

State: MAHARASHTRA

Agriculture Contingency Plan for District: BHANDARA

1.0 District Agriculture profile					
1.1	Agro-Climatic/Ecological Zone				
	Agro Ecological Sub Region (ICAR)		Satpura range and Wainganga Valley, hot moist subhumid ESR with shallow to deep loamy to clayey mixed Red and Black soils, low to medium AWC and LGP 180-210 days (10.4)		
	Agro-Climatic Zone (Planning Commission)		Eastern plateau and hills region (VII)		
	Agro Climatic Zone (NARP)		Eastern Vidarbha Zone (High rainfall zone) (MH-9)		
	List all the districts or part thereof falling under the NARP Zone		Chandrapur, Bhandara, Gondia and Gadchiroli		
	Geographic coordinates of district headquarter : Bhandara		Latitude	Longitude	Altitude
			21 ⁰ 10'35.93”	79°39'03.61”	288 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS		Zonal Agricultural Research Station (ZARS), Sindewahi, District, Chandrapur- 441222		
	Mention the KVK located in the district		Krishi Vigyan Kendra, Sakoli, District – Bhandara 441802		
1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	1211.6	50.5	24 th Met. Week (June 11-17)	40 th MW (1-7 Oct)
	NE Monsoon(Oct-Dec):	80.7	4.1	-	-
	Winter (Jan- March)	48.9	3.3		
	Summer (Apr-May)	20.1	1.7		
	Annual	1361.3	59.6		

1.3	Land use pattern of the district (latest statistics)	Geographical Area	Cultivable area	Forest area	Land under non agricultural use	Permanent pastures	Cultivable waste land	Land under miscellaneous tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	342	178.3	62	36.9	33.5	11.8	7.7	4.8	5.0	2

Source: *District Socio economic Review 2009 of respective district pub by Govt. of M.S., Mumbai ** Hand Book of Basic Statistics of Maharashtra State. 2006

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))	Area ('000 ha)	% of total Geographical Area
	Deep soil	269.8	78.9
	Shallow soils	45.0	13.0
	Medium deep soils	27.1	8.0

Note:- Soils belong to Mixed Red and Black Soil

1.5	Agricultural land use	Area ('000 ha)*	Cropping intensity %
	Net sown area	178.3	136.4
	Area sown more than once	64.9	
	Gross cropped area	243.2	

Source : * District Socio- economic Review 2009 of respective district pub by Govt. of M.S., Mumbai Source :www.dacnet.nic/lus

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	107		
	Gross irrigated area	139		
	Rainfed area	71.3		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		70.6	65
	Tanks	114		
	Open wells	14228	14.5	13.5
	Bore wells	306		
	Lift irrigation schemes	4	0.8	0.7
	Micro-irrigation			
	Other sources (please specify) Medium projects	5	15.3	14.3
	Total Irrigated Area		107	
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	-		
	Critical	-		
	Semi- critical	-		
	Safe	All (seven)	23% (Ground water Development)	
	Wastewater availability and use			
	Ground water quality			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70% Source CDAP Bhandara, Ex Engg Irrigation Bhandara				

1.7 Area under major field crops and horticulture etc. (2008-09)

1.7	Major Field Crops cultivated	Area ('000 ha)						
		<i>Kharif</i>			<i>Rabi</i>			Summer
		<i>Irrigated</i>	<i>Rainfed</i>	Total	<i>Irrigated</i>	<i>Rainfed</i>	Total	Total
	Paddy	-	-	190.9	-	-	-	190.9
	Soybean	-	9.2	9.2	-	-	-	9.2
	Pigeonpea	-	4.2	4.2	-	-	-	4.2
	Wheat	-	-	-	3.7		3.7	3.7
	Gram	-	-	-	2.6		2.6	2.6
	Summer groundnut	-	-	-	-	-	-	0.1
	Others (specify) Sesame		1.0	1.0				1.0
	Horticulture crops - Fruits	Total area ('000 ha)						
	Mango	3.9						
	Chikoo	0.06						
	Citrus	0.1						
	Guava	0.1						
	others	0.3						
	Total	4.46						
	Horticultural crops - Vegetables	Total area ('000 ha)						
	Brinjal	1.2						
	Tomato	0.6						
	Chilli	0.7						
	Ladyfinger	0.5						
	Leafy vegetables	0.5						
	Others (specify)	1.4						
	Total	4.9						

