drench the basin with carbendazim 200g, or copper sulphate 100 g / 200 l water (3-4 time at an interval of 15-20 days)	Premature leaf Fall: Follow the recommended spray schedule	Proper storage and immediate transportation to market/godown
Mango	Mango malformation: Follow the recommended management practices.	Mango hopper: Follow the recommended spray schedule	Mango fruit fly: Follow the recommended spray schedule, Gur 50g + malathion 10ml in 5 lt water + fruit fly traps @ 25/ha	Proper storage and immediate transportation to market/godown
<i>Kharif</i> onion	Not applicable	Purple blotch: Spray mancozeb 0.2 % / Tebuconazole 0.15 % / zineb 0.2 % Thrips : spray profenophos 2ml/ lit or Acephate 1 g/lit	Field drainage	Not applicable
Early Pea	Wilt in low lying water logged patches: Drench Carbendazim 1.0 g/l at the base of plants	Root rot: Soil drenching with carbendazim 0.1 %, Powdery mildew: Spray Carbendazim 0.1 %	Field drainage	

### 2.2.2 Unusual rains (untimely, unseasonal etc) (for both Rain fed and irrigated situations) **Rabi** season

<b>Condition</b>	<b>Suggested contingency measure</b>			
<b>Continuous high rainfall in a short span leading to water logging</b>	<b>Vegetative stage</b>	<b>Flowering stage</b>	<b>Crop maturity stage</b>	<b>Post harvest</b>
Wheat	Drainage	Top N dress after rain spells, field drainage	Field drainage	Proper storage
Barley	Drainage	Top N dress after rain spells, field	Field drainage	Proper storage

		drainage		
<b>Horticulture</b>				
Pea	Drainage/IDM/IPM	IDM/IPM	Field drainage	Storage and immediate transportation to market
Potato	Drainage/IDM/IPM	IDM/IPM	Field drainage	Storage and immediate transportation to market
Cole crops	Drainage/IDM/IPM	IDM/IPM	Field drainage	Storage and immediate transportation to market
<b>Heavy rainfall with high speed winds in a short span</b>				
Wheat	Drainage	Top dressing of N after rain spells	Field drainage	Storage and immediate transportation to market
Barley	Drainage	Top dressing of N after rain spells	Field drainage	Storage and immediate transportation to market
<b>Horticulture</b>				
Pea	Staking/Drainage	Staking	Field drainage	Storage and immediate transportation to market
Potato	Drainage	-	Field drainage	Storage and immediate transportation to market



Cole crops	Drainage	-	Field drainage	Storage and immediate transportation to market
<b>Outbreak of pests and diseases due to unseasonal rains</b>				
Wheat	Drainage	Top dressing of N after rain spells	Field drainage	Storage and immediate transportation to market
Barley	Drainage	Top dressing of N after rain spells	Field drainage	Storage and immediate transportation to market
<b>Horticulture</b>				
Pea	Staking/Drainage/IDM/IPM	Staking/IDM/IPM	Field drainage	Storage and immediate transportation to market
Potato	Drainage/IDM/IPM	IDM/IPM	Field drainage	Storage and immediate transportation to market
Cole crops	Drainage/IDM/IPM	IDM/IPM	Field drainage	Storage and immediate transportation to market

### 2.3 Floods

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

Sea water inundation <sup>3</sup>	
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## 2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone

Extreme event type	Suggested contingency measure <sup>r</sup>			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Heat Wave</b>				
Rice	Not applicable			
Maize	Not applicable			
<b>Horticulture</b>				
Mango	Irrigation if available may be applied to combat the effect of high temperature			
Citrus	Irrigation if available may be applied to combat the effect of high temperature			
Litchi	Irrigation if available may be applied to combat the effect of high temperature			
<b>Cold wave</b>	Not applicable			
<b>Horticulture</b>				
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			
<b>Frost</b>	Not applicable			
<b>Hailstrom</b>				
<b>Horticulture</b>				
Mango	Not applicable	Anti hail netting at fruit bearing stage		Not applicable
Apple	Not applicable	Anti hail netting at fruit bearing stage		Not applicable
<b>Cyclone</b>	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
<b>Drought</b>			

Feed and fodder availability	<ul style="list-style-type: none"> <li>Increasing area under fodder crops; collect crop residues, collect tree fodder, use mangers, use chaff cutters , hay storage</li> <li>Establishment of fodder bank at village level with available dry fodder (paddy /wheat straw)</li> <li>Increase area under perennial fodder cultivation with high yielding Hybrid Napier varieties.</li> <li>Collection and conservation of local grsses</li> <li>Conservation of maize green fodder as silage</li> <li>Sowing of cereals (Bajra) and leguminous crops during North-East monsoon under dry land system for fodder production</li> <li>Encourage fodder production with Maize, Jowar, Bajra</li> <li>Processing &amp; storage of feed/fodder and roughages in the form of complete feed/blocks</li> </ul>	<ul style="list-style-type: none"> <li>Utilization of fodder from Perennial &amp; 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</li> <li>Harvest and use biomass of dried up crops (Maize, Wheat, Paddy , barley, millets etc.,) material as fodder</li> <li>Utilizing fodder from fodder bank reserves</li> <li>Utilizing stored silage/hay</li> <li>Transporting complete feed/fodder and dry roughages to the affected areas</li> <li>Continuous supplementation of mineral mixture to prevent infertility</li> <li>Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals</li> </ul>	<ul style="list-style-type: none"> <li>Availing Insurance, raising of fodder trees, replacement of unproductive animals with improved ones</li> <li>Training/educating farmers for feed &amp; fodder storage</li> <li>Maintenance/repair of silo pits and feed/fodder stores</li> <li>Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize (UP chari, MP chari, African Tall etc.,</li> <li>Supply of quality fodder seed (multi cut sorghum/Bajra /maize varieties) and fodder slips of Napier, guinea grass well before monsoon</li> <li>Replenish the feed and fodder banks</li> </ul>
Drinking water	<ul style="list-style-type: none"> <li>Storage of water in tanks , traditional water ponds , rivers</li> <li>Adopt various water conservation methods at village level to improve the ground water level for adequate water supply</li> <li>Identification of water resources</li> <li>Desilting of ponds</li> <li>Rain water harvesting and create</li> </ul>	<ul style="list-style-type: none"> <li>Utilization of stored water, stall drinking, rivers, traditional water ponds</li> <li>Adequate supply of drinking water.</li> <li>Restrict wallowing of animals in water bodies/resources</li> <li>Use of ground water frm bore wells</li> </ul>	<ul style="list-style-type: none"> <li>Rejuvenation of wat sources, Watersh management practic shall be promoted conserve the rainwater</li> <li>Bleach (0.1%) drinking water / water sources</li> </ul>

