State: HARYANA

Agriculture Contingency Plan District: FARIDABAD

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Northern Plain (And Central Highlands) In (4.1)		
	Agro-Climatic Region (Planning Commission)	Trans Gangetic Plain Region (VI)		
	Agro Climatic Zone (NARP)*	Eastern Zone (HR-1)		
	List all the districts falling under the NARP Zone	Panchkula, Ambala, Yamunanagar, Kurukshetra, Karnal, Kaithal, Jind, Panipat, Sonipat, Faridabad, Mewat, Palwal and parts of Rohtak, Jhajjar and Gurgaon		
	Geographical coordinates of district	Latitude	Longitude	Altitude
		28º22'55.99" N	$77^0$18'11.3" E	221 m
	Name and Address of the concerned ZRS/ZARS/RARS/RRTTS	ZRS, Rohtak-124 001		
	Mention the KVK located in the district	KVK, Faridabad- 121 002		
1.2	**Rainfall**	Average (mm)	Normal Onset (week and month)	Normal Cessation (week and month)
	SW monsoon (June-Sep):	521.0	1st week of July	3rd week of September
	NE Monsoon(Oct-Dec):	20.2	-	-
	Winter (Jan- March)	28.0		
	Summer (Apr-May)	26.4		
	Annual:	595.6		

* If a district falls in two NARP zone, mention the zone in which more than 50% area falls.

1.3	**Land use pattern of the district** (latest statistics)	Total geographical area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable waste land	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area (000 ha)	172	1	40	2	-	-	5	9	-

(Source: Statistical Abstract Haryana: 2007-08)

1. 4	**Major Soil types**	Area ('000 ha)	Per cent (%) of total area
	Sandy loam soils	60	100

Note: Mention colour, depth and texture (heavy, light, sandy, loamy, clayey etc) and give vernacular name, if any, in brackets

1.5	**Agricultural land use**	Area (‘000 ha)	Cropping intensity %
	Net sown area	115	187
	Area sown more than once	100	
	Gross cropped area	215	

1.6	**Irrigation**	Area (‘000 ha)		
	Net irrigated area	115		
	Gross irrigated area	200		
	Rainfed area	Nil		
	Sources of Irrigation	Number	Area (‘000 ha)	% area
	Canals		16	13.9

	Tanks	-	-	-
	Open wells	-	-	-
	Bore wells	-	99	86.1
	Lift irrigation	-	-	-
	Micro-irrigation		-	-
	Other sources	-	-	-
	Total Irrigated Area		115	
	Pumpsets			
	No. of Tractors			
	Groundwater availability and use	No. of blocks	% area	Quality of water
	Over exploited*	NA		
	Critical	NA		
	Semi- critical	NA		
	Safe	NA		
	Wastewater availability and use	NA		
	Ground water quality	Alkaline in nature and moderately to highly saline		

*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 (2008-09)

1.7	**Major Field Crops cultivated**	**Area ('000 ha)***							
		Kharif			***Rabi***			**Summer**	**Grand Total**
		Irrigated	***Rainfed***	***Total***	***Irrigated***	***Rainfed***	***Total***	-	
	Wheat	-	-	-	104.8	-	104.8	-	104.8
	Rice	27.4	-	27.4	-	-	-	-	27.4
	Pearlmillet	8.9	-	8.9	-	-	-	-	8.9
	Rapeseed Mustard				4.2	-	4.2		4.2
	Horticulture crops - Fruits	**Total area**							

	Guava	491
	Ber	164
	Citrus	145
	Horticultural crops - Vegetables	**Total area**
	Radish	1.6
	Cauliflower	1.5
	Carrot	1.3
	Tomato	1.2
	Medicinal and Aromatic crops	**-**
	Plantation crops	**-**
	Fodder crops	**-**
	Total fodder crop area	-
	Grazing land	-
	Sericulture etc	-
	Others (Specify)	-

* If break-up data (irrigated, rainfed) is not available, give total area-

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Number ('000)**
	Cattle	-	-	69
	Buffaloes total	-	-	362
	Commercial dairy farms	-	-	NA
	Goat	-	-	24
	Sheep	-	-	16
	Others (Camel, Pig, Yak etc)	-	-	22
1.9	**Poultry**	**No. of farms**	**Total no. of birds ('000)**	
	Commercial	**-**	27	
	Backyard	**-**	8	

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.)**
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
	ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**	**No. of Reservoirs**		**No. of village tanks**		
	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 (Average of last 3 years: 2006, 07, 08)

1.11	**Major Field Crops cultivated**	**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)
	Wheat	-	-	389	3706	-	-	389	3706
	Rice	84	3113	-	-	-	-	84	3113
	Pearlmillet	16	1764	-	-	-	-	16	1764
	Rapeseed Mustard	-	-	6	1493	-	-	6	1493
	Major Horticultural crops								
	Guava	5715	-	-	-	-	-	-	-
	Ber	965	-	-	-	-	-	-	-

	Citrus	615	-	-	-	-	-	-	-
	Major Vegetable crops								
	Radish	17875	10545	-	-	-	-	17875	10545
	Cauliflower	31490	19930	-	-	-	-	31490	19930
	Carrot	-	-	20210	14970	-	-	20210	14970
	Tomato	-	-	13705	10964	-	-	13705	10964

(Source: Statistical Abstract Haryana)