	Medicinal and Aromatic crops	Total area ('000 ha)
	Aromatic	0.01
	Medicinal	0.003

(Source- CDAP Bhandara 2006-07)

	Plantation crops	-
	Others such as industrial pulpwood crops etc (specify)	-
	Fodder crops	-
	Others (specify)	-
	Total fodder crop area	-
	Grazing land	19.9
	Sericulture etc	0.5
	Others (Specify)	-

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	139.4	83.9	223.3
	Crossbred cattle	10.7	57.9	68.7
	Non descriptive Buffaloes (local low yielding)	14.4	68.2	827.3
	Graded Buffaloes	1.0	4.6	5.7
	Goat	44.4	112.7	157.2
	Sheep	0.4	1.5	2.0
	Others (Camel, Pig, Yak etc.)			NA
	Commercial dairy farms (Number)			NA
1.9	Poultry	No. of farms	Total No. of birds ('000)	
	Commercial	0	46.9	
	Backyard	0	116.7	

1.10	Fisheries (Data source: Chief Planning Officer)						
	A. Capture						
	i) Marine (Data Source: Fisheries Department) not applicable for Bhandara	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake and trap nets)	
				-	-	-	-
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
10		73		5948			
	B. Culture						
		Water Spread Area (‘000ha)		Yield (t/ha)		Production (‘000 tons)	
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)	-		-		-	
	ii) Fresh water (Data Source: Fisheries Department)	12.5		0.88		11 065	
	Others	22.0				15225	

(Source CDAP Bhandara)

1.11 Production and Productivity of major crops (Average of last 5 years: 2004, 05, 06, 07, 08; specify)

Production and Productivity of Major Crops (Average of last 3 years: 2007, 08, 09, 10, 11, specifying)										
1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder ('000 tons)
		Production (tonnes)	Productivity (kg/ha)	Production (tonnes)	Productivity (kg/ha)	Production (tonnes)	Productivity (kg/ha)	Production (tonnes)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Paddy	219.2	1683	-	-	-	-	219.2	1683	-
	Soybean	10.5	1159	-	-	-	-	10.5	1159	-
	Pigeonpea	3.6	863.1	-	-	-	-	3.6	863.16	-
	Wheat	-	-	9.0	823.6	-	-	9.0	823.66	-

Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango	-	-	-	-	-	-	0.3	7.5 tonnes	-
	Chikoo	-	-	-	-	-	-	0.003	3.8 tonnes	-
	Citrus	-	-	-	-	-	-	0.009	7.8 tonnes	-
	Guava	-	-	-	-	-	-	0.016	12.1 tonnes	-
	Brinjal	-	-	-	-	-	-	1.5	125 tonnes	-
	Tomato	-	-	-	-	-	-	0.5	80 tonnes	-
	Chilli	-	-	-	-	-	-	0.4	60 tonnes	-
	Ladyfinger	-	-	-	-	-	-	0.002	35 tonnes	-

1.12	Sowing window for 5 major field crops	Paddy Nursery	Soybean	Pigeon pea	Linseed	Gram
	Kharif- Rainfed	15 June – 10 July	15 June – 15 July	15 June – 7 July	-	-
	Kharif-Irrigated	10 June – 20 June	-	-	-	-
	Rabi- Rainfed	-	-	-	1-15 Oct	1-15 Oct.
	Rabi-Irrigated	-	-	-	15oct- 15 Nov.	15 Oct – 25 Oct.

