

State: HARYANA

Agriculture Contingency Plan for District: YAMUNANAGAR

1.0 District Agriculture profile						
1.1	Agro-Climatic/Ecological Zone					
	Agro Ecological Sub Region (ICAR)		Northern Plain, Hot Subhumib (Dry) Eco-Region (9.1)			
	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	
			30° 07'58.70" N	77°17'16.02" E	307 m	
	Name and Address of the concerned ZRS/ZARS/RARS/RRTTS		ZRS, Karnal -132001			
	Mention the KVK located in the district		KVK, Damla, Yamunanagar -135001			
1.2	Rainfall	Average (mm)	No of rainy days	Normal Onset (week and month)	Normal Cessation (week and month)	
	SW monsoon (June-Sep):	779.0	-	1 st week of July	3 rd week of September	
	NE Monsoon(Oct-Dec):	42.1	-	NA	NA	
	Winter (Jan- March)	90.5	-			
	Summer (Apr-May)	40.6	-			
	Annual:	952.2	-			

* 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	Cultivable 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	128.1	14	26	2	0.24	-	5	-	-

(Source: Statistical Abstract Haryana: 2007-08)

1.4	Major Soil types	Area ('000 ha)	Per cent (%) of total area
	Sandy loam	93	75
	Loamy sand	32	25
	Sand	-	-
	loam	-	-
	Clay loam	-	-

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	125	164
	Area sown more than once	80	
	Gross cropped area	205	

1.6	Irrigation	Area ('000 ha)
	Net irrigated area	110

Gross irrigated area	188		
Rainfed area	15		
Sources of Irrigation	Number	Area ('000 ha)	% area
Canals		3	2.7
Tanks	-	-	-
Open wells	-	-	-
Bore wells	-	107	97.3
Lift irrigation	-	-	-
Other sources	-	-	-
Total	-	110	-
Pumpsets	31526	-	-
Tractors	-	-	-
Micro-irrigation		-	-
Groundwater availability and use	No. of blocks	% area	Quality of water
Over exploited*	3	50	-
Critical	-	-	-
Semi- critical	2	33.3	-
Safe	1	16.7	-
Wastewater availability and use	NA	-	-
Ground water quality	Alkaline in nature		

*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)*							
		<i>Kharif</i>			<i>Rabi</i>			Summer	Grand Total
		<i>Irrigated</i>	<i>Rainfed</i>	<i>Total</i>	<i>Irrigated</i>	<i>Rainfed</i>	<i>Total</i>		
	Wheat	-	-	-	-	-	71.3	-	71.3
	Rice	-	-	59.4	-	-	-	-	59.4
	Sugarcane	-	-	42.2	-	-	-	-	42.2
	Horticulture crops - Fruits	Total area							
	Mango	5.0							
	Guava	0.4							
	Chiku	0.3							
	Horticultural crops - Vegetables	Total area							
	Potato	3.0							
	Cauliflower	2.5							
	Onion	2.4							
	Radish	2.1							
	Medicinal and Aromatic crops	Total area							
	Safed Musli	0.03							
	Ashwagandha	0.01							
	Aloe vera	0.1							
	Lemon grass+palmarosa	0.05							
	Others	0.2							
	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)	Total ('000)			
	Non descriptive Cattle (local low yielding)	-	-	108			
	Crossbred cattle	-	-	219			
	Non descriptive Buffaloes (local low yielding)	-	-	NA			
	Graded Buffaloes	-	-	15			
	Goat	-	-	16			
	Sheep	-	-	17			
1.9	Poultry	No. of farms	Total No. of birds('000)				
	Commercial	-	1522				
	Backyard	-	3				
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)	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)						
	Wheat	-	-	295	4155	-	-	295	4155
	Rice	213	3615	-	-	-	-	213	3615
	Sugarcane (Gur)	289.4	6890	-	-	-	-	289.4	6890
	Major Horticultural crops								
	Mango	35247	-	-	-	-	-	35247	-
	Guava	1781	-	-	-	-	-	1781	-
	Chiku	598	-	-	-	-	-	598	-

(Source: Statistical Abstract Haryana)-

1.12	Sowing window for 5 major crops	Wheat	Rice	Sugarcane
	Kharif- Rainfed	-	-	-
	Kharif-Irrigated	-	15 th May – 30 th June	Mid feb – End of March
	Rabi- Rainfed	-	-	-
	Rabi-Irrigated	End of Oct – 15 th Nov	-	-

1.13	What is the major contingency the district is prone to	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: No

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation (No rainfed cultivation)

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			Not Applicable		
Delay by 4 weeks					
Delay by 6 weeks					
Delay by 8 weeks					

Condition			Suggested Contingency measures
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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	Major Farming situation	Crop/cropping system	Crop management	Suggested Contingency measures	
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)				Soil nutrient & moisture conservation measures	Remarks on Implementation
At vegetative stage	NA				

