

State: HIMACHAL PRADESH
Agriculture Contingency Plan for District: Chamba

1.0 District Agriculture profile			
1.1	Agro-Climatic/Ecological Zone		
	Agro Ecological Sub Region (ICAR)	Western Himalayas, Warm Subhumid (To Humid With Inclusion Of Perhumid) Eco-Region. (14.2)	
	Agro-Climatic Zone (Planning Commission)	Western 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)	Bilaaspur, Hamiirpur, Lahul&Spiti, Shimla, Kullu, Solan, Chamba, Mandi, Kangra and Sirmaur, Solan	
	Geographic coordinates of district headquarters	Latitude	Longitude
		32^o11'30" and 33^o13'6" N	75^o49' and 77^o3'30" E
	Altitude	926m	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Horticulture Research Station, Dr YS Parmar University of Horticulture and Forestry -Mashobra(Shimla)Phone No: 0177-2740261, 2740793 FAX-2740092,2740793	
	Mention the KVK located in the district with address	Krishi Vigyan Kendra, Saru, Chamba , Himachal Pradesh – 176 310. Phone: 01899- 232219 (O), 01899- 232 144 (R). Dr. M.L. Bhardwaj, Sr. Programme Coordinator (09418144057) kvkchamba@yahoo.in	
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	IMD, Shimla	

1.2	Rainfall	Normal RF(mm)*	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep)	616.86	4 th week of June	1 st week of September
	NE Monsoon (Oct-Dec)	60.73		
	Winter (Jan- March)	215.56		
	Summer (Apr-May)	119.28		
	Annual	1012.425		

Average rainfall from 1991 to 2010, KVK, Chamba

1.3	Land use pattern of the district(latest statistics)	Geographical Area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	692.4	45.3	272.0	11.7	353.0	7.2	0.015	5.5	2.4	1.0

Department of Economics and Statistics, Govt. of HP

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))*	Area ('000 ha)	Percent (%) of total
	Brown forest soils		
	Humus and iron podzols		
	Alpine humus mountain skeletal soils		

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	41.9	159.2
	Area sown more than once	24.8	
	Gross cropped area	66.7	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	5.2		
	Gross irrigated area	30		
	Rainfed area	36.7		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	-	-	-
	Tanks	-	-	-
	Open wells	-	-	-

Bore wells	-	-	--
Lift irrigation schemes	-	-	-
Micro-irrigation	-	-	-
Other sources (please specify) Kuhls and streams	-	-	-
Total Irrigated Area		5.2	100.0
Pump sets		NA	NA
No. of Tractors		NA	NA
Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
Over exploited	-	-	-
Critical	-	-	-
Semi- critical	-	-	-
Safe		-	-
Wastewater availability and use		-	-
Ground water quality	Good, EC<750μ mhos/cm at 25 ⁰ C		

*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%

1.7 Area under major field crops & horticulture (as per latest figures)(2006-07)

1.7	Major field crops cultivated	Area (*000 ha)		
		Total	Irrigated	Rainfed
	Maize	28.2	1.0	27.2
	Paddy	2.7	2.7	-
	Wheat	21.3	3.6	17.6
	Barley	3.1	0.3	2.7
	Pulses (Black gram & Rajmash)	3.4	0.07	3.3
	Oil seeds (Brown Sarson, Raya)	2.9	0.03	2.9

State Statistical Abstract of HP, 2008-09

Horticulture crops –	Area (*000 ha) (2007-08)

	Fruits	Total	Irrigated	Rainfed
	Apple	11.5	-	11.5
	Other temperate fruits	1.4	-	1.4
	Walnut and Dry fruits	1.5	-	1.5
	Citrus	0.7	-	0.7
	Other fruits (Plum, Apricot etc.)	0.6	-	0.6

	Horticulture crops – Vegetables	Total	Irrigated	Rainfed
	Peas	0.870	-	0.870
	Tomato	0.123	-	0.123
	Beans	0.447	-	0.447
	Cabbage	0.064	-	0.064
	Potato	0.7	-	0.7

District agricultural Plan, Vol II, Chamba

	Medicinal and Aromatic crops	Total	Remarks
	Kalazeera	Less than 1 hectare	The medicinal plants are naturally found in forests and local inhabitants traditionally collect them as a source of supplementary farm income. However, cultivation of medicinal plants is also encouraged in isolated blocks and different
	Lavander	5.8 hectare	

	Dhoop	Less than 1 hectare	medicinal plant species are also cultivated by few of progressive farmers
	Karu	Less than 1 hectare	
	Ratanjot	Less than 1 hectare	

District agricultural Plan, Vol II, Chamba

	Plantation crops	Total	Irrigated	Rainfed
	No plantation crops are available in Chamba district	-	-	-
	Fodder crops*	-	-	-
	Total fodder crop area	-	-	-
	Grazing land	353 (000 ha)	-	353 (000 ha)
	Sericulture etc	-	-	-
	Others (specify)	-	-	-