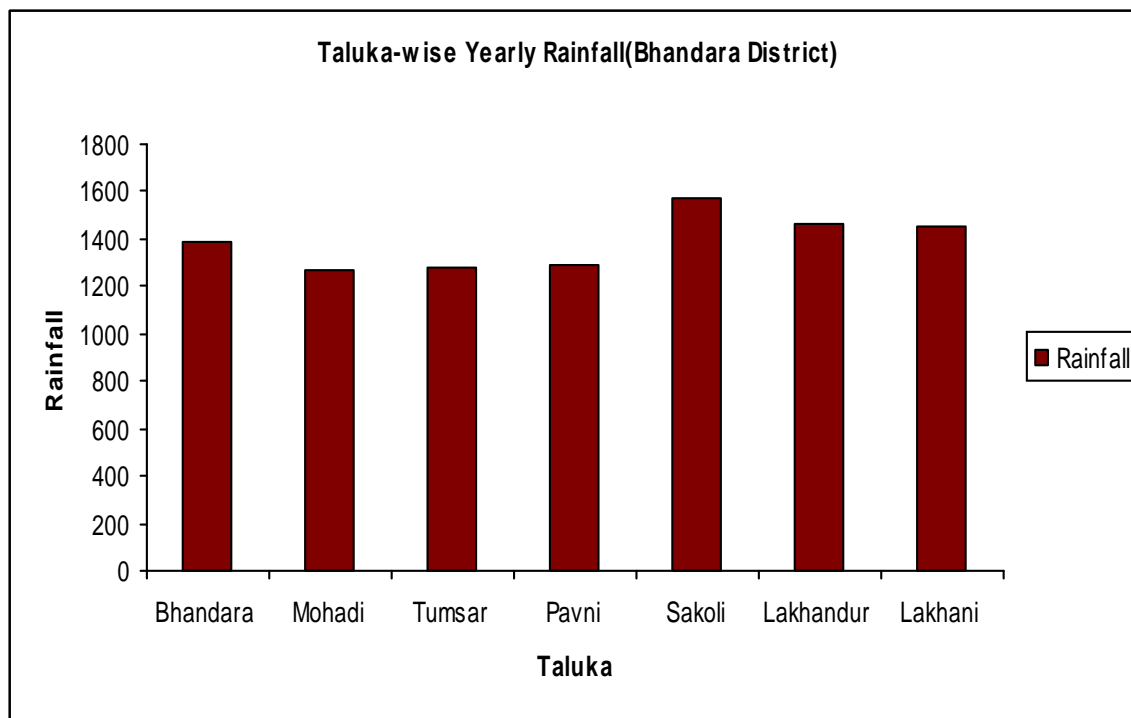
1.13	What is the major contingency the district is prone to (Tick mark)	Regular	Occasional	None
	Drought	-		-
	Flood	-		-
	Cyclone	-	-	
	Hail storm	-	-	
	Heat wave	-		-
	Cold wave	-	-	
	Frost	-	-	
	Sea water intrusion*	-	-	
	Pests and disease outbreak (specify)		-	-
	Others (specify)		-	

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

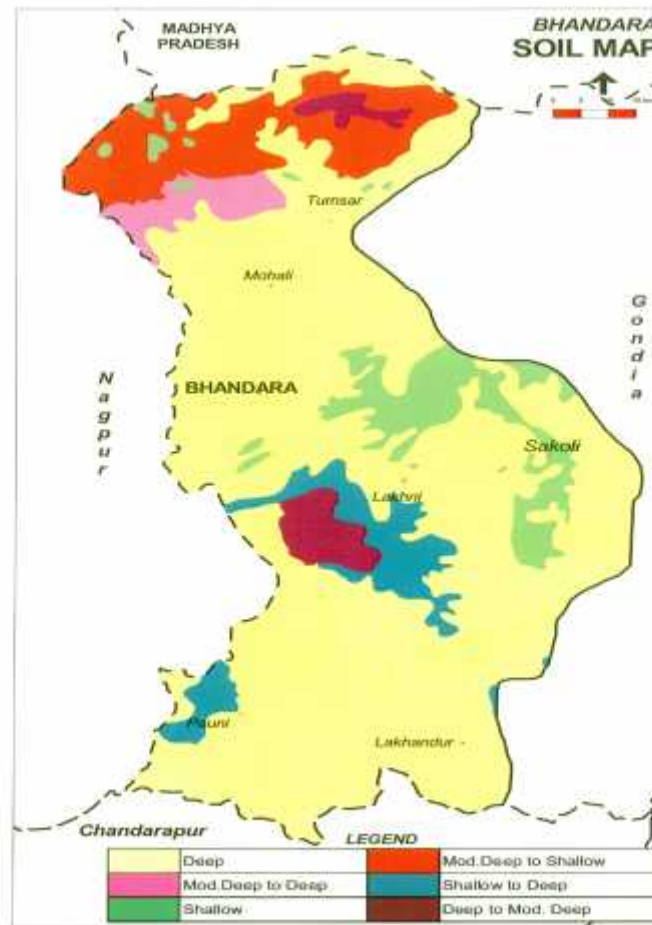
Annexure 1: Location Map



Annexure 2: Mean Annual Rainfall



District Bhandara		
Taluka	Rainfall	Rainy Day
Bhandara	1388.2	64.8
Mohadi	1274.0	58.7
Tumsar	1275.0	58.7
Pavni	1285.1	67.2
Sakoli	1572.3	68.0
Lakhandur	1464.0	58.7
Lakhani	1457.0	58.7
Overall	1387.9	62.1