1.12	**Sowing window for 5 major crops** (start and end of sowing period)	**Wheat**	**Rice**	**Bajra**	**Rapeseed & Mustard**
	Kharif- Rainfed	-	-	Onset of rain	-
	Kharif-Irrigated	-	15th May – 30th June	1st July-15th July	-
	Rabi- Rainfed	October end – November end	-	-	September end
	Rabi-Irrigated	October end – 15 November	-	-	September end – 20 October

1.13	**What is the major contingency the district is prone to? (Tick mark)**	**Regular**	**Occasional**	**None**
	Drought	-	√ (May-June)	-
	Flood	-	√ (July-Aug)	-
	Cyclone	-	-	√
	Hail storm	-	√ (Dec - Mar)	-
	Heat wave	√	-	-
	Cold wave	√	-	-
	Frost	-	√ (Jan)	-

	Sea water inundation	-	-	√
	Pests and diseases (specify)	-	√	-

1.14	**Include Digital maps of the district for**	Location map of district with in State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes / No

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation (No rainfed area)

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 2 weeks	NA				

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 4 weeks	NA				

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	NA				

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	NA				

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**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	NA				

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	NA				

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	NA				

Condition			Suggested Contingency measures		
Terminal drought	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Rabi crop planning**	**Remarks on Implementation**
	NA				

2.1.2 Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed/ limited release of water in canals due to low rainfall	Sandy soils/sandy loam soils tubewell irrigated	Pearlmillet-Wheat	Pearlmillet-Raya	10-15% higher seed rate, optimum plant spacing Sprinkler irrigation, Planting on beds, planting with ridger seeder, Laser land leveling, Conjunctive use of canal and ground waters. Split application of fertilizer, Application of organic manures, Straw mulching, Limited ground water use, prefer life saving irrigation Short duration cultivars, Adoption of plant protection measures, soaking of seeds before sowing, seed treatment with biofertilizer, deep ploughing during *kharif* season Shallow irrigation of 4-5 cm depth, weed free environment	Seeds from State, national seed and private seed agencies. The schemes of NREGS, RKRY, NFSM, NHM are in operation. Govt. subsidy on sprinkler, drip irrigation systems and laser leveler
		Pearlmillet-Chickpea	Clusterbean-Barley	As above	
		Fallow -Raya	Summer moong-Raya	Short duration cultivars Seed treatment with azotobactor/rhizobium	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
				Straw mulching Sprinkler irrigation Planting on beds, planting with ridger seeder Laser land leveling, Conjunctive use of canal and ground waters. Limited ground water use, prefer life saving irrigation Weed free environment	
		Sorghum-Barley	Cucurbeets-Raya	Sprinkler irrigation Planting on beds, planting with ridger seeder Laser land leveling, Conjunctive use of canal and ground waters. Split application of fertilizer Straw mulching Limited ground water use, prefer life saving irrigation Seed treatment with azotobactor Deep ploughing during kharif season Shallow irrigation of 4-5 cm depth Weed free environment	
	Well drained, medium alluvial soils, canal and tubewell irrigated	Clusterbean-Wheat	Pearlmillet -Wheat	Drip/furrow irrigation, paired row planting Sprinkler in wheat Planting on beds Straw mulching Planting on beds Planting with ridger seeder Laser land leveling Split application of fertilizer Straw mulching in sugarcane Limited ground water use, prefer life saving irrigation Conjunctive use of brackish ground waters with canal waters Short duration cultivars Soaking of wheat seeds before sowing Seed treatment with azotobactor/rhizobium Deep ploughing during *kharif* season Shallow irrigation of 4-5 cm depth Sowing of vegetable seeds in polythene bags and replanting	Shallow ground water use alone or in combination. Seeds from State, national and private seed agencies seed agencies, The schemes of NREGS, RKRY, NFSM, NHM are in operation. Govt. subsidy on sprinkler and drip irrigation systems, on laser land leveling

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
				them in holes. Weed free environment	
		Pearlmillet-Wheat	Pearlmillet-Raya/Chickpea	Paired row planting Sprinkler irrigation Planting on beds Straw mulching Laser land leveling Split application of fertilizer Straw mulching Limited ground water use, prefer life saving irrigation Conjunctive use of brackish ground waters with canal waters Short duration cultivars Seed treatment with azotobactor/rhizobium Deep ploughing during *kharif* season Shallow irrigation of 4-5 cm depth Weed free environment	
		Sugarcane-Wheat	Sugarcane–Moong intercropping	Drip/furrow irrigation in sugarcane, paired row planting Planting on beds Straw mulching in sugarcane Laser land leveling Split application of fertilizer Limited ground water use, prefer life saving irrigation Conjunctive use of brackish ground waters with canal waters Short duration cultivars Weed free environment Weed free environment	
		Pearlmillet/fallow-Raya	Vegetables	furrow irrigation in pearlmillet/raya, paired row planting Planting on beds Straw mulching Laser land leveling Split application of fertilizer Limited ground water use, prefer life saving irrigation Conjunctive use of brackish ground waters with canal waters Short duration cultivars	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
				Seed treatment with azotobactor Deep ploughing during kharif season Shallow irrigation of 4-5 cm depth Sowing of vegetable seeds in polythene bags and replanting them in holes. Weed free environment	
	Clay soils, canal and tubewell irrigated	Rice-Wheat	Summer Moong-Rice	Sprinkler irrigation in moong, Planting on beds Laser land leveling	Late sown cultivars Short duration Desi wheat and Basmati rice. Shallow ground water use alone or in combination. Conservation of rain water, mulching, rain water harvesting Seeds from State and national seed agencies, The schemes of NREGS, RKRY, NFSM, NHM are in operation. Seed from private seed agencies
		Sugarcane-Wheat	Sugarcane-Onion intercropping	Drip irrigation in paired row planting of sugarcane Laser land leveling Straw mulching in sugarcane	
		Sorghum fodder-Wheat	Vegetables/ flowers	Sprinkler/drip irrigation, Planting on beds, laser land leveling Mulching on inter-row spacing Limited ground water use, prefer 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	Sandy soils, tubewell irrigated	Pearlmillet-Raya	Pulses-raya	Planting on beds Sprinkler irrigation Laser land leveling Straw mulching Paired row planting	Short duration cultivars of crops Shallow ground water use alone or in

