

**State: HARYANA**

**Agriculture Contingency Plan: PANIPAT**

<b>1.0 District Agriculture profile</b>				
<b>1.1</b>	<b>Agro-Climatic/Ecological Zone</b>			
	Agro Ecological Sub Region (ICAR)		North Punjab plain, Ganga-Yamuna Doab and Rajasthan upland, hot, dry, semi-arid eco-subregion	
	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
			29°22'55.22 "N	76°58'14.03" E
	Name and Address of the concerned ZRS/ZARS/RARS/RRTTS		ZRS, Karnal- 132001	
	Mention the KVK located in the district		Krishi Vigyan Kendra, Ujha Village, P.O. Rishalu, Panipat Dist., Pin - 132104	
<b>1.2</b>	<b>Rainfall</b>	Average (mm)	Normal Onset ( week and month)	Normal Cessation (week and month)
	SW monsoon (June-Sep):	443.1	1 <sup>st</sup> week of July	3 <sup>rd</sup> week of September
	NE Monsoon(Oct-Dec):	20.4	-	-
	Winter (Jan- March)	47.4		
	Summer (Apr-May)	23.8		
	Annual:	534.7		

<b>1.3</b>	<b>Land use pattern of the district</b> (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)	130	3	20	4	2	-	1	6.3	0.1

(Source: Statistical Abstract Haryana: 2007-08)

<b>1.4</b>	<b>Major Soil types</b>	Area ('000 ha)	Per cent (%) of total area
	Sandy loam soils	220	100

<b>1.5</b>	<b>Agricultural land use</b>	Area ('000 ha)	Cropping intensity %
	Net sown area	94	196
	Area sown more than once	90	
	Gross cropped area	184	

<b>1.6</b>	<b>Irrigation</b>	Area ('000 ha)	Percent (%)		
	Net irrigated area	94			
	Gross irrigated area	184			
	Rainfed area	-			
	<b>Sources of Irrigation</b>	Number	Area ('000 ha)	% area	
	Canals		29	30.8	
	Tanks	-	-	-	
	Open wells	-	-	-	
	Bore wells	32244 (CGWB report)	65	69.2	
	Lift irrigation	-	-	-	
	Other sources	-	-	-	
	Total		94	-	
	Pumpsets	30318			
	Micro-irrigation				
	<b>Groundwater availability and use</b>	No. of blocks	% area	Quality of water	
	Over exploited*	5	100		
	Critical	-			
	Semi- critical	-			
	Safe	-			
	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 (2008-09)

1.7	Major Field Crops cultivated	Area ('000 ha)							
		Kharif			Rabi			Summer	Grand Total
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
	Wheat				81.5		81.5		81.5
	Rice	70.8		70.8					70.8
	Sugarcane (Gur)	7.8		7.8					7.8
	Rapeseed-Mustard				1.0		1.0		1.0
	<b>Horticulture crops - Fruits</b>	<b>Total area</b>							
	Guava	0.2							
	Mango	0.2							
	Ber	0.1							
	<b>Horticultural crops - Vegetables</b>	<b>Total area</b>							
	Cauliflower	3.2							
	Potato	1.3							
	<b>Medicinal and Aromatic crops</b>	-							
	<b>Plantation crops</b>	-							
	<b>Fodder crops</b>	-							
	Total fodder crop area	-							
	Grazing land	-							
	Sericulture etc	-							

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	-	-	40
	Crossbred cattle	-	-	
	Non descriptive Buffaloes (local low yielding)	-	-	258

	Graded Buffaloes-						
	Goat	-	-			7	
	Sheep	-	-			9	
	Others (Camel, Pig, Yak, horse etc.)	-	-			14	
	Commercial dairy farms (Number)						
<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>				
	Commercial	-	-				
	Backyard	-	-				
<b>1.10</b>	<b>Fisheries (Data source: Chief Planning Officer)</b>						
	<b>A. Capture</b>						
	<b>i) Marine</b> (Data Source: Fisheries Department)	<b>No. of fishermen</b>	<b>Boats</b>		<b>Nets</b>		<b>Storage facilities (Ice plants etc.)</b>
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
		-	-		-	-	-
	<b>ii) Inland</b> (Data Source: Fisheries Department)	<b>No. Farmer owned ponds</b>		<b>No. of Reservoirs</b>		<b>No. of village tanks</b>	
		-		-		-	
	<b>B. Culture</b>						
		<b>Water Spread Area (ha)</b>		<b>Yield (t/ha)</b>		<b>Production ('000 tons)</b>	

i) <b>Brackish water</b> (Data Source: MPEDA/ Fisheries Department)			
ii) <b>Fresh water</b> (Data Source: Fisheries Department)			