Annexure 3: Soil map (Source: NBSS & LUP, Nagpur)

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Suggested Contingency measures				
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Delay by 2 weeks Last week of June	Deep to medium deep soils	Paddy (Transplanted) Bandhi system	No change Prefer SKL-6, PKV Makrand, PKV Ganesh, PKV HMT, SYE 2001	Staggered sowing of paddy nursery	-
		Soybean	No change	Recommended practices by Dr.PDKV	
	Shallow to medium deep soils	Paddy (Transplanted) Bandhi system	SKL-6, PKV Makrand, PKV Ganesh, PKV HMT, SYE 2001by drilling	Staggered sowing of paddy nursery	
		Soybean	No change	Recommended practices by Dr.PDKV	
		Pigeon pea on paddy bunds	No change	Recommended practices by Dr.PDKV	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 4 weeks 2 nd week of July	Deep to medium deep soils	Paddy (Transplanted) Bandhi system	Prefer mid late and early varieties MTU 1010, SKL 6, Ganesh, PKV HMT, SYE2001, Makrand	Drilling of paddy in main field and use of weedicide Sprouted seed sowing by using drum seeder on puddled field	The seedlings should be raised in community nurseries
		Soybean	No change	Staggered sowing of paddy nursery	
	Shallow to medium deep soils	Paddy (Transplanted) Bandhi system	SKL-6, PKV Makrand, PKV Ganesh, PKV HMT, SYE 2001by drilling	Recommended practices by Dr.PDKV	
		Soybean	No change		
		Pigeon pea on paddy bunds	No change		

Condition	Suggested Contingency measures				
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 6 weeks 4 th week of July	Deep to medium deep soils	Paddy (Transplanted) Bandhi system	<ul style="list-style-type: none"> •Early varieties of paddy SKL-6, IR 36, IR 64 	<ul style="list-style-type: none"> •Raising of nursery by Dapog method and transplanting in field Sowing of sprouted paddy seed by using drum seeder on puddled field •Drilling of paddy directly in main field and pre-emergence application of Pendamethalene 30 EC @ 1 kg a.i. •Closer transplanting (15 X 15 cm) and adopt 25 % 	-

				higher seed rate for nursery.	
		Soybean	Drilled paddy	Protective irrigation	
	Shallow to medium deep soils	Paddy (Transplanted) Bandhi system	Drilled paddy	Protective irrigation	
		Soybean	Drilled paddy (Bunded condition) Early varieties of paddy like SYE- 1, SKL-6, IR-64, IR-36	-	
		Pigeon pea on paddy bunds	Bunds are left fallow	-	

Condition	Suggested Contingency measures				
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agonomic measures	Remarks on Implementation
Delay by 8 weeks 2 nd week of August	Deep to medium deep soils	Paddy (Transplanted) Bandhi system	Prefer Sakoli-6, Sindewahi-1, Sindewahi-75, PKV Ganesh	<ul style="list-style-type: none"> •Direct seeding of sprouted seed on puddled fields by using drum seeder •Drilling of early varieties with increased seed rate. •Sowing of semi rabi sesame N-8 •Sowing of sunflower in paddy bandhies with 15 to 20 kg / ha seed. 	-
		Soybean	Prefer Paddy Sakoli-6, Sindewahi-1, Sindewahi-75, PKV Ganesh	<ul style="list-style-type: none"> •Direct seeding of sprouted seed on puddled fields by using drum seeder •Drilling of early varieties with increased seed rate. 	

				<ul style="list-style-type: none"> •Sowing of semi rabi sesame N-8 •Sowing of sunflower in paddy bandhies with 15 to 20 kg / ha seed. 	
	Shallow to medium deep soils	Paddy (Transplanted) Bandhi system	Prefer Sakoli-6, Sindewahi-1, Sindewahi-75, PKV Ganesh	<ul style="list-style-type: none"> •Direct seeding of sprouted seed on puddled fields by using drum seeder •Drilling of early varieties with increased seed rate. •Sowing of semi rabi sesame N-8 •Sowing of sunflower in paddy bandhies with 15 to 20 kg / ha seed. 	
		Soybean	Prefer Sakoli-6, Sindewahi-1, Sindewahi-75, PKV Ganesh	<ul style="list-style-type: none"> •Direct seeding of sprouted seed on puddled fields by using drum seeder •Drilling of early varieties with increased seed rate. •Sowing of semi rabi sesame N-8 •Sowing of sunflower in paddy bandhies with 15 to 20 kg / ha seed. 	
		Pigeon pea on paddy bunds	Sesame, Dolichos sp. (Popatwal) on paddy bunds	-	