1.8	Livestock	Total ('000)
	Cattle	290.9
	Buffaloes	41.4
	Goat	184.8
	Sheep	281.4
	Others (Camel, Pig, Yak etc.)	6.4
	Commercial dairy farms (Number)	Not Available

1.9	Poultry	No. of farms	Total No. of birds ('000)
	Commercial	-	-
	Backyard	-	58.2

1.10	Fisheries (Data source: Chief Planning Officer)						
	A. Capture						
	i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc.)
	Nil		Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
		322	-	-	-	-	-
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
	270 M.T	6		3		18	
	B. Culture						
				Water Spread Area (ha)	Yield (t/ha)	Production ('000 tons)	
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)			-	-	-	
	ii) Fresh water (Data Source: Fisheries Department)*			-	-	-	
	Others						

1.11 Production and Productivity of major crops

1.11	Name of crop	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	74.09	2060.0					74.09	2060.0
	Rice	3.69	1280.0					3.69	1280.0
	Wheat			32.83	1585.00			32.83	1585.0
	Barley			4.83	1365.4			4.83	1365.4
	Pulses(Black gram and Rajmash)	1.25	260.66					1.25	260.6
	Oil seeds(Brown sarson and Raya)			0.54	180.8			0.54	180.8
	Horticulture - fruits								
	Apple	9.414	460.0					9.414	460.0
	Other Temperate fruits	0.518	300					0.518	300
	Walnut and Dry fruits	0.322	210.0					0.322	210.0
	Citrus	0.906	1530.0					0.90	1530.0
	Other fruits (Plum, Apricot etc.)	1.99	1545.0					1.991	1545.0

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Maize	Paddy	Wheat	Barley	Pulses (Rajmash/ Black gram)	Oilseed Crops (Gobhi Sarson, Raya)	Potato	Vegetables (Pea, Tomato, Cabbage, capsicum, Cauliflower)
	Kharif- Rainfed	1 st week of June-2 nd week of July	-	-	-	2 nd week of June -2 nd week of July	-	1 st week of April	1 st week of March - 4 th week of June
	Kharif-Irrigated	-	2 nd week of June -2 nd week of July	-	-	-	-	1 st week of April	1 st week of March - 4 th week of June
	Rabi- Rainfed	-	-	4 th week of October - 2 nd week of November	1 st week of November - 3 rd week of November	-	1 st week of November - 3 rd week of November	2 nd week of January - 4 th Week of January	1 st week of October - November

	Rabi-Irrigated	-	-	4 th week of October to 2 nd Week of November	-	-	-	2 nd week of January- 4 th Week of January	1 st week of October - November
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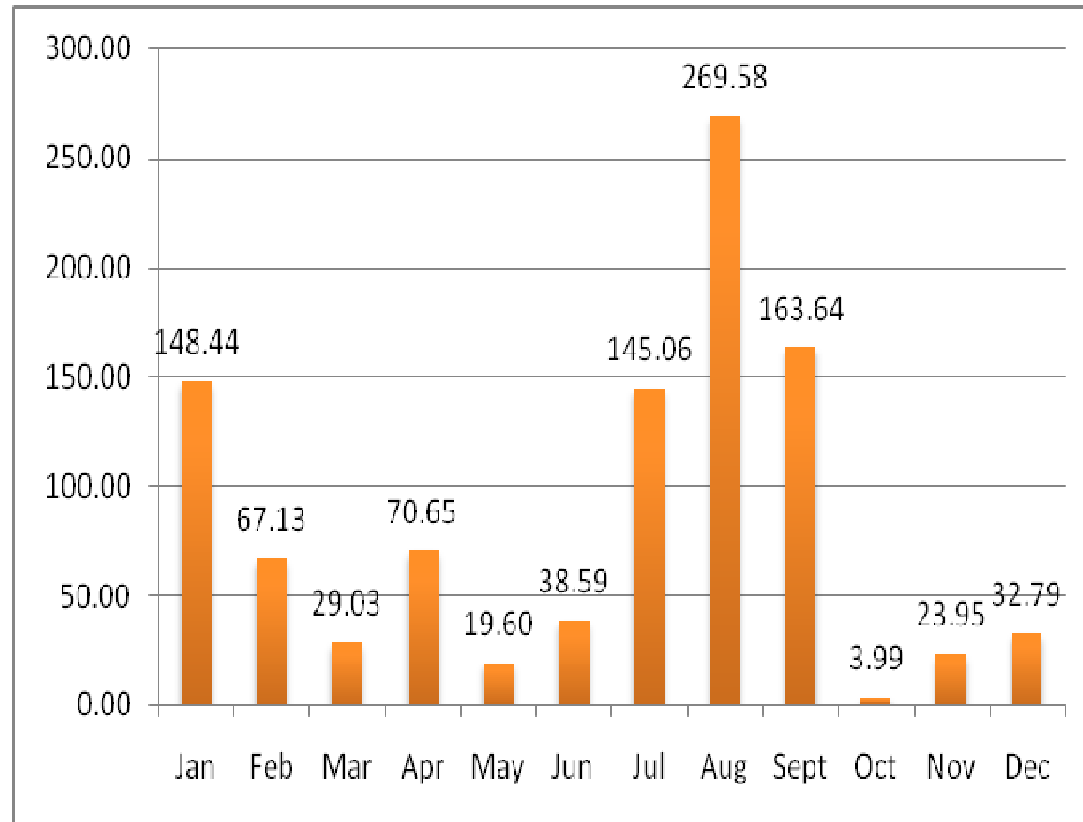
What is the major contingency the district is prone to? (Tick mark)		Regular	Occasional	None
	Drought		√	
	Flood			√
	Cyclone			√
	Hail storm	√		
	Heat wave			√
	Cold wave		√	
	Frost			√
	Sea water intrusion			√
	Pests and disease outbreak (specify)			√
	Others (specify)	-	-	-