**1.11 Production and Productivity of major crops** (Average of last 3 years: 2006,07, 08)

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)
	Wheat	-	-	367	4477	-	-	367	4477
	Rice	194	2738	-	-	-	-	194	2738
	Sugarcane (Gur)	60.5	7566	-	-	-	-	60.5	7566
	Rapeseed-mustard			1.4	1341			1.4	1341
Others		-	-	-	-	-	-	-	-
	<b>Major Horticultural crops</b>								
	Guava	-	-	-	-	-	-		1955
	Mango	-	-	-	-	-	-		2388
	Ber	-	-	-	-	-	-		2255
	<b>Major Vegetable crops</b>								
	Cauliflower	-	-	-	-	-	-	54230	17000
	Potato	-	-	-	-	-	-	28600	22000

(Source: Statistical Abstract Haryana)

1.12	Sowing window for 5 major crops (start and end of sowing period)	Wheat	Rice	Sugarcane	Rapeseed & Mustard
	Kharif- Rainfed	-	-	-	-
	Kharif-Irrigated	-	15 May – 30 June	Mid February – March End	-
	Rabi- Rainfed	-	-	-	-
	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			
	Flood			
	Cyclone			
	Hail storm			
	Heat wave			
	Cold wave			
	Frost			
	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: <b>Yes</b>
		Mean annual rainfall as Annexure 2	Enclosed: <b>Yes</b>
		Soil map as Annexure 3	Enclosed: <b>No</b>

## 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 (Specify month)			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 (Specify month)			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	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	Upland Alluvial soils heavy textured, canal irrigated	Rice-Wheat	No change	<ul style="list-style-type: none"> <li>• 10-15% higher seed rate,</li> <li>• optimum plant spacing</li> <li>• Sprinkler irrigation, Planting on beds, planting with ridger seeder, Laser land leveling,</li> <li>• Conjunctive use of canal and ground waters.</li> <li>• Split application of fertilizer, Application of organic manures, Straw mulching, Limited ground water use, prefer life saving irrigation</li> <li>• Short duration cultivars</li> <li>• Adoption of plant protection measures</li> <li>• Soaking of wheat seeds before sowing, seed treatment with biofertilizer , deep ploughing during <i>kharif</i> season</li> <li>• Shallow irrigation of 4-5 cm depth, weed free environment</li> </ul>	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	No change	<ul style="list-style-type: none"> <li>• Drip/Furrow irrigation in sugarcane, paired row planting, optimum plant spacing, Planting on beds, straw mulching</li> <li>• Laser land leveling</li> <li>• Split application of fertilizer, Application of organic manures</li> <li>• Intercultural operation and earthing up, Limited ground water use, prefer life saving irrigation</li> <li>• Conjunctive use of brackish ground waters with canal waters</li> <li>• Short duration cultivars</li> <li>• Adoption of plant protection measures</li> <li>• Weed free environment</li> </ul>	-do-

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	Upland Alluvial	Rice-Wheat	No change	<ul style="list-style-type: none"> <li>• 10-15% higher seed rate,</li> <li>• optimum plant spacing</li> </ul>	Seeds from State, national seed and private seed

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
under delayed onset of monsoon in catchment	soils heavy textured, canal irrigated			<ul style="list-style-type: none"> <li>• Sprinkler irrigation, Planting on beds, planting with ridger seeder, Laser land leveling,</li> <li>• Conjunctive use of canal and ground waters.</li> <li>• Split application of fertilizer, Application of organic manures, Straw mulching, Limited ground water use, prefer life saving irrigation</li> <li>• Short duration cultivars</li> <li>• Adoption of plant protection measures</li> <li>• Soaking of wheat seeds before sowing, seed treatment with biofertilizer , deep ploughing during <i>kharif</i> season</li> <li>• Shallow irrigation of 4-5 cm depth, weed free environment</li> </ul>	agencies. The schemes of NREGS, RKRY, NFSM, NHM are in operation. Govt. subsidy on sprinkler, drip irrigation systems and laser leveler.
		Sugarcane	No change	<ul style="list-style-type: none"> <li>• Drip/Furrow irrigation in sugarcane, paired row planting, optimum plant spacing, Planting on beds, straw mulching</li> <li>• Laser land leveling</li> <li>• Split application of fertilizer, Application of organic manures</li> <li>• Intercultural operation and earthing up, Limited ground water use, prefer life saving irrigation</li> <li>• Conjunctive use of brackish ground waters with canal waters</li> <li>• Short duration cultivars</li> <li>• Adoption of plant protection measures</li> <li>• Weed free environment</li> </ul>	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