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient and moisture conservation measures	Remarks on Implementation
Normal onset followed by 15-20 days dry spell after sowing/ transplanting leading to poor germination/crop stand etc.	Deep to medium deep soils	Paddy (Transplanted) Bandhi system	Protective irrigation, Weeding	Application of fertilizers at sufficient soil moisture	-
		Soybean	Gap filling	Hoeing to reduce evapotranspiration Life saving irrigation	
	Shallow to medium deep soils	Paddy (Transplanted) Bandhi system	Protective irrigation, Weeding	Application of fertilizers at sufficient soil moisture	
		Soybean	Gap filling	Hoeing to reduce evapotranspiration Life saving irrigation	
		Pigeon pea on paddy bunds	-	-	

Condition	Suggested Contingency measures				
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient and moisture conservation measures	Remarks on Implementation
At vegetative stage	Deep to medium deep soils	Paddy (Transplanted) Bandhi system	Life saving irrigation	Application of nitrogenous fertilizers at sufficient soil moisture. Interculture	Rain water harvesting and recycling. Deepening of bodies
		Soybean JS-335,TAMS 98-21, JS-93 -05 & NRCS -37	Imazethapyr @ 75 gm a.i./ha	Hoeing by tying coir string to hoe	If the cultivation and sowing is along the slope, open the intermittent furrow by lifting the hoe at

					10-15 ft. distance instead of opening the continuous furrows
	Shallow to medium deep soils	Paddy (Transplanted) Bandhi system	Life saving irrigation	Application of nitrogenous fertilizers at sufficient soil moisture. Interculture	Rain water harvesting and recycling. Deepening of bodies
		Soybean	Imazethapyr @ 75 gm a.i./ha	Hoeing by tying coir string to hoe	If the cultivation and sowing is along the slope, open the intermittent furrow by lifting the hoe at 10-15 ft. distance instead of opening the continuous furrows
		Pigeon pea on paddy bunds AKT- 8811, Vipula , PKV- Tara, BSMR-736,Asha	-	-	-

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient and moisture conservation measures	Remarks on Implementation
At flowering/ fruiting stage	Deep to medium deep soils	Paddy (Transplanted) Bandhi system	Life saving irrigation	-	-
		Soybean	Life saving irrigation	Spray 2 % DAP	
	Shallow to medium deep soils	Paddy (Transplanted) Bandhi system	Life saving irrigation	-	
		Soybean	Life saving irrigation	Spray 2 % DAP	
		Pigeon pea on paddy bunds	-	-	

Condition			Suggested Contingency measures		
Terminal drought (Early withdrawal of monsoon Up to 15 th September)	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
	Deep to medium deep soils	Paddy (Transplanted) Bandhi system	Give second dose of nitrogen (25 kg N) under Protective irrigation.	-	-
		Soybean	Protective irrigation		
	Shallow to medium deep soils	Paddy (Transplanted) Bandhi system	Give second dose of nitrogen (25 kg N) under Protective irrigation.		
		Soybean	Protective irrigation		
		Pigeon pea on paddy bunds	-		

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
Limited release of water in canals due to low rainfall	Deep to medium deep soils	Paddy (kharif)	No change	Adopt SRI, community nursery to facilitate Staggered transplanting	Prefer DAPOG nursery
Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Deep to medium deep soils	Paddy (kharif)	Drilled paddy with short duration varieties SKL- 6, MTU-1010, SYE- 1	Weeding	-

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	NA				

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Rabi cropping under open wells	Paddy	Chickpea, Lathyrus, Linseed, vegetables	Irrigate at critical stages	Reduce area under paddy