1.14	Include Digital maps of the district for	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

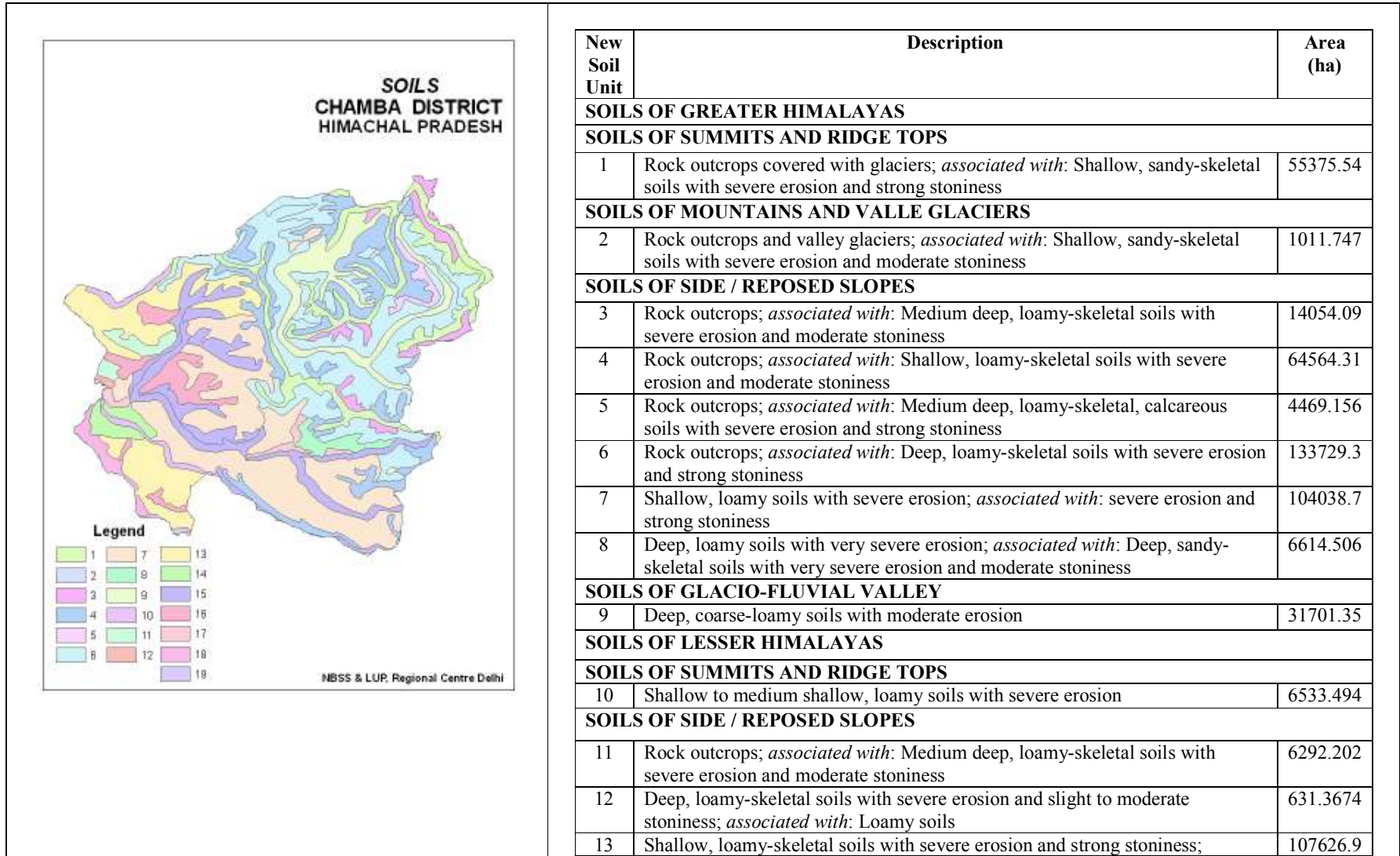
Annexure I



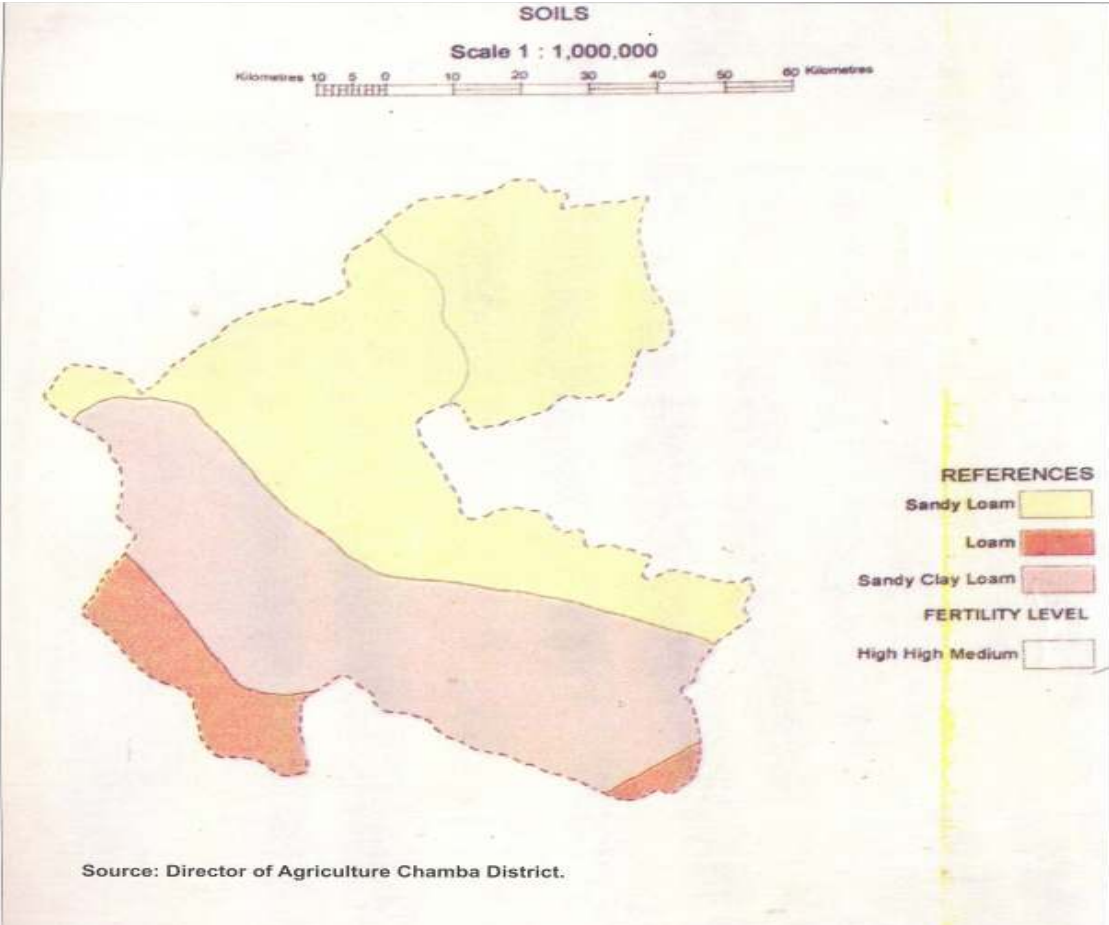
Annexure II



Annexure III



		<i>associated with:</i> Rock outcrops	
14		Deep, loamy soils with severe erosion	7504.967
15		Shallow to medium deep, loamy soils with moderate to severe erosion and slight stoniness	54811.21
16		Medium deep to deep loamy soils with moderate to severe erosion	18250.16
17		Deep, loamy over sandy soils with very slight erosion and moderate stoniness; <i>associated with:</i> Shallow, loamy soils with moderate erosion and moderate stoniness	4902.286
SOILS OF SIDE / REPOSED SLOPES			
18		Medium deep to deep, loamy-skeletal soils moderate to severe erosion; <i>associated with:</i> Loamy soils with moderate erosion	16312.34
19		Deep, loamy soils with moderate erosion and moderate stoniness; <i>associated with:</i> Medium, deep, loamy soils	14375.67
Total area			652799.3



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situatio	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementati on
Delay by 2 weeks 2 nd week of July	Brown Forest Shallow to moderately deep gravelly sandy loam to sandy clay loam Soils (Scarce rainfall)	Maize – Wheat	No Change	Normal Agronomic measures recommended by SAU	-
		Paddy-wheat+ Sarson			
		Maize/Blackgram/Rajmash – Wheat+sarson			
		Vegetable- Vegetable			