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				NA	

Condition	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Upland Alluvial soils, tube well irrigated	Rice-Wheat	Maize-Wheat	<ul style="list-style-type: none"> <li>• 10-15% higher seed rate, sprinkler irrigation, planting on beds, planting with ridger seeder, laser land leveling, conjunctive use of canal and ground waters.</li> <li>• split application of fertilizer, application of organic manures, straw mulching</li> <li>• Limited ground water use, prefer life saving irrigation</li> <li>• Short duration cultivars Soaking of wheat seeds before sowing</li> <li>• Seed treatment with biofertilizer, deep ploughing during <i>kharif</i> season, shallow irrigation of 4-5 cm depth</li> <li>• Weed free environment</li> <li>• Plant protection measures.</li> </ul>	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	No change	<ul style="list-style-type: none"> <li>• Drip/furrow irrigation in sugarcane, paired row planting, optimum plant spacing, planting on beds, straw mulching in sugarcane</li> <li>• Laser land leveling, split application of fertilizer, application of organics, intercultural operation and earthing up</li> <li>• Limited ground water use, prefer life saving irrigation</li> <li>• Conjunctive use of brackish ground waters with canal waters</li> <li>• Short duration cultivars</li> <li>• Adoption of plant protection measures</li> <li>• Weed free environment</li> </ul>	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

## 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-
Rapeseed-mustard	Drainage, if depth of standing water is > 5-6 cm	Drainage	Drainage	Shifting to dry place
<b>Horticulture</b>				
All Crops	<ul style="list-style-type: none"> <li>• No adverse effect</li> <li>• Removal of unwanted sprouts</li> <li>• Spray insecticides &amp; pesticides to control the insect &amp; pest</li> <li>• Drain out water excess water</li> </ul>	<ul style="list-style-type: none"> <li>• Drain out the excess water to avoid flower and fruit drop</li> <li>• To control the fruit drop apply foliar application of nutrients and growth regulators Apply insecticide &amp; pesticides to control the insect &amp; pest and diseases on young developing fruits</li> <li>• Plough the field to increase the root aeration.</li> </ul>	Harvest the fruit crops timely and send to the market immediately.	<ul style="list-style-type: none"> <li>• Apply fungicide to avoid post harvest diseases.</li> <li>• Proper covering of the produce.</li> <li>• Proper grading and cleaning of fruits immediately after harvest.</li> <li>• Use the damaged fruits for processing</li> <li>• Use water proof packaging</li> </ul>
<b>Heavy rainfall with high speed winds in a short span</b>				
Rice	Drain stagnant water	Drainage	Drainage	Shifting to dry place
Wheat	-do-	-do-	-do-	-do-
Sugarcane	-do-	-do-	-do-	-do-
Vegetables	-do-	-do-	-do-	-do-
Rapeseed-mustard	Drainage, if depth of standing water is > 5-6 cm	-do-	-do-	-do-
<b>Horticulture</b>				
All crops	Drain out excess water	<ul style="list-style-type: none"> <li>• Drain out the excess water to avoid flower and fruit drop</li> <li>• To control the fruit drop apply foliar application of</li> </ul>	Harvest the fruit crops timely and send to the market immediately.	<ul style="list-style-type: none"> <li>• Apply fungicide to avoid post harvest diseases.</li> <li>• Proper covering of the</li> </ul>