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

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Paddy	Drain excess water above 5 cm.	Drain excess water	Drainage Delay harvesting for few days. Harvesting and threshing Harvesting at physiological maturity	Harvesting at physiological maturity Drying of paddy on bunds. Salt treatment of wetted paddy seeds with 5 % common salt to prevent germination. Shifting of produce at safer place or covering with paddy straw. Use of Paraquat as pre-harvest dessicant @ 0.1 % spray application for early harvesting to avoid losses by unpredictable monsoon at later stages.
Soybean	Drain out excess water	Drain out excess water	Harvesting at	

			physiological maturity drying grains	
Horticulture				
Mango	Drainage and micro site improvement	Need based plant protection measures	Need based plant protection measures	-
Heavy rainfall with high speed winds in a short span				
Paddy	Drainage excess water above 5 cm.	Drainage excess water above 10 cm.	Drainage Delay harvesting	Harvesting at physiological maturity Drying of paddy on bunds. Salt treatment of wetted paddy sheaves with 5 % common salt to prevent germination. Shifting of produce at safer place or covering with paddy straw. Use of PARAQUAT as pre-harvest desiccant @ 0.1 % spray application for early harvesting to avoid losses by unpredictable monsoon at later stages.
Outbreak of pests and diseases due to unseasonal rains				
Paddy	Spraying of Monocrotophos 36 EC 14 ml or Cypermethrin 10 EC 6 ml per 10 liter of water	Spraying of Monocrotophos 36 EC 14 ml or Cypermethrin 10 EC 6 ml per 10 Liter of water	Removal and destruction of infected panicles due to Loose smut	
Soybean	To control semi-looper spray NSKE 5% or quinalphos 25 EC 20 ml/10 lit.	To control semilooper spray NSKE 5% or quinalphos 25 EC 20 ml/10 lit.	-	-
Pigeonpea	Spraying of Quinolphos 25 EC @ 16 ml per 10 liters of water to control leaf roller and leaf minor.	Removal and destruction of wilted plant	Spraying of neem extract 5 % Quinolphos 25 EC 20 ml or HANPV 250 LE to control pod borer	
Horticulture				
Mango		Leaf hopper: spraying of dimethoate 30 EC 10 ml or quinalphos 25 EC 20 ml / 10 lit. of water		

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave				
Horticulture				
Mango	<ul style="list-style-type: none"> • Increase the frequency of irrigation • Spraying of antitranspirants • Mulching 	<ul style="list-style-type: none"> • Increase the frequency of irrigation • Spraying of antitranspirants • Mulching • Pruning of damaged parts 	<ul style="list-style-type: none"> • Increase the frequency of irrigation • Spraying of antitranspirants • Mulching • Pruning of damaged parts 	Harvesting and grading
Cold wave	NA			
Frost	NA			
Hailstorm	NA			
Cyclone	NA			

2.5 Contingent strategies for Livestock, Poultry and Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event ^s	During the event	After the event
Drought			
Feed and fodder availability	<p>As the district is occasionally prone to drought the following measures to be taken to mitigate the fodder deficiency problem</p> <p>Sowing of cereals (Sorghum/Bajra) and leguminous fodder crops (Lucerne, Berseem, Horse gram, Cowpea) during North-East monsoon under dry land system for fodder production.</p> <p>Collection of soya meal waste and groundnut haulms for use as feed supplement during drought</p> <p>Preserving the green maize fodder as silage</p> <p>Establishment of fodder bank at village level with available dry fodder (wheat straw, paddy straw and groundnut haulms etc.)</p> <p>Development of silvopastoral models with Leucaena, Glyricidia, Prosopis as fodder trees and Marvel, Madras Anjan, Stylo, Desmanthus, etc., as under storey grass</p> <p>Encourage fodder production with Sorghum – stylo- Sorghum on rotation basis and also to cultivate short-term fodder crops like sunhemp</p> <p>Promote Azola cultivation at backyard</p> <p>Formation of village Disaster Management Committee</p> <p>Capacity building and preparedness of the stakeholders and official staff for the drought/floods</p>	<p>Harvest and use biomass of dried up crops (paddy, soybean, wheat, gram, groundnut) material as fodder</p> <p>Use of unconventional and locally available cheap feed ingredients especially soya meal waste and groundnut cake for feeding of livestock during drought</p> <p>Harvest all the top fodder available (Subabul, Glyricidia, Pipol, Prosopis etc) and feed the LS during drought</p> <p>Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured from Govt. Godowns for feeding as supplement for high productive animals during drought</p> <p>Promotion of Horse gram as contingent crop and harvesting it at vegetative stage as fodder</p> <p>All the hay should be enriched with 2% Urea molasses solution or 1% common salt solution and fed to LS.</p> <p>Continuous supplementation of minerals to prevent infertility.</p> <p>Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals</p>	<p>Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAIN T BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 on their own lands with input subsidy</p> <p>Supply of quality seeds of COFS 29, Stylo and fodder slips of Marvel, Yaswant, Jaywant, Napier, guinea grass well before monsoon</p> <p>Flushing the stock to recoup</p> <p>Replenish the feed and fodder banks</p>
Drinking water	<p>Adopt various water conservation methods at village level to improve the ground water level for adequate water supply.</p>	<p>Adequate supply of drinking water.</p> <p>Restrict wallowing of animals in water</p>	<p>Watershed management practices shall be promoted to</p>