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementatio n
Delay by 4 weeks 4 th week of July	Brown Forest Shallow to moderately deep gravelly sandy loam to sandy clay loam Soils (Scarce rainfall)	Maize – Wheat	Maize: K-517, K-9451, K-25 and KH-2005 (K= Kanchan)	<ul style="list-style-type: none"> Hand weeding Mulching between rows with weeds and grasses @5 t/ha 	-Link SAU, NSC Department of agriculture and other seed firms to get good quality
		Paddy-Wheat+ Sarson	Paddy:RP-2421/		

		Blackgram/ Rajmash	Blackgram: T-9 Rajmash: Jwala Intercropping with legumes like black gram (Him-1)	<ul style="list-style-type: none"> • Hand weeding • Mulching between rows with weeds and grasses @5 t/ha 	seed Awareness and training campaigns by extension agencies KVK
		Vegetable- Vegetable Pea- Tomato/Beans	No Change	<ul style="list-style-type: none"> • Hand weeding • Mulching between rows with weeds and grasses @5 t/ha 	
		Potato -Peas	Potato: Kufri Jayoti		

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 6 weeks 2 nd week of August	Brown Forest Shallow to moderately deep gravelly sandy loam to sandy clay loam Soils (Scarce rainfall)	Maize – Wheat	<ul style="list-style-type: none"> • Maize: K-517, K-9451, K-25 and KH-2005 (K= Kanchan) • Intercropping with legumes like blackgram cv. Him-1 	<ul style="list-style-type: none"> • Sowing of maize with 15-20% higher seed rate • Dry sowing of maize • Adopt closer spacing in • Mulching between rows with weeds and grasses @5 t/ha 	Department of Agril, Awareness campaigns by extension agencies
		Paddy-Wheat+ Sarson	Paddy:RP-2421	<ul style="list-style-type: none"> • Adopt closer spacing in rice 	
		Blackgram/Rajmash – Wheat + Sarson	Blackgram: T-9 Rajmash: Jwala	<ul style="list-style-type: none"> • Sowing of maize with 15-20% higher seed rate • Adopt closer spacing • Dry sowing of maize • Intercropping with legumes like black gram • Mulching between rows with weeds and grasses @5 t/ha. 	

		Vegetable- Vegetable Pea- Tomato/Beans	No Change	<ul style="list-style-type: none"> • Hand weeding • Mulching between rows with weeds and grasses @5 t/ha 	
		Potato - Peas	Potato: Kufri Jayoti		

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Delay by 8 weeks 4 th week of August	Brown Forest Shallow to moderately deep gravelly sandy loam to sandy clay loam Soils (Scarce rainfall)	Maize – Wheat	Toria /Oats	<ul style="list-style-type: none"> • Sowing of Toria at 30 cm spacing and oats at 25 cm spacing . • Construction of rainwater harvesting structures i.e. LDPE farm ponds 	Department of Agriculture, Department of Horticulture, NREGA, RKVY, Technology mission , Pt. DeenDayalUpadhayYojna etc.
		Paddy-wheat+ Sarson	Toria: DK-1 or Bhawani		
		Blackgram/Rajmash - Wheat+sarson	Oats: Palampur-1, Kent		
		Vegetable- Vegetable Pea- Tomato/Beans	Growing of marigold flowers (African Marigold) Marigold : Pusa Narangi		
		Potato - Peas	Toria /Oats Toria: DK-1 or Bhawani Oats: Palampur-1, Kent		

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	Major Farming situation	Normal Crop / Cropping system	Crop management	Soil nutrient and moisture conservation measures	Remarks on Implementation
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop	Brown Forest Shallow to moderately deep gravelly sandy loam to sandy clay loam	Maize – Wheat	<ul style="list-style-type: none"> • Hand weeding in maize • Reduction in plant population by 10-15 % by thinning • Intercropping of blackgram cv. Him-1 or UG-218 in 	<ul style="list-style-type: none"> • Mulching between rows with weeds and grasses @5 t/ha • Foliar spray of urea @ 0.5% 	NREGA, RKVY, watersheds, Technology mission , Pt. DeenDayalUpadhayYojna for the support of farm

stand etc.)	Soils (Scarce rainfall)		<ul style="list-style-type: none"> poor germinated areas Re-sowing of maize where there is meager or no germination 	<ul style="list-style-type: none"> Construction of rainwater harvesting structures i.e. LDPE farm ponds 	pond technology
		Blackgram/Rajmash - Wheat+sarson	<ul style="list-style-type: none"> Hand weeding in maize Reduction in plant population by 10-15 % by thinning 		
		Rice -wheat+ Sarson	<ul style="list-style-type: none"> Hand weeding Reduction in plant population by 10-15 % by thinning Re-transplanting of rice where there is mortality 	<ul style="list-style-type: none"> Foliar spray of urea @ 0.5% to replace soil application Construction of rainwater harvesting structures i.e. LDPE farm ponds 	
		Vegetable- Vegetable Pea- Tomato/Beans	<ul style="list-style-type: none"> Sowing with early cultivars of pea like Arkel and Matarageta Gap filling with new plants 	<ul style="list-style-type: none"> Mulching between rows with weeds and grasses @5 t/ha Foliar spray of urea @ 0.5% to replace soil application 	
		Potato - Peas Potato: KufriJayoti	<ul style="list-style-type: none"> Hand weeding Reducing plant population by 15% 		