Condition	Major Farming situation	Crop/cropping system	Crop management	Suggested Contingency measures	
Mid season drought (long dry spell)				Soil nutrient & moisture conservation measures	Remarks on Implementation
At reproductive stage	NA				

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

2.1.2 Irrigated situation

Condition	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
Delayed/limited release of water in canals due to low rainfall	Light sandy loam soil with tubewell/canal irrigated condition prominently tubewell	Rice-wheat	Maize-wheat	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 wheat seeds before sowing, seed treatment with biofertilizer, deep ploughing during <i>kharif</i> 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
		Sugarcane	Intercropping of Onion/Garlic with Sugarcane	Drip/furrow irrigation in sugarcane, paired row planting, optimum plant spacing, Planting on beds, straw mulching Laser land leveling Split application of fertilizer, Application of organics Intercultural operation and earthing, Limited ground water use, prefer life saving irrigation, Conjunctive use of brackish ground waters with canal waters Short duration cultivars Adoption of plant protection measures Weed free environment	
	Medium clay loam soil with tubewell/canal irrigated condition prominently tubewell	Rice-wheat	No change	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 wheat seeds before sowing, seed treatment with biofertilizer, deep ploughing during <i>kharif</i> season Shallow irrigation of 4-5 cm depth, weed free environment	
		Maize-wheat	None	10-15% higher seed rate, optimum plant spacing	

Condition	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
				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 wheat seeds before sowing, seed treatment with biofertilizer, deep ploughing during <i>kharif</i> season Shallow irrigation of 4-5 cm depth, weed free environment	
		Sugarcane	Intercropping of Onion/Garlic with Sugarcane	Drip/furrow irrigation in sugarcane, paired row planting, optimum plant spacing, Planting on beds, straw mulching Laser land leveling Split application of fertilizer, Application of organics Intercultural operation and earthing, Limited ground water use, prefer life saving irrigation, Conjunctive use of brackish ground waters with canal waters Short duration cultivars Adoption of plant protection measures Weed free environment	

Condition	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Light sandy loam soil with tubewell/canal irrigated condition prominently tubewell	Rice-wheat	Maize-wheat	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	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

Condition	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
				Soaking of wheat seeds before sowing, seed treatment with biofertilizer, deep ploughing during <i>kharif</i> season Shallow irrigation of 4-5 cm depth, weed free environment	systems and laser leveler
		Maize-wheat	None	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 wheat seeds before sowing, seed treatment with biofertilizer, deep ploughing during <i>kharif</i> season Shallow irrigation of 4-5 cm depth, weed free environment	
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		Maize-wheat	None	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 wheat seeds before sowing, seed treatment with	

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
				biofertilizer, deep ploughing during <i>kharif</i> season Shallow irrigation of 4-5 cm depth, weed free environment	
		Sugarcane	Intercropping of Onion/Garlic with Sugarcane	Drip/furrow irrigation in sugarcane, paired row planting, optimum plant spacing, Planting on beds, straw mulching Laser land leveling Split application of fertilizer, Application of organics Intercultural operation and earthing, Limited ground water use, prefer life saving irrigation, Conjunctive use of brackish ground waters with canal waters Short duration cultivars Adoption of plant protection measures Weed free environment	

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	Light sandy loam soil with tubewell/canal irrigated condition prominently tubewell	Rice-wheat	Maize-wheat	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 wheat seeds before sowing, seed treatment with biofertilizer, deep ploughing during <i>kharif</i> 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
		Maize-wheat	None	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,	

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
				Straw mulching, Limited ground water use, prefer life saving irrigation Short duration cultivars, Adoption of plant protection measures Soaking of wheat seeds before sowing, seed treatment with biofertilizer, deep ploughing during <i>kharif</i> season Shallow irrigation of 4-5 cm depth, weed free environment	
Medium clay loam soil with tubewell/canal irrigated condition prominently tubewell	Rice-wheat	No change	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 wheat seeds before sowing, seed treatment with biofertilizer, deep ploughing during <i>kharif</i> season Shallow irrigation of 4-5 cm depth, weed free environment		
	Maize-wheat	None	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 wheat seeds before sowing, seed treatment with biofertilizer, deep ploughing during <i>kharif</i> season Shallow irrigation of 4-5 cm depth, weed free environment		
	Sugarcane	Intercropping of Onion/Garlic with Sugarcane	Drip/furrow irrigation in sugarcane, paired row planting, optimum plant spacing, Planting on beds, straw mulching Laser land leveling Split application of fertilizer, Application of organics Intercultural operation and earthing, Limited ground water use, prefer life saving irrigation, Conjunctive use of brackish ground		

Condition	Suggested Contingency measures			
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures
				waters with canal waters Short duration cultivars Adoption of plant protection measures Weed free environment