		<p>nutrients and growth regulators</p> <ul style="list-style-type: none"> <li>• Apply insecticide &amp; pesticides to control the insect &amp; pest and diseases on young developing fruits</li> <li>• Plough the field to increase the root aeration.</li> </ul>		<p>produce.</p> <ul style="list-style-type: none"> <li>• Proper grading and cleaning of fruits immediately after harvest.</li> <li>• Use the damaged fruits for processing</li> <li>• Use water proof packaging</li> </ul>
<b>Outbreak of pests and diseases due to unseasonal rains</b>				
Rice	<p>Bacterial leaf blight, blast disease and false smut increases due to rains</p> <p>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</p>	Follow recommended control measures		
Wheat	<p>Yellow and brown rust of wheat become severe Powdery mildew intensity becomes low to moderate Karnal bunt increases</p> <p>Spray 600 – 800 gm Mancozeb 200 lt. of water/acre at the appearance of disease and repeat after 15-20 days</p> <p>For powdery mildew control spray 600-800 gm wettable sulphur/200 lt. of water/acre</p>			
Sugarcane	<p>Red rot becomes severe due to heavy rains</p> <p>Use disease free setts treated with Emisan containing 6% mercury (Hg) for 4-5 min. or hot steam</p>			

	treated disease free setts			
<b>Horticulture</b>				
<b>Potato</b>	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			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Transient water logging/ partial inundation</b>				
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-
Rapeseed-mustard	Drainage, if depth of standing water is > 5-6 cm	Drainage	Drainage	Shifting to dry place
<b>Horticulture</b>				
Crop1 (specify)	<ul style="list-style-type: none"> <li>• Drain out the flood water</li> <li>• Spray of nutrients/supplementation</li> <li>• Prefer plantation of water logging resistant crop like Jamun.</li> <li>• Mount planting of fruit trees</li> </ul>			Drain out the flood water
Crop2				
Crop3				
<b>Continuous submergence for more than 2 days</b>				
Rice	No adverse effect on crop	No adverse effect on crop	No adverse effect on crop	Shifting the produce to dry place
Wheat	Drainage, if stagnant water	Drainage	Drainage	-do-
Sugarcane	-do-	-do-	-do-	-do-
Vegetables	-do-	-do-	-do-	-do-
Rapeseed-mustard	Drainage, if depth of standing water is > 5-6 cm	-do-	-do-	-do-
<b>Horticulture</b>				

	<ul style="list-style-type: none"> <li>➤ Drain out the flood water</li> <li>➤ Spray of nutrients/supplementation</li> <li>➤ Prefer plantation of water logging resistant crop like Jamun.</li> <li>➤ Mount planting of fruit trees</li> </ul>	Drain out the flood water
<b>Sea water inundation</b>	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
<b>Heat Wave</b>				
Rice	Micro-irrigation, avoid irrigation during hot hours with poor quality waters	Micro-irrigation avoid irrigation during hot hours with poor quality waters	-	
Sugarcane	-do-	-do-	Micro-irrigation avoid irrigation during hot hours with poor quality waters	
<b>Cold wave</b>				
Wheat	Irrigation and proper nutrition	Irrigation and proper nutrition	Irrigation and proper nutrition	
Rapeseed-mustard	-do-	-do-	-do-	
<b>Horticulture</b>				
Vegetables	Irrigation and proper nutrition	Irrigation and proper nutrition	Irrigation and proper nutrition	Vegetables
<b>Frost</b>				
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	
Rapeseed-mustard	Irrigation and proper nutrition	Irrigation and proper nutrition	Irrigation and proper nutrition	
<b>Hailstorm</b>				
<b>Cyclone</b>	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
<b>Drought</b>			
Feed and fodder availability	<ol style="list-style-type: none"> <li>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.</li> <li>2. Complete feed blocks should be prepared and stored in the feed banks for scarcity periods.</li> <li>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 &amp; fodder needs of livestock.</li> <li>4. Increase the sown area under fodder crops</li> <li>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, bailing,</li> </ol>	<ol style="list-style-type: none"> <li>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.</li> <li>2. Facilities like storing densified roughages transported from other districts should also be established adjacent to these camps.</li> <li>3. Complete feed blocks stored in the feed banks should be provided to productive, lactating and pregnant animals for scarcity periods</li> <li>4. Since stall feeding adversely affects the breeding efficiency in case of sheep, therefore, sheep should always be resorted to natural grazing.</li> <li>5. Special care is required for productive, lactating and pregnant animals. These animals must be supplemented with additional concentrates and fodders.</li> <li>6. Most of such animals will be retained by the farmers and arrangements for fodder, feed and drinking water should be made accordingly.</li> </ol>	<ol style="list-style-type: none"> <li>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.</li> <li>2. Farmers might have to be compensated for abandoning food or commercial cash crop to meet contingent fodder requirements.</li> </ol>