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
monsoon in catchment				Split application of fertilizer Straw mulching Limited ground water use, prefer life saving irrigation Conjunctive use of brackish ground waters with canal waters Short duration cultivars Seed treatment with azotobactor/rhizobium Deep ploughing during *kharif* season Shallow irrigation of 4-5 cm depth Weed free environment	combination. Conservation of rain water, mulching, rain water harvesting. Shallow ground water use alone or in combination. Conservation of rain water, mulching, rain water harvesting.
		Pearlmillet-Chickpea	Clusterbean-Barley	Sprinkler irrigation Planting on beds Straw mulching Laser land leveling Split application of fertilizer Limited ground water use, prefer life saving irrigation Conjunctive use of brackish ground waters with canal waters Short duration cultivars Seed treatment with azotobactor Deep ploughing during kharif season Shallow irrigation of 4-5 cm depth Weed free environment	
		Fallow – Raya/barley	Vegetables-Raya	Sowing of vegetable seeds in polythene bags and replanting them in holes. Drip irrigation in vegetables Planting on beds Straw mulching Laser land leveling Split application of fertilizer Limited ground water use, prefer life saving irrigation Conjunctive use of brackish ground waters with canal waters Seed treatment with azotobactor Deep ploughing during *kharif* season Shallow irrigation of 4-5 cm depth Weed free environment	

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Well drained, medium alluvial soils, canal and tubewell irrigated	Clusterbean-Barley	Pearlmillet -Wheat	Drip/furrow irrigation Sprinkler in wheat Planting on beds Laser land leveling Limited ground water use, prefer life saving irrigation Conjunctive use of ground water Shallow irrigation of 4-5 cm depth Weed free environment	Short duration cultivars of crops Shallow ground water use alone or in combination. Conservation of rain water, mulching, rain water harvesting. Shallow ground water use alone or in combination. Conservation of rain water, mulching, rain water harvesting
		Pearlmillet/fallow-Wheat	Pearlmillet-Raya/Chickpea	Paired row planting Sprinkler irrigation Planting on beds Straw mulching Laser land leveling Split application of fertilizer Straw mulching Limited ground water use, prefer life saving irrigation Conjunctive use of brackish ground waters with canal waters Short duration cultivars Seed treatment with azotobactor/rhizobium Deep ploughing during kharif season Shallow irrigation of 4-5 cm depth Weed free environment	
		Pearlmillet/fallow-Raya	Sugarcane+Moong intercropping	Drip/furrow irrigation in sugarcane, paired row planting Planting on beds Straw mulching in sugarcane Laser land leveling Split application of fertilizer Limited ground water use, prefer life saving irrigation Conjunctive use of brackish ground waters with canal waters Short duration cultivars Weed free environment	
		Sorghum -Wheat	Vegetables	Sowing of vegetable seeds in polythene bags and replanting them in holes. Drip irrigation in vegetables Planting on beds	

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
				Straw mulching Laser land leveling Split application of fertilizer Limited ground water use, prefer life saving irrigation Conjunctive use of brackish ground waters with canal waters Seed treatment with azotobactor Deep ploughing during kharif season Shallow irrigation of 4-5 cm depth Weed free environment	
	Clay soils, canal and tubewell irrigated	Pigeon pea – Wheat/barley	Summer moong-Wheat		Short duration cultivars of crops Shallow ground water use alone or in combination. Conservation of rain water, mulching, rain water harvesting. Shallow ground water use alone or in combination. Conservation of rain water, mulching, rain water harvesting
		Fallow --raya	Sugarcane-mungbean intercropping	Drip/furrow irrigation in sugarcane, paired row planting Planting on beds Straw mulching in sugarcane Laser land leveling Split application of fertilizer Limited ground water use, prefer life saving irrigation Conjunctive use of brackish ground waters with canal waters Short duration cultivars Weed free environment	
		Sorghum fodder-Wheat	Vegetables/ flowers	Sowing of vegetable seeds in polythene bags and replanting them in holes. Drip irrigation in vegetables Planting on beds Straw mulching Laser land leveling Split application of fertilizer Limited ground water use, prefer life saving irrigation Conjunctive use of brackish ground waters with canal waters Seed treatment with azotobactor /rhizobium	