Condition	Suggested Contingency measures			
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures
Insufficient groundwater recharge due to low rainfall	Light sandy loam soil with tubewell/canal irrigated condition prominently tubewell	Rice-wheat	Maize-wheat	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 wheat seeds before sowing, seed treatment with biofertilizer, deep ploughing during <i>kharif</i> season Shallow irrigation of 4-5 cm depth, weed free environment
		Maize-wheat	None	As above
	Medium clay loam soil with tubewell/canal irrigated condition prominently tubewell	Rice-wheat	No change	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

Condition	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
				Soaking of wheat seeds before sowing, seed treatment with biofertilizer, deep ploughing during <i>kharif</i> season Shallow irrigation of 4-5 cm depth, weed free environment	
		Maize-wheat	None	As above	
		Sugarcane	Intercropping of Onion/Garlic with Sugarcane	Drip/furrow irrigation in sugarcane, paired row planting, optimum plant spacing, Planting on beds, straw mulching Laser land leveling Split application of fertilizer, Application of organics Intercultural operation and earthing, Limited ground water use, prefer life saving irrigation, Conjunctive use of brackish ground waters with canal waters Short duration cultivars Adoption of plant protection measures Weed free environment	

2.2 Unusual rains (untimely, unseasonal etc)

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Rice	-	Drainage	Drainage	Shifting to dry place
Wheat	Planting on beds and drainage	-do-	-do-	-do-
Sugarcane	-do-	-do-	-do-	-do-
Vegetables	-do-	-do-	-do-	-do-
Maize	Drainage, if depth of standing water is > 5-6 cm	-do-	-do-	-do-
Horticulture				

Cauliflower, Potato, Onion and Raddish	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 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 span²				
Rice	Drainage, if stagnant water	Drainage	Drainage	Shifting to dry place
Wheat	-do-	-do-	-do-	-do-
Sugarcane	-do-	-do-	-do-	-do-
Vegetables	-do-	-do-	-do-	-do-
Maize	Drainage, if depth of standing water is > 5-6 cm	-do-	-do-	-do-
Horticulture				
Cauliflower, Potato, Onion and Raddish	Drain out water if heavy rains	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 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 rot becomes severe due to heavy rains	Use disease free setts treated with Emisan containing 6% mercury (Hg) for 4-5 min. or hot steam treated disease free setts			
Horticulture				
Potato: Early and late blight of potato increases with rainfall viral disease decreases	Spray Mancozeb @ 0.25% 4-5 times at an interval of 15 days	-	-	-

2.3 Floods

Condition	Suggested contingency measure ^o			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation ¹				
Rice	Drainage, if stagnant water	Drainage	Drainage	Shifting to dry place
Wheat	-do-	-do-	-do-	-do-
Sugarcane	-do-	-do-	-do-	-do-
Vegetables	-do-	-do-	-do-	-do-
Maize	Drainage, if depth of standing water is > 5-6 cm	-do-	-do-	-do-
Horticulture				

Cauliflower, Potato, Onion and Raddish	<ul style="list-style-type: none"> ➤ 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
Continuous submergence for more than 2 days²				
Rice	No adverse effect on crop	No adverse effect on crop	No adverse effect on crop	Shifting to dry place
Wheat	Drainage, if stagnant water	Drainage	Drainage	-do-
Sugarcane	-do-	-do-	-do-	-do-
Vegetables	-do-	-do-	-do-	-do-
Maize	Drainage, if depth of standing water is > 5-6 cm	-do-	-do-	-do-
Horticulture				
Cauliflower, Potato, Onion and Raddish	<ul style="list-style-type: none"> ➤ 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
Sea water inundation	NA			

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

Extreme event type	Suggested contingency measurer			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave				
Rice	Micro-irrigation, avoid irrigation during hot hours with poor quality waters	Micro-irrigation avoid irrigation during hot hours with poor quality waters	-	
Sugarcane	Micro- sprinkler irrigation avoid irrigation during hot hours with poor quality waters	Micro- sprinkler irrigation avoid irrigation during hot hours with poor quality waters	Micro-sprinkler irrigation Avoid irrigation during hot hours With poor quality waters	
Maize	Micro- sprinkler irrigation avoid irrigation during hot hours	Micro- sprinkler irrigation avoid irrigation during hot hours	Micro-sprinkler irrigation Avoid irrigation during	

Cold wave				
Wheat	Irrigation and proper nutrition	Irrigation and proper nutrition	Irrigation and proper nutrition	
Vegetables	-do-	-do-	-do-	
Maize	-do-	-do-	-do-	
Frost				
Wheat	Irrigation and proper nutrition	Irrigation and proper nutrition	Irrigation and proper nutrition	
Vegetables	Irrigation and proper nutrition, covering the crop with straw or plastic sheet	Irrigation and proper nutrition, covering the crop with straw or plastic sheet	Irrigation and proper nutrition, covering the crop with straw or plastic sheet	
Maize	Irrigation and proper nutrition	Irrigation and proper nutrition	Irrigation and proper nutrition	
Hailstorm	-		-	-
Cyclone	-	-	-	-