	<p>Identification of water resources</p> <p>Desilting of ponds</p> <p>Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals)</p> <p>Construction of drinking water tanks in herding places/village junctions/relief camp locations</p> <p>Community drinking water trough can be arranged in shandies /community grazing areas</p>	<p>bodies/resources</p> <p>Add alum in stagnated water bodies</p>	<p>conserve the rainwater. Bleach (0.1%) drinking water / water sources</p> <p>Provide clean drinking water</p>
Health and disease management	<p>Procure and stock emergency medicines and vaccines for important endemic diseases of the area</p> <p>All the stock must be immunized for endemic diseases of the area</p> <p>Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</p> <p>Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures</p> <p>Procure and stock multivitamins & area specific mineral mixture</p>	<p>Carryout deworming to all animals entering into relief camps</p> <p>Identification and quarantine of sick animals</p> <p>Constitution of Rapid Action Veterinary Force</p> <p>Performing ring vaccination (8 km radius) in case of any outbreak</p> <p>Restricting movement of livestock in case of any epidemic</p> <p>Tick control measures be undertaken to prevent tick borne diseases in animals</p> <p>Rescue of sick and injured animals and their treatment</p> <p>Organize with community, daily lifting of dung from relief camps</p>	<p>Keep close surveillance on disease outbreak.</p> <p>Undertake the vaccination depending on need</p> <p>Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer</p>

Floods	<p>In case of early forewarning (EFW), harvest all the crops (paddy, soybean, wheat, gram, groundnut etc.) that can be useful as feed/fodder in future (store properly)</p> <p>Keeping sufficient of dry fodder to transport to the flood affected villages</p> <p>Don't allow the animals for grazing if severe floods are forewarned</p> <p>Keep stock of bleaching powder and lime</p> <p>Carry out Butax spray for control of external parasites</p> <p>Identify the Clinical staff and trained paravets and indent for their services as per schedules</p> <p>Identify the volunteers who can serve in need of emergency</p> <p>Arrangement for transportation of animals from low lying area to safer places and also for rescue animal health workers to get involve in rescue operations</p>	<p>Transportation of animals to elevated areas</p> <p>Proper hygiene and sanitation of the animal shed</p> <p>In severe storms, un-tether or let loose the animals</p> <p>Use of unconventional and locally available cheap feed ingredients for feeding of livestock.</p> <p>Avoid soaked and mould infected feeds / fodders to livestock</p> <p>Emergency outlet establishment for required medicines or feed in each village</p> <p>Spraying of fly repellants in animal sheds</p>	<p>Repair of animal shed</p> <p>Bring back the animals to the shed</p> <p>Cleaning and disinfection of the shed</p> <p>Bleach (0.1%) drinking water / water sources</p> <p>Encouraging farmers to cultivate short-term fodder crops like sunhemp.</p> <p>Deworming with broad spectrum dewormers</p> <p>Proper disposal of the dead animals / carcasses by burning / deep burying (4-8 feet) with lime powder (1kg for small ruminants and 5kg for large ruminants) in pit</p> <p>Drying the harvested crop material and proper storage for use as fodder.</p>
Cyclone	NA		
Heat & Cold wave	<p>Arrangement for protection from heat wave</p> <ul style="list-style-type: none"> i) Plantation around the shed ii) H₂O sprinklers / foggers in the shed iii) Application of white reflector paint on the roof iv) Thatched sheds should be provided as a shelter to 	<p>Allow the animals early in the morning or late in the evening for grazing during heat waves</p> <p>Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves</p> <p>Put on the foggers / sprinklers during heat waves</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>

	animal to minimize heat stress	In severe cases, vitamin 'C' and electrolytes should be added in H ₂ O during heat waves.	
Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	Submission for insurance claim and availing insurance benefit Purchase of new productive animals

Vaccination schedule in small ruminants (Sheep & Goat)

Disease	Season
Foot and mouth disease (FMD)	Preferably in winter / autumn
PPR	All seasons, preferably in June-July
Black quarter (BQ)	May / June
Enterotoxaemia (ET)	May
Haemorrhagic septicaemia (HS)	March / June
Sheep pox (SP)	December / march