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measure**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Sandy soils, tubewell irrigated	Pearlmillet-Wheat	Clusterbean-Wheat	Planting on beds, sprinkler irrigation, Planting on beds, sprinkler irrigation, Drip irrigation Limited ground water use, prefer life saving irrigation	Short duration cultivars of crops Shallow ground water use alone or in combination. Conservation of rain water, mulching, rain water harvesting.
		Sorghum-Wheat	Sugarcane-Wheat/Raya		
		Pearlmillet-Chickpea	Fallow-Raya		
	Well drained, medium alluvial soils, canal and tubewell irrigated	Rice-Wheat	Pearlmillet-Chickpea	Drip/furrow irrigation in cotton, sprinkler in wheat, planting on beds Sprinkler irrigation, Planting on beds, planting with ridger seeder, laser land leveling Limited ground water use, prefer life saving irrigation Drip irrigation, paired row Planting	Short duration cultivars of crops Shallow ground water use alone or in combination. Conservation of rain water, mulching, rain water harvesting.
		Sugarcane-Wheat	Pigeonpea-Wheat		
		Rice-berseem(fodder)	Sorghum-Wheat		
	Clay soils, canal and tubewell irrigated	Pigeon pea – Wheat/barley	Summer Moong-Wheat	Drip irrigation, paired row planting of sugarcane Planting on beds Shallow irrigation in vegetable and straw mulching Conjunctive use of ground water Use of gypsum for reclaiming sodic waters Limited ground water use, prefer life saving irrigation	Short duration cultivars of crops Shallow ground water use alone or in combination. Conservation of rain water, mulching, rain water harvesting.
		Sugarcane-Wheat	Sugarcane+ Mungbean intercropping		
		Sorghum fodder-Wheat	Vegetables/ flowers		

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	Sandy soils, tubewell irrigated	Pearlmillet-Barley	Clusterbean-Wheat	Adoption of efficient methods of irrigation viz., drip in wide spaced, vegetables and horticultural crops Sprinkler irrigation in other crops	Artificial ground water recharge
		Fallow-Raya	Sugarcane-Wheat/raya		
		Pearlmillet-Chickpea	Fallow-Raya		
	Well drained, medium alluvial soils, canal and tubewell irrigated	Rice-Wheat	Pearlmillet-Chickpea		
		Sugarcane-Wheat	Pigeonpea-Wheat		
		Rice-Berseem(fodder)	Cotton-Wheat		

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Clay soils, canal and tubewell irrigated	Pigeon pea –Wheat/barley	Clusterbean-Raya		
		Pearlmillet–Raya/Chickpea	Planting on beds		
		Sorghum fodder-Wheat	Cucurbeets-Raya		

2.2 Un-timely (unseasonal) rains

Condition	**Suggested contingency measure**			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Rice	Drainage, if depth of standing water is > 5-6 cm	Drainage	Drainage	Shifting to dry place
Sugarcane	Planting on beds and drainage	Drainage	Drainage	-
Wheat	-do-	-do-	-do-	Shifting to dry place
Pearlmillet	-do-	-do-	-do-	-do-
Sorghum (fodder)	-do-	-do-	-do-	-do-
Horticulture				
	1. No adverse effect 2. Removal of unwanted sprouts 3. Spray insecticides & pesticides to control the insect & pest 4. Drain out water if heavy rains	1. Drain out the excess water to avoid flower and fruit drop 2. To control the fruit drop apply foliar application of nutrients and growth regulators 3. Apply insecticide & pesticides to control the insect & pest and diseases on young developing fruits 4. Plough the field to increase the root aeration.	Harvest the fruit crops timely and send to the market immediately.	1. Apply fungicide to avoid post harvest diseases. 2. Proper covering of the produce. 3. Proper grading and cleaning of fruits immediately after harvest. 4. Use the damaged fruits for processing 5. Use water proof packaging
Heavy rainfall with high speed winds in a short span[2]				
Rice	Drainage, if stagnant water	Drainage	Drainage	Shifting to dry place

Sugarcane	-do-	-do-	-do-	-do-
Wheat	-do-	-do-	-do-	-do-
Pearlmillet	-do-	-do-	-do-	-do-
Sorghum (fodder)	-do-	-do-	-do-	-do-
Horticulture				
All crops	Drain out water if heavy rains	1. Drain out the excess water to avoid flower and fruit drop 2. To control the fruit drop apply foliar application of nutrients and growth regulators 3. Apply insecticide & pesticides to control the insect & pest and diseases on young developing fruits 4. Plough the field to increase the root aeration.	Harvest the fruit crops timely and send to the market immediately.	1. Apply fungicide to avoid post harvest diseases. 2. Proper covering of the produce. 3. Proper grading and cleaning of fruits immediately after harvest. 4. Use the damaged fruits for processing 5. Use water proof packaging
Outbreak of pests and diseases due to unseasonal rains				
Rice : Bacterial leaf blight, blast disease and false smut increases due to rains	Soak 10 kg of seed in 10 lt. water suspension of Emisan / Bavistin 10 gm +1 g Streptocycline for 24 hrs. before sowing. No recommendation at vegetative stage for BLB control	Follow recommended control measures		
Wheat : Yellow and brown rust of wheat become severe Powdery mildew intensity becomes low to moderate Karnal bunt increases	Spray 600 – 800 gm Mancozeb 200 lt. of water/acre at the appearance of disease and repeat after 15-20 days For powdery mildew control spray 600-800 gm wettable sulphur/200 lt. of water/acre			
Sugarcane : Red	Use disease free setts treated			

rot becomes severe due to heavy rains	with Emisan containing 6% mercury (Hg) for 4-5 min. or hot steam treated disease free setts			