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient and moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)					
At vegetative stage	Brown Forest Shallow to moderately	Maize/Blackgram/ Rajmash - Wheat+sarson	<ul style="list-style-type: none"> Hand weeding 	<ul style="list-style-type: none"> Mulching between rows with weeds and grasses @5 t/ha Foliar spray of urea @ 0.5% 	<ul style="list-style-type: none"> LinkNREGA, RKVY, watersheds, Technology mission , Pt.

deep gravelly sandy loam to sandy clay loam Soils (Scarce rainfall)	Paddy-wheat+ Sarson	<ul style="list-style-type: none"> • Interculture 	DeenDayalUpadhy ayYojna for the support of farm pond technology <ul style="list-style-type: none"> •
	Vegetable- Vegetable Pea- Tomato/Beans	<ul style="list-style-type: none"> • Gap filling with new seedlings in tomato 	
	Potato - Peas Potato: KufriJayoti	<ul style="list-style-type: none"> • Hand weeding • Reducing plant population by 15% 	

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient and moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell)					
At flowering/ fruiting stage	Brown Forest Shallow to moderately deep gravelly sandy loam to sandy clay loam Soils (Scarce rainfall)	Maize – Wheat Maize: K-517, K-9451, K-25 and KH-2005 (K= Kanchan) Wheat: Raj-3765	<ul style="list-style-type: none"> •Foliar spray of urea @ 0.5% to replace soil application •Interculture 	<ul style="list-style-type: none"> •Mulching between rows with weeds and grasses @5 t/ha •Construction of rainwater harvesting structures i.e. LDPE farm ponds •Life saving irrigation if possible 	<ul style="list-style-type: none"> •LinkNREGA, RKVY, watersheds, Technology mission , Pt. Deen Dayal Upadhyay Yojna for the support of farm pond technology
		Paddy-wheat+ Sarson			
		Blackgram/Rajmash - Wheat+sarson			
		Vegetable- Vegetable Pea- Tomato/Beans			
		Potato - Peas Potato: KufriJayoti			
		Fruit Based Apples Other temperate fruits Walnut and dry fruits Citrus Other fruits			

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop Planning	Remarks on Implementation
Terminal drought (Early withdrawal of monsoon)	Brown Forest Shallow to moderately deep gravelly sandy loam to sandy clay loam Soils (Scarce rainfall)	Maize/ Blackgram/ Rajmash -Wheat+sarson	<ul style="list-style-type: none"> • Hand weeding in maize • Life saving irrigation 	If damage is severe, plan for land preparation for early Gobhisarson var. Neelam or Raya variety RCC-4 or Brown sarson var. KBS-3	<ul style="list-style-type: none"> • Providing improved species of fruit plants by the Department of Horticulture under Horticulture Technology Mission • Link NREGA, RKVY, watersheds, Technology mission, Pt. Deen Dayal Upadhyay Yojna for the support of farm pond technology • Link SAU, NSC and department of agriculture for good quality seed and KVK for training needs of farmers
Paddy-wheat+ Sarson					
Vegetable- Vegetable Pea- Tomato/Beans		<ul style="list-style-type: none"> • Life saving irrigation 	<ul style="list-style-type: none"> • Sowing with early cultivars of pea like Arkel and Matarageta 		
Potato -Peas Potato: Kufri Jayoti		<ul style="list-style-type: none"> • Spray of Ethephon @ 500 ml / 200 l water to enhance maturity • Clean basin cultivation by manual weeding or by spray of glyphosate @ 1 ml / l 	<ul style="list-style-type: none"> • Planning for introducing drought tolerant fruit plants like Harar, Amla, Karonda, pomegranate, • In-situ planting of walnut and pecan • In-situ moisture conservation by preparing V-shaped micro- catchments and planting on apex. 		
Fruit Based Apples Other temperate fruits Walnut and dry fruits Citrus Other fruits					