Vaccination programme for cattle and buffalo:

Disease	Age and season at vaccination
Anthrax	In endemic areas only, Feb to May
HS	May to June
BQ	May to June
FMD	November to December

2.5.2 Poultry

Drought	Suggested contingency measures		
	Before the event ^a	During the event	After the event
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Supplementation to all survived birds
Drinking water		Use water sanitizers or offer cool hygienic drinking water	
Health and disease management	Culling of sick birds.	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one	Hygienic and sanitation of poultry house

	Deworming and vaccination against RD and IBD	litre water)	Disposal of dead birds by burning / burying with lime powder in pit
Floods			
Shortage of feed ingredients	In case of early forewarning of floods, shift the birds to safer place Storing of house hold grain like maize, broken rice, bajra etc,	Use stored feed as supplement Don't allow for scavenging Culling of weak birds	Routine practices are followed Deworming and vaccination against RD
Drinking water		Use water sanitizers or offer cool hygienic drinking water	
Health and disease management	In case of EFW, add antibiotic powder (Terramycin/Ampicilline/ Ampiclox etc., 10g in one litre) in drinking water to prevent any disease outbreak	Prevent water logging surrounding the sheds through proper drainage facility Assure supply of electricity by generator or solar energy or biogas Sprinkle lime powder to prevent ammonia accumulation due to dampness	Sanitation of poultry house Treatment of affected birds Disposal of dead birds by burning / burying with lime powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD
Cyclone	NA		
Heat wave			
Shelter/environment management	Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day	Routine practices are followed

Health and disease management	Deworming and vaccination against RD and fowl pox	Supplementation of house hold grain Provide cool and clean drinking water with electrolytes and vit. C In hot summer, add anti-stress probiotics in drinking water or feed	Routine practices are followed
Cold wave	NA		

^a based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

	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	Extra food supply / sale out fish-	Extra food supply / sale out fish	--
(ii) Changes in water quality	--	--	--
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	--	--	--
(ii) Impact of salt load build up in ponds / change in water quality	--	pH maintenance	200 Kg lime / ha.
2) Floods			
A. Capture			
Marine			
Inland			
(i) Average compensation paid due to loss of human life	As per Govt .norm	--	1 lakh per fisherman nominee for death OR 0.5 lakh for disability

(ii) No. of boats / nets/damaged	--	--	0.01 lakh /fisherman Coop Soc. For tank
(iii) No.of houses damaged	--	--	--
(iv) Loss of stock	--	--	0.01 lakh /fisherman Coop Soc. For tank
(v) Changes in water quality	--	pH maintenance	200 Kg lime / ha
(vi) Health and diseases	--	Ulcerative syndrome	25% subsidy on treatment
B. Aquaculture			
(i) Inundation with flood water	--	--	--
(ii) Water contamination and changes in water quality	--	pH maintenance	200 Kg lime / ha.
(iii) Health and diseases	--	Ulcerative syndrome	25% subsidy on treatment
(iv) Loss of stock and inputs (feed, chemicals etc)	--	--	per fisherman Rs 500/-
(v) Infrastructure damage (pumps, aerators, huts etc)	--	--	--
3. Cyclone / Tsunami			
A. Capture	--	--	--
Marine	--	--	--
(i) Average compensation paid due to loss of fishermen lives	As per Govt .norm	--	1 lakh per fisherman nominee.
(ii) Avg. no. of boats / nets/damaged	--	--	--
(iii) Avg. no. of houses damaged	--	--	--
Inland			--
B. Aquaculture			
(i) Overflow / flooding of ponds	As per Govt .norm	--	0.005 / fisherman or Rs 500/-
(ii) Changes in water quality (fresh water / brackish water ratio)	--	PH maintenance	200 Kg lime / ha.
(iii) Health and diseases	--	Ulcerative syndrome	25% subsidy on treatment
(iv) Loss of stock and inputs (feed, chemicals etc)	--	--	0.005 / fisherman or Rs 500/-
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	--	--	--
4. Heat wave and cold wave	--	--	--
A. Capture	--	--	--
Marine	--	--	--
Inland	--	--	--

B. Aquaculture			
(i) Changes in pond environment (water quality)	--	PH maintenance	200 Kg lime / ha.
(ii) Health and Disease management	--	Ulcerative syndrome	25% subsidy on treatment