2.3 Floods

Condition	**Suggested contingency measure**			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Rice	Surface drainage	Drainage	Drainage	Shifting to dry place
Sugarcane	-do-	-do-	-do-	-do-
Wheat	-do-	-do-	-do-	-do-
Pearlmillet	-do-	-do-	-do-	-do-
Sorghum	-do-	-do-	-do-	-do-
Horticulture				
All crops	➢ Drain out the flood water ➢ Spray of nutrients/supplementation ➢ Prefer plantation of water logging resistant crop like Jamun. ➢ Mount planting of fruit trees	Drain out the flood water		➢ Drain out the flood water ➢ Spray of nutrients/supplementation ➢ Prefer plantation of water logging resistant crop like Jamun. ➢ Mount planting of fruit trees
Continuous submergence for more than 2 days				
Rice	Surface drainage	Drainage	Drainage	Shifting to dry place
Sugarcane	-do-	-do-	-do-	-do-
Wheat	-do-	-do-	-do-	-do-
Pearlmillet	-do-	-do-	-do-	-do-
Sorghum	-do-	-do-	-do-	-do-
Horticulture				
	Drain out the flood water			
Sea water inundation				

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				
Rice	Micro-irrigation, avoid irrigation during hot hours with poor quality water	Micro-irrigation avoid irrigation during hot hours with poor quality water	-	
Sugarcane	-do-	-do-	Micro sprinkler –irrigation, avoid irrigation during hot hours with poor quality water	-
Wheat	Micro-drip irrigation	Deep irrigation	Deep irrigation	
Pearlmillet	Micro-sprinkler irrigation, avoid irrigation during hot hours with poor quality water	-do-	Micro-irrigation, avoid irrigation during hot hours with poor quality water	
Sorghum	-do-	-do-	-do-	
Clusterbean	-do-	-do-	-do-	
Pigeonpea	-do-	-do-	-do-	
Horticulture	-	-	-	
Cold wave				
Wheat	Irrigation, balanced fertilizer application, Foliar spray of nutrients	Irrigation, fertilizer application	Irrigation, fertilizer application	-
Raya	Frost resistant cultivars Irrigation, fertilizer application Foliar spray of nutrients	-do-	-do-	-
Chickpea	Frost resistant cultivars Irrigation, fertilizer application	-do-	-do-	-
Barley	Frost resistant cultivars Irrigation, fertilizer application Foliar spray of nutrients	-do-	-do-	
Fodder	-do-	-do-	-do-	
Frost				
Wheat	Irrigation and proper nutrition	Irrigation and proper nutrition	Irrigation and proper nutrition	
Raya	-do-	-do-	-do-	
Chickpea	-do-	-do-	-do-	
Barley	-do-	-do-	-do-	

Fodder	-do-	-do-	-do-	
Hailstorm	Use Anti-hail nets			
Cyclone	NA			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Feed and fodder availability	1. All Districts should be asked to locate their feed and fodder banks in view of submergence situation arising due to draught. Sufficient care must be taken to sensitize the farmers to protect their feed and fodder much ahead of onset of monsoon. The sources for procurement of feed / rice bran (Kunda) within the district and nearest locations should be identified, and the suppliers kept informed about the emergency situation, which might require action at their level for production and supply to the identified areas within the shortest possible time. 2. Complete feed blocks should be prepared and stored in the feed banks for scarcity periods. 3. The livestock holders of small ruminants should be educated/ informed to collect sufficient amount of green leaves from edible plants for use during the period of submergence at the earliest, after receipt of draught warning. The district authorities of Animal Husbandry Department should chalk out a complete programme to cater the feed & fodder needs of livestock. 4. Increase the sown area under fodder crops 5. Looking to scarcity of crop residues, burning of paddy straw and stubbles should not be allowed	1. The best option is to open fodder depots for milch animals which farmers will never deposit into the cattle camps and establish cattle camps for dry and scrub animals. These camps should be established along assured source of water or canals for drinking and growing fodder. 2. Facilities like storing densified roughages transported from other districts should also be established adjacent to these camps. 3. Complete feed blocks stored in the feed banks should be provided to productive, lactating and pregnant animals for scarcity periods 4. Since stall feeding adversely affects the breeding efficiency in case of sheep, therefore, sheep should always be resorted to natural grazing. 5. Special care is required for productive, lactating and pregnant animals. These animals must be supplemented with additional concentrates and fodders. 6. Most of such animals will be retained by the farmers and arrangements for fodder, feed and drinking water should be made accordingly.	1. Immediate efforts are needed to grow fodder crops like oats, barley, *kasni* and *lucern* etc. in the canal command areas. 2. Farmers might have to be compensated for abandoning food or commercial cash crop to meet contingent fodder requirements.