	<p>water bodies/watering points (when water is scarce use only as drinking water for animals)</p> <ul style="list-style-type: none"> <li>• Prohibition of ground water from bore-wells</li> <li>• Construction of drinking water tanks in herding places/village junctions/relief camp locations</li> <li>• Community drinking water trough can be arranged in shandies /community grazing areas</li> </ul>		
Health and disease management	<ul style="list-style-type: none"> <li>• Advance preparation with medicines and vaccination, local ethno pharmaceutical and modern medicines</li> <li>• Rapid mobile veterinary team (RMVT) may be formed</li> <li>• Procure and stock emergency medicines and vaccines for important endemic diseases of the area</li> <li>• All the stock must be immunized for endemic diseases of the area</li> <li>• Surveillance and disease monitoring network to be established at district HQ</li> <li>• Adequate refreshment training on drought management to VOs' with regard to health &amp; management measures</li> <li>• Procure and stock multivitamins &amp; area specific mineral mixture</li> </ul>	<ul style="list-style-type: none"> <li>• Treatment of affected livestock by mass campaign, modern veterinary care , veterinary camps, insulation</li> <li>• Carryout deworming to all animals entering into relief camps</li> <li>• Identification and isolation of sick animals</li> <li>• Constitution of Rapid Action Veterinary Force</li> <li>• Performing ring vaccination (8 km radius) in case of any outbreak</li> <li>• Restricting movement of livestock in case of any Epidemic &amp; isolation of sick animals</li> <li>• Tick control measures be undertaken to prevent tick borne diseases in animals</li> <li>• Rescue of sick and injured animals and their treatment</li> <li>• Organize with community, daily lifting of dung from relief camps to maintain hygienic conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Proper veterinary care, awareness, capacity building of locals, health care management</li> <li>• Keep close surveillance on disease outbreak.</li> <li>• Undertake the vaccination depending on need</li> <li>• Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer</li> <li>• Claim and availing insurance benefit</li> <li>• Purchase of new productive Animals and replace unproductive animals</li> </ul>

<b>Floods</b>	Not applicable
Feed and fodder availability	
Drinking water	
Health and disease management	
<b>Cyclone</b>	Not applicable
Feed and fodder availability	
Drinking water	
Health and disease management	
<b>Cold wave</b>	Not applicable
Shelter/environment management	
Health and disease management	

### 2.5.2 Poultry

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>Drought</b>			
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	<ul style="list-style-type: none"> <li>• Rapid mobile veterinary team (RMVT) may be formed</li> <li>• Surveillance and management by animal husbandry department</li> <li>• Advance preparation with medicines and vaccination, local ethno pharmaceutical and modern</li> </ul>	Surveillance and management by animal husbandry department	Surveillance and management by animal husbandry department

	<p>medicines</p> <ul style="list-style-type: none"> <li>• Procure and stock emergency medicines and vaccines for important endemic diseases of the area</li> <li>• All the stock must be immunized for endemic diseases of the area</li> <li>• Procure and stock multivitamins &amp; area specific mineral mixture</li> </ul>		
<b>Floods</b>	Not applicable		
Shortage of feed ingredients	Not applicable		
Drinking water			
Health and disease management			
<b>Cyclone</b>	Not applicable		
Shortage of feed ingredients	Not applicable		
Drinking water			
Health and disease management			
<b>Heat wave and cold wave</b>	Not applicable		
Shelter/environment management	Not applicable		
Health and disease management			

### 2.5.3 Fisheries

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>Drought</b>			
Shallow water in ponds due to insufficient rains/inflows	Water harvesting structures with rain water impounding from catchment areas	Impounding of water through department 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	Not applicable		
<b>Floods</b>	Not manageable in the torrent monsoon season		
Inundation with flood waters	Not applicable		
Water contamination and changes in BOD	Not applicable		

Health and disease management	Rapid mobile veterinary team (RMVT) may be formed	Not applicable	Not applicable
<b>Cyclone</b>			
Overflow / flooding of ponds	Not applicable		
Change in fresh/brackish water ratio	Not applicable		
Health and disease management	Not applicable		
<b>Heat wave and cold wave</b>			
Management of pond environment	Not applicable		
Health and disease management	Rapid mobile veterinary team (RMVT) may be formed	Not applicable	Not applicable