2.1.2 Drought - Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall	Khul, undulating lands and brown forest soils	Paddy (sub merged conditions)	Maize / Aerobic rice	Select short duration varieties of maize and aerobic rice	<ul style="list-style-type: none"> • Awareness campaigns by extension agencies • Installation of drip irrigation systems under Pt. DeenDayalUpadhyayojna and RKVY
		Vegetables based Capsicum, Potato, French Bean, Cabbage, Chilli	Millets	Limited irrigation Alternate Furrow irrigation Drip irrigation Foliar application of urea@ 0.5 percent	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Limited release of water in canals due to low rainfall	Khul, undulating lands and brown forest soils	Vegetable based Capsicum, Potato, French Bean, Cabbage, Chilli	Continue vegetable based system	Limited irrigation Alternate Furrow irrigation Drip irrigation	<ul style="list-style-type: none"> • Installation of drip irrigation systems under Pt. DeenDayalUpadhyayojna and RKVY • Awareness campaigns by extension agencies

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Khul, undulating lands and brown forest soils	Paddy (sub merged conditions)	Aerobic rice/ Millets	In-situ moisture conservation technologies Water harvesting, recycling of rain water Management of disease and insects pest	<ul style="list-style-type: none"> • Awareness campaigns by extension agencies • Provision of seed material and agrochemicals

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
					by Department of Agriculture

Condition			Suggested Contingency measures		
	Major Farming situation	Normal 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	Khul, undulating lands and brown forest soils	Paddy (sub merged conditions)	Maize, Aerobic rice and vegetables (Tomato, chilli and Brinjal)	Limited irrigation Drip irrigation Spray 2% urea Control of insects and pests	<ul style="list-style-type: none"> • Awareness campaigns by extension agencies • Provision of seed material and agrochemicals by Department of Agriculture

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Khul, undulating lands and brown forest soils	Paddy (sub merged conditions)	Maize, Aerobic rice and vegetables (Tomato, chilli and Brinjal)	Limited irrigation Hand weeding and mulching Spray 0.5% urea Drip irrigation Control of insects and pests	<ul style="list-style-type: none"> • Awareness campaigns by extension agencies • Provision of seed material and agrochemicals by Department of Agriculture

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

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Vegetables (Capsicum, Cabbage, Tomato, Beans, Cucurbits)	Provide drainage	Use of shade nets Grow crops in protected structures Provide drainage	Drain out Harvesting at physiological maturity Use stakes and avoid touching of fruits to the ground	Grade and pack after safe storage at pack and grading houses
Horticulture Fruit crops (Apple, Plum, Apricot, Pears, Nut and Dry fruits)	Provide drainage	Drain out excess water	Harvesting at physiological maturity	Grade and pack after safe storage at pack and grading house
Heavy rainfall with high speed winds in a short span²	-		-	
Pea Tomato Beans Cucurbits Cauliflower	Provide drainage	Use of shade nets Grow crops under protected structures Provide drainage	Drain out Harvesting at physiological maturity Use of stakes for support	Grade and pack after safe storage at pack and grading houses
Horticulture Fruit crops (Apple, Plum, Apricot, Pears, Nut and Dry fruits)	Provide drainage	Drain out excess water Use of shade nets	Drain out Harvesting at physiological maturity	Grade and pack after safe storage from insect pest at pack and grading houses
Outbreak of pests and diseases due to unseasonal rains	-			

2.3 Floods

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

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
Heat Wave	Not applicable			
Cold wave				
Horticulture				
Apple	Raise nursery plants in poly chambers	Light irrigation on foliage Heavy pruning during dormancy Coating of plants through tree spray oils	For improving fruit setting placement of bee hives Placement of pollinizer bouquets	Proper packing and grading of fruits for safe storage and transportation to destination APMC's
Other temperate fruits				
Frost				
Pea	Grow seedling in low poly tunnels	Mist formation with light irrigation	Light irrigation	Removal of affected pods/fruits Proper packing & grading of fruits
Tomato				
Horticulture				
Apple	Use shade nets Light irrigation in evening period	Mist formation with light irrigation Use of foggers	Light irrigation	Removal of injured pods/fruits Proper packing & grading of fruits
Mango				
Litchi				
Hailstorm				
Pea	Use of anti hail nets	In hail prone areas grow these vegetable under shade net or in playhouses or	Use of shade nets to protect from hail injuries	Removal of injured pods/fruits Proper packing of graded fruits
Tomato				
Cucurbits				

cauliflower		protected structures	Use of plant growth regulators for injury recovery	
Horticulture				
Apple	Use of shade nets	Use of anti hail nets	Use of anti hail nets wherever feasible Use of plant growth regulators for injury filling Remove hailed/ injured fruits Use of anti hail guns wherever feasible	Remove injured fruits Safe storage of graded fruit at pack house
Apricot				
Plum				
Cyclone	Not applicable			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event ^s	During the event	After the event
Drought			
Feed and fodder availability	Collect crop residues, collect tree fodder, use mangers, use chaff cutters , hay storage ,	Utilization of fodder from Perennial & reserve sources, Open grazing in forests and alpine slopes/ community lands and feeding of crop residues ; use of mangers and chaff cutters , feeding of household waste	Culling undesirable Livestock (sheep and goats) , Raising of fodder trees, replacement of unproductive animals with improved ones
Drinking water	Storage of water in tanks , Traditional water ponds , rivers	Utilization of stored water, Stall drinking , rivers , traditional water ponds	Rejuvenation of water sources
Health and disease management	Advance preparation with medicines and vaccination, Local ethno pharmaceutical and modern medicines	Treatment of affected livestock by mass campaign, Modern veterinary care , veterinary camps , insulation	Proper veterinary care , awareness , capacity building of locals, health care management
Floods	Not applicable		