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
	in Haryana. This can be properly harvested, baled, densified and fortified using 4% urea with molasses and transported to areas of fodder scarcity. Standardized machinery for harvesting, bailing, densification and fortification is available with Punjab Agro Federation and in the market.		
Drinking water	Prior to the onset of summer all the water ponds/lakes in the villages/cities should be filled up with canal water/tube wells.	1. All the affected livestock should have an access to clean drinking water. Arrangements are required to be made in this regard with the help of concerned Government functionaries of the Districts. 2. Resorting to alternate day watering to camel, sheep and goats. Experimental evidences show that even watering twice a week did not have much adverse effect on body weight of the sheep. 3. Avoiding long distance grazing, as tired animals need more and frequent watering and feeding.	Normal supply of water should be restored.
Health and disease management	Constitution of task force at district and sub division level which will formulate guidelines for action should have a mobile veterinary unit at their disposal. Procurement of mineral and feed supplements, life saving drugs, electrolytes, vaccines etc.	Disbursement of supplements, treatment of affected animals in camps, proper disposal of dead animals, deworming and vaccinations.	Rehabilitation of affected animals, provision of veterinary aid and follow up, provide supplements etc to make up losses for deficiencies.
Floods			
Feed and fodder availability	1. All Districts should be asked to locate their feed and fodder banks in view of submergence situation arising due to floods. Sufficient care must be taken to sensitize the farmers to protect their feed and fodder much ahead of onset of monsoon. The sources for procurement of feed / rice bran (Kunda) within the district and nearest locations should be identified, and the suppliers kept informed about the emergency situation, which might require action at their level for production and supply to the identified areas within the	1. The best option is to open fodder depots for milch animals which farmers will never deposit into the cattle camps and establish cattle camps for dry and scrub animals. These camps should be established along assured source of water or canals for drinking and growing fodder. 2. Facilities like storing densified roughages transported from other parts of the country should also be established adjacent to these camps. 3. Immediate efforts are needed to grow fodder crops like oats, barley, *kasni* and *lucern* etc. in the canal command areas.	1. Immediate efforts are needed to grow fodder crops like oats, barley, *kasni* and *lucern* etc. in the canal command areas. 2. Farmers might have to be compensated for abandoning food or commercial cash crops to meet contingent fodder requirements. 3. After the sheds have dried, these should be disinfected

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
	shortest possible time. 2. Complete feed blocks should be prepared and stored in the feed banks for scarcity periods 3. The livestock holders of small ruminants should be educated/ informed to collect sufficient amount of green leaves from edible plants for use during the period of submergence at the earliest, after receipt of draught warning. The district authorities of Animal Husbandry Department chalk out a complete programme to cater the feed & fodder needs of cattle, buffalo, sheep, goat, pig, dog, poultry birds etc. 4. The livestock holders of livestockare trained regarding shifting of animals before flooding. The farmers are instructed to let loose their animals instead of tieing much before flood. 5. Increase the sown area under fodder crops 6. Looking to scarcity of crop residues, burning of paddy straw and stubbles should not be allowed in Haryana. This can be properly harvested, bailed, densified and fortified using 4% urea with molasses and transported to areas of fodder scarcity. Standardized machinery for harvesting, bailing, densification and fortification is available with Punjab Agro Federation and in the market.	4. Farmers might have to be compensated for abandoning food or commercial cash crops to meet contingent fodder requirements. 5. Since stall feeding adversely affects the breeding efficiency in case of sheep, therefore, sheep should always be resorted to natural grazing. 6. Special care is required for productive, lactating and pregnant animals. These animals must be supplemented with additional concentrates and fodders. 7. Most of such animals will be retained by the farmers and arrangements for fodder, feed and drinking water should be made accordingly.	and regular feed of the animals should be introduced gradually.
Drinking water	Tube wells should be installed before monsoon to provide underground water to the livestock during flood period.	All the affected livestock and poultry should have an access to clean drinking water. Arrangements are required to be made in this regard with the help of concerned Government functionaries of the Districts. The available water may be chlorinated if required with help of Halogen Tablet prior to drinking by livestock and poultry.	Normal supply of water should be restored.
Health and disease management	Constitution of task force at district and sub division level which will formulate guidelines for	Evacuate to safe places, provide veterinary aid to affected animals, proper disposal of dead animals,	Rehabilitation of affected animals, provision of veterinary

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
	action. Procurement of mineral and feed supplements, life saving drugs, electrolytes, vaccines etc. Workout places for evacuation.	disainfection of drinking water. If not already done, carry out deworming and vaccinations for HS, FMD, BQ in cattle, PPR, sheep pox, ET in sheep and goats, swine fever in pigs..	aid and follow up, provide supplements etc. Disinfection of area, control of vectors, prevention of spread of disease/outbreaks. Treatment of affected animals.
Cyclone	-NA-		
Feed and fodder availability			
Drinking water			
Health and disease management			
Heat wave and cold wave			
Shelter/environment management	Necessary arrangement of tatties, gunny bags and tirpal should be made available so as to cover the sheds during heat and cold waves	1. Window of the sheds should be covered with gunny bags, tatties, and tirpal. Electric fans should be provided in the sheds and if possible desert cooler should be provided during heat period. 2. High energy and readily available sources of energy nutrients may be provided in the ration.	Normal shelter should be restored
Health and disease management	Provision of shelter/roof/covered and open area to animals, procurement of life saving drugs and vaccines.	Cold waves: Cover the animal with old blanket/gunny bag etc. Heat wave: Sprinkle water/take buffaloes to ponds. Treat affected animals, vaccinate if not done earlier.	Treatment of affected animals, provide veterinary aid and follow up.