	Suggested contingency measures		
	Before the event	During the event	After the event
	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.	<ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>3. Avoiding long distance grazing, as tired animals need more and frequent watering and feeding.</li> </ol>	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.
<b>Floods</b>			
Feed and fodder availability	<ol style="list-style-type: none"> <li>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 shortest possible time.</li> <li>2. Complete feed blocks should be prepared and stored in the feed banks for scarcity periods</li> <li>3. The livestock holders of small ruminants</li> </ol>	<ol style="list-style-type: none"> <li>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.</li> <li>2. Facilities like storing densified roughages transported from other parts of the country should also be established adjacent to these camps.</li> <li>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.</li> <li>4. Farmers might have to be compensated for abandoning food or commercial cash crops to meet contingent fodder requirements.</li> <li>5. Since stall feeding adversely affects the breeding efficiency in case of sheep, therefore, sheep should always</li> </ol>	<ol style="list-style-type: none"> <li>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.</li> <li>2. Farmers might have to be compensated for abandoning food or commercial cash crops to meet contingent fodder requirements.</li> <li>3. After the sheds have dried, these should be disinfected and regular feed of the animals should be introduced gradually.</li> </ol>

	<b>Suggested contingency measures</b>		
	<b>Before the event</b>	<b>During the event</b>	<b>After the event</b>
	<p>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 &amp; 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, bailing, densification and fortification is available with Punjab Agro Federation and in the market.</p>	<p>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>	
Drinking water	<p>Tube wells should be installed before monsoon to provide underground water to the livestock during flood period.</p>	<p>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.</p>	<p>Normal supply of water should be restored.</p>
Health and disease management	<p>Constitution of task force at district and sub division level which will formulate guidelines for action. Procurement of mineral and feed supplements, life saving drugs, electrolytes, vaccines etc. Workout places for evacuation.</p>	<p>Evacuate to safe places, provide veterinary aid to affected animals, proper disposal of dead animals, disinfection 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.</p>	<p>Rehabilitation of affected animals, provision of veterinary aid and follow up, provide supplements etc. Disinfection of area, control of vectors,</p>

	Suggested contingency measures		
	Before the event	During the event	After the event
			prevention of spread of disease/outbreaks. Treatment of affected animals.
<b>Cyclone</b>	-NA-		
Feed and fodder availability			
Drinking water			
Health and disease management			
<b>Heat wave and cold wave</b>			
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"> <li>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.</li> <li>2. High energy and readily available sources of energy nutrients may be provided in the ration.</li> </ol>	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.

### 2.5.2 Poultry

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>Drought</b>			
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

	<p>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.</p> <p>I. The district authorities of Animal Husbandry Department should chalk out a complete programme to cater to feed the poultry birds.</p>		
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.
<b>Floods</b>			
Shortage of feed ingredients	<p>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.</p> <p>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.</p>	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 required with help of Halogen Tablet	Normal drinking water restored

		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.
<b>Cyclone</b>	-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 °F and above 100 °F. 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.
<b>Heat wave and cold wave</b>			
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			

### 2.5.3 Fisheries

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>1) Drought</b>			
<b>A. Capture</b>			
Marine			
Inland			
(i) Shallow water depth due to insufficient rains/inflow			
(ii) Changes in water quality			
<b>B. Aquaculture</b>			
(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.
<b>2) Floods</b>			
<b>A. Capture</b>			
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>B. Aquaculture</b>			

(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 $\text{KmNO}_4$ @ 10 ppm in each fish tanks. Add new fresh water periodically.	Disinfect fish ponds with $\text{KmNO}_4$ @ 10g/10,000 liter water fortnightly.	Treatment with $\text{KmNO}_4$ 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.
<b>3. Cyclone / Tsunami</b>			
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)			
<b>4. Heat wave and cold wave</b>			
<b>A. Capture</b>			
Marine			
Inland			
<b>B. Aquaculture</b>			
(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 infected	Disinfection with $KmNO_4$ continues. Sale out all the fishes except, infected ones. Dump the infected fishes in a ditch in the ground.

Location map of district in the state of Haryana



Annexure 2

Mean Annual rainfall