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.	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.	1. Immediate efforts are needed to grow fodder crops like oats, barley, <i>kasni</i> and <i>lucern</i> etc. in the canal command areas. 2. Farmers

	<p>2. Complete feed blocks should be prepared and stored in the feed banks for scarcity periods.</p> <p>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.</p> <p>4. Increase the sown area under fodder crops</p> <p>5. Looking to scarcity of crop residues, burning of paddy straw and stubbles should not be allowed 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, baling, densification and fortification is available with Punjab Agro Federation and in the market.</p>	<p>3. Complete feed blocks stored in the feed banks should be provided to productive, lactating and pregnant animals for scarcity periods</p> <p>4. Since stall feeding adversely affects the breeding efficiency in case of sheep, therefore, sheep should always be resorted to natural grazing.</p> <p>5. Special care is required for productive, lactating and pregnant animals. These animals must be supplemented with additional concentrates and fodders.</p> <p>6. Most of such animals will be retained by the farmers and arrangements for fodder, feed and drinking water should be made accordingly.</p>	<p>might have to be compensated for abandoning food or commercial cash crop to meet contingent fodder requirements.</p>
Drinking water	<p>Prior to the onset of summer all the water ponds/lakes in the villages/cities should be filled up with canal water/tube wells.</p>	<p>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.</p> <p>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.</p> <p>3. Avoiding long distance grazing, as tired animals need more and frequent watering and feeding.</p>	<p>Normal supply of water should be restored.</p>
Health and disease management			
Floods			
Feed and fodder availability	<p>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</p>	<p>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.</p>	<p>1. Immediate efforts are needed to grow fodder crops like oats, barley, <i>kasni</i></p>

	<p>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.</p> <p>2. Complete feed blocks should be prepared and stored in the feed banks for scarcity periods</p> <p>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.</p> <p>4. The livestock holders of livestock are trained regarding shifting of animals before flooding. The farmers are instructed to let loose their animals instead of tying much before flood.</p> <p>5. Increase the sown area under fodder crops</p> <p>6. Looking to scarcity of crop residues, burning of paddy straw and stubbles should not be allowed 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, baling, densification and fortification is available with Punjab Agro Federation and in the market.</p>	<p>2. Facilities like storing densified roughages transported from other parts of the country should also be established adjacent to these camps.</p> <p>3. Immediate efforts are needed to grow fodder crops like oats, barley, <i>kasni</i> and <i>lucern</i> etc. in the canal command areas.</p> <p>4. Farmers might have to be compensated for abandoning food or commercial cash crops to meet contingent fodder requirements.</p> <p>5. Since stall feeding adversely affects the breeding efficiency in case of sheep, therefore, sheep should always be resorted to natural grazing.</p> <p>6. Special care is required for productive, lactating and pregnant animals. These animals must be supplemented with additional concentrates and fodders.</p> <p>7. Most of such animals will be retained by the farmers and arrangements for fodder, feed and drinking water should be made accordingly.</p>	<p>and <i>lucern</i> etc. in the canal command areas.</p> <p>2. Farmers might have to be compensated for abandoning food or commercial cash crops to meet contingent fodder requirements.</p> <p>3. After the sheds have dried, these should be disinfected and regular feed of the animals should be introduced gradually.</p>
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			
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	<ol style="list-style-type: none"> 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			

^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	<ol style="list-style-type: none"> 1. 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 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. The district authorities of Animal Husbandry Department should chalk out a complete programme to cater to feed the poultry birds. 	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
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			
Floods			
Shortage of feed ingredients	<ol style="list-style-type: none"> 1. 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. 2. 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	<ol style="list-style-type: none"> 1. 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 required with help of Halogen Tablet prior to drinking by livestock and poultry.	Normal drinking water restored
Health and disease management			
Cyclone	-NA-		
Shortage of feed ingredients			
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	Normal shelter should be restored

		during heat period. 2.High energy and readily available sources of energy nutrients may be provided in the ration.	
Health and disease management			

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			
(iii) Any other			
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.
(vi) Any other			
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 KmNO_4 @ 10 ppm. Sale out the bigger fishes.	Treatment of KmNO_4 @ 10 ppm. Dump the fishes which were heavily	Disinfection with KmNO_4 continues. Sale out all the fishes except, infected

		infected	ones. Dump the infected fishes in a ditch in the ground.
(iii) Any other			

Annexure 1

Location map of district in the state of Haryana



Annexure 2

Mean Annual rainfall