[s] based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Shortage of feed ingredients	I. All Districts should be asked to locate their feed banks in view of submergence situation arising due to draught. Sufficient care must be taken to sensitize the farmers to protect their feed and fodder much ahead of onset of monsoon. The sources for procurement of feed / rice bran (Kunda) within the district and	Poultry farmers should be provided with sufficient amount of feed ingredients and complete feed during draught situation from the feed banks.	Normal feeding should be restored

	nearest locations should be identified, and the suppliers kept informed about the emergency situation, which might require action at their level for production and supply to the identified areas within the shortest possible time. II. The district authorities of Animal Husbandry Department should chalk out a complete programme to cater to feed the poultry birds.		
Drinking water	Necessary arrangement for water storage should be made. Hand pumps should be installed around the sheds. Sufficient quantity of electrolytes should be ensured.	All the affected poultry should have an access to clean drinking water. Arrangements are required to be made in this regard with the help of concerned Government functionaries of the Districts.	Normal drinking water restored
Health and disease management	Constitution of task force at district and sub division level which will formulate guidelines for action should have a mobile veterinary unit at their disposal. Commercial poultry farms can procure grain/feed in advance.	In backyard birds, put some grains and sufficient water inside the enclosure, provide some vitamin supplement.	In backyard poultry, carry out deworming and vaccination for Ranikhet disease and Gumboro. Provide vitamins and mineral supplement.
Floods			
Shortage of feed ingredients	I. All Districts should be asked to locate their feed banks in view of submergence situation arising due to flood. Sufficient care must be taken to sensitize the farmers to protect their feed much ahead of onset of monsoon. The sources for procurement of feed / rice bran (Kunda) within the district and nearest locations should be identified, and the suppliers kept informed about the emergency situation, which might require action at their level for production and supply to the identified areas within the shortest possible time. II. The poultry farmers should be trained regarding shifting of birds before flood. For shifting of poultry birds to safer places, the farmer should be educated to make suitable cages from bamboos.	Sufficient quantity of feeds stored in the feed banks should be made available to the poultry farmers.	Normal feeding should be restored
Drinking water	I. Prior to the onset of monsoon tube wells should be installed in the villages and near to the poultry farms so as to provide underground water during flood.	All the affected poultry should have an access to clean drinking water. Arrangements are required to be made in this regard with the help of concerned Government functionaries of the Districts. The available water may be chlorinated if	Normal drinking water restored

		required with help of Halogen Tablet prior to drinking by livestock and poultry.	
Health and disease management	Constitution of task force at district and sub division level which will formulate guidelines for action should have a mobile veterinary unit at their disposal. Make provision of shelter for evacuation and arrangement around farm so that flood water does not enter poultry farm/shed. Provision or facilities for disposal of dead birds.	Evacuate the birds to safer places. Carry out deworming and vaccinations. May dispose off/sell birds for meat purpose. Proper disposal of dead birds.	Make the shed dry, sprinkle lime and spray insecticides and disinfectant before placement of birds, use of coccidiostat in feed or water, and proper disposal of dead birds.
Cyclone	-NA-		
Shortage of feed ingredients			
Drinking water			
Health and disease management	Keep arrangements in place in shed for heating during winter/cold waves and for cooling by use of sprinklers/foggers. Procure electrolytes and supplements.	Avoid too much fluctuation below the temperature of 70 ºF and above 100 ºF. Use bukharies, gas burner, secure curtains during winter. Provide a course of antibiotics in feed or water for 3-5 days to combat respiratory problems. Provide vitamin C, electrolyte in drinking water during heat waves and use of foggers, wetting of curtains, sprinkling of water etc. during heat waves. May dispose off/sell birds if heavy mortality occurring.	Treatment of affected birds, vaccination if delayed may be carried out as per schedule.
Heat wave and cold wave			
Shelter/environment management	Necessary arrangement of tatties, gunny bags and tirpal should be made available so as to cover the sheds during heat and cold waves	1. Window of the sheds should be covered with gunny bags, tatties, and tirpal. Electric fans should be provided in the sheds and if possible desert cooler should be provided during heat period. 2. High energy and readily available sources of energy nutrients may be provided in the ration.	Normal shelter should be restored
Health and disease management			