Feed and fodder availability			
Drinking water			
Health and disease management			
Cyclone	Not applicable		
Feed and fodder availability			
Drinking water			
Health and disease management			
Cold wave			
Shelter/environment management	Brought back from high hill pasture lands to nearby pastures ; restricted open grazing	Stationary conditions in cowsheds , group living, dry grass flooring, gunny bags on windows, gunny bags wrapped on the belly of milking animals , restricted open grazing during sunny days only	Open grazing, grazing in open sun , massage of milking animals and other species, hot water bath of animals
Health and disease management	Traditional herbs fed to animals	Warm living conditions, syrup of <i>lassi</i> (curd juice) after roasting fed to animals , avoid exposure to cold and rains/ snow.	Open grazing in sunny days and feeding of medicinal herbs . In case of acute problem , veterinary care

2.5.2 Poultry (Backyard only)

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event ^a	During the event	After the event	
Drought				
Shortage of feed ingredients	Surplus storage of poultry feed ; No special preparations as these are kept as backyard activity	Utilization of surplus feed; No impact as these is kept in captivity. Moreover these are kept as backyard and household waste is sufficient for their keeping	Kept as backyard activity Availing Insurance Culling affected birds	Collaboration with Directorate of Animal Husbandary
Drinking water	Storage of water in tanks	Utilize stored water	Kept as backyard activity and local drinking water is sufficient	Water storage structures can be constructed in collaboration with MNERAGA , HTM and other schemes of the Department of Rural Development

Health and disease management	Advance preparation with medicines and vaccination	Mass Vaccination, Locally managed with the help of veterinary care	Kept as backyard activity and local health care is practiced	Collaboration with Directorate of Animal Husbandry
Floods	Not applicable	Not applicable	Not applicable	Not applicable
Shortage of feed ingredients				
Drinking water				
Health and disease management				
Cyclone	Not applicable	Not applicable	Not applicable	Not applicable
Shortage of feed ingredients				
Drinking water				
Health and disease management				
Heat wave and cold wave				
Shelter/environment management	Proper Ventilation and warm space	Proper aeration and fan , open spacing, water supply , warm space	Kept as backyard activity so no proper action is taken	Collaboration with Directorate of Animal Husbandry
Health and disease management	Local	Local and Veterinary care	Kept as backyard activity and local knowledge about veterinary care is practiced	

2.5.3 Fisheries/ Aquaculture (*It is a supportive activity only*)

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought	Not applicable	Not applicable	Not applicable
A. Capture			
Marine			
Inland			
(i) Shallow water depth due to insufficient rains/inflow			
(ii) Changes in water quality			

(iii) Any other			
B. Aquaculture	Not applicable	Not applicable	Not applicable
(i) Shallow water in ponds due to insufficient rains/inflow			
(ii) Impact of salt load build up in ponds / change in water quality			
(iii) Any other			
2) Floods	Not applicable	Not applicable	Not applicable
A. Capture	No specific action is taken as it is a supporting activity only and fishes are collected from natural ponds, rivers only .		
Marine			
Inland			
(i) No. of boats / nets/damaged			
(ii) No.of houses damaged			
(iii) Loss of stock			
(iv) Changes in water quality			
(v) Health and diseases			
B. Aquaculture	Not applicable	Not applicable	Not applicable
(i) Inundation with flood water			
(ii) Water contamination and changes in water quality			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, hutsetc)			
(vi) Any other			
3. Cyclone / Tsunami	Not applicable	Not applicable	Not applicable
A.Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives			
(ii) Avg. no. of boats / nets/damaged			

(iii) Avg. no. of houses damaged			
Inland			
B. Aquaculture			
(i) Overflow / flooding of ponds			
(ii) Changes in water quality (fresh water / brackish water ratio)			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, shelters/hutsetc)			
(vi) Any other			
4. Heat wave and cold wave	Not applicable	Not applicable	Not applicable
A. Capture			
Marine			
Inland			
B. Aquaculture	Not applicable	Not applicable	Not applicable
(i) Changes in pond environment (water quality)			
(ii) Health and Disease management			
(iii) Any other			

- No specific action is taken as it is a supporting activity only and fishes are collected from natural ponds, rivers only.