[a] based on forewarning wherever available

2.5.3 Fisheries

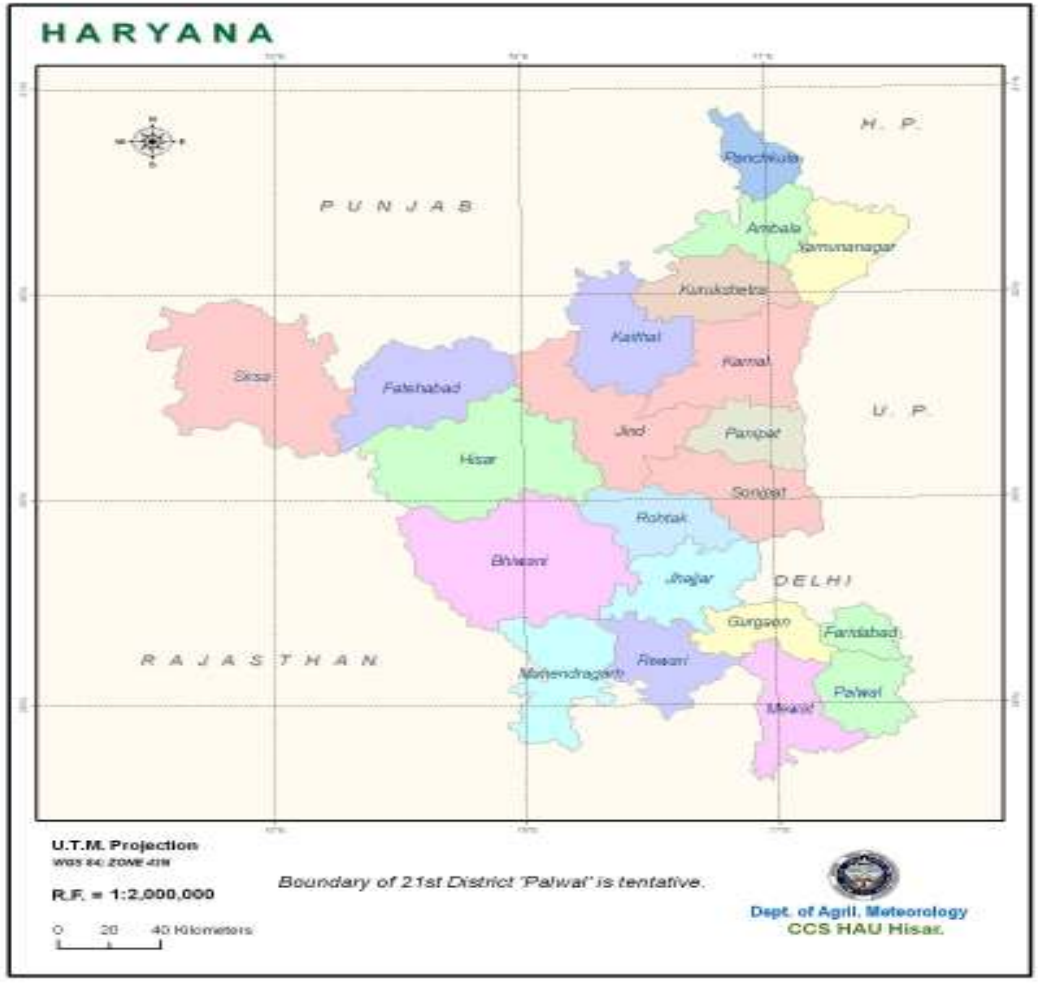
	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine			
Inland			
(i) Shallow water depth due to insufficient rains/inflow			
(ii) Changes in water quality			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Further increase the depth of ponds, store the fish stock in 1 & 2 ponds only.	Sell the big fishes and keep the smaller fishes in one tank.	Stock the young fishes in different tanks, species wise.
(ii) Impact of salt load build up in ponds / change in water quality	Continuously add some water from tube well/water source in fish ponds	Do not allow the water level to go below 3.5 feet in fish ponds.	Stock the young fishes in different tanks and keep the water between 3.5 and 6.0 feet.
(iii) Any other			
2) Floods			
A. Capture			
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			
(i) Inundation with flood water	Boundaries/Bundhs with height >6 feet may be made around fish ponds, will restrict, escape of fishes from ponds	Netout and stock the fishes in one big tanks and make the bundh >6 feet height around the ponds.	Remove the bundh separately and release the fishes, species-wise in tanks.
(ii) Water contamination and changes in water quality	Add more fresh water in each tank (tube well/canal), grow aquatic weeds.	Repeatedly filter and recirculate water from stocking tanks	Filter, recirculate and add new fresh water every week, will decrease fish mortality.
(iii) Health and diseases	Treat the pond water with $KmNO_4$ @ 10 ppm in each fish tanks. Add new fresh water periodically.	Disinfect fish ponds with $KmNO_4$ @ 10g/10,000 liter water fortnightly.	Treatment with $KmNO_4$ must continue for one month even after flood situation is out. Remove the highly infected fishes from ponds.
(iv) Loss of stock and inputs (feed, chemicals etc)	Store the inputs at safer places.	Move stock and inputs to safer places and acquire fresh stock in shortage.	Retain the normal arrangements.
(v) Infrastructure damage (pumps, aerators, huts etc)	Make alternate arrangements according to the anticipated conditions	Proper maintenance/repairing of damaged infrastructure or make new arrangements.	Proper maintenance/repairing of damaged infrastructure.
3. Cyclone / Tsunami			
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/huts etc)			
(vi) Any other			
4. Heat wave and cold wave			
A. Capture			
Marine			
Inland			
B. Aquaculture			
(i) Changes in pond environment (water quality)	Keep the ponds water fresh by adding fresh tubewell water, regularly.	Showering the water in air and add fresh tube-well water, periodically.	During heat waves, showering is must and also tubewell water. In winter continue adding of tubewell water with $KmNO_4$.
(ii) Health and Disease management	Treatment of KmNO4 @ 10 ppm. Sale out the bigger fishes.	Treatment of KmNO4 @ 10 ppm. Dump the fishes which were heavily infected	Disinfection with $KmNO_4$ continues. Sale out all the fishes except, infected ones. Dump the infected fishes in a ditch in the ground.

Annexure 1

Location map of district in the state of Haryana



Annexure 2

Mean Annual rainfall