

*DISTRICTWISE
CONTINGENCY CROP
PLANNING FOR
KONKAN
MAHARASHTRA*

RATNAGIRI

State: MAHARASHTRA

Agriculture Contingency Plan for District: RATNAGIRI

1.0 District Agriculture profile					
1.1	Agro-Climatic/Ecological Zone				
	Agro Ecological Sub Region (ICAR)	Western Ghats and Coastal Plain, hot, humid-per humid eco region (19.2) and Western Ghats and Coastal Plain, Hot Humid-Perhumid Eco-Region (19.3)			
	Agro-Climatic Zone (Planning Commission)	Western Coast Plains and Ghat region (XII)			
	Agro Climatic Zone (NARP)	South Konkan Coastal Zone (MH-1)			
	List all the districts or part thereof falling under the NARP Zone	Ratnagiri and Sindhudurg			
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude	
		16 ⁰ 59’31.29’’ N	73 ⁰ 17’ 32. 33’’ E	46 m.	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Dr. Haladavnekar P.C., Associate Director of Research, Regional Fruit Research Station, Vengurle- 417 516, Dist. Sindhudurg (M.S.)			
	Mention the KVK located in the district	Krishi Vigyan Kendra, Devade, Post : Devade – 416 712 Tal.: Lanja, Dist. Ratnagiri (M.S.)			
	Name and address of the nearest Agromet Field Unit for agro-advisories in the zone	AMFU Dapoli, Department of Agronomy, Dr. B.S. Konkan Krishi Vidyapeeth, Dapoli - 415 712, Dist. Ratnagiri (M.S.)			
1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	3414.7	91	2 nd week of June	2 nd week of October
	NE Monsoon(October-December)	--	--	--	
	Post monsoon shower (October-December)	171.8	7	-	--
	Winter (January- March)	4.6	0	--	--
	Summer (April-May)	27.0	1	--	--
	Annual	3618.2	99	-	-

1.3	Land use pattern of the district (latest statistics)	Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000' ha)	816	215.46	5.86	21.17	28	138	49	197.918	31	42

Source – District Socio-economic Review -2014-15 (Directorate of Economic & Statistics, Govt. of Maharashtra)

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))*	Area ('000' ha)	Percent (%) of total geographical area
	Deep soils	64.3	7.8
	Medium deep soils	234.0	28.6
	Shallow soils	517.6	63.4

Source :- NBSS & LUP, Nagpur

1.5	Agricultural land use	Area ('000' ha)	Cropping intensity %
	Net sown area	303.0	111.6
	Area sown more than once	35.0	
	Gross cropped area	338.0	

Source – District Socio-economic Review -2014-15 (Directorate of Economic & Statistics, Govt. of Maharashtra)

1.6	Irrigation	Area ('000' ha)		
	Net irrigated area	14		
	Gross irrigated area	10.4		
	Rainfed area	293.6		
	Sources of Irrigation	Number	Area ('000' ha)	Percentage of total irrigated area
	Canals	-	0.2	2.1
	Tanks	-	-	-
	Open wells	7534	2.3	59.6
	Bore wells	170	6.1	38.3
	Lift irrigation schemes	453		
	Micro-irrigation			
	Other sources (please specify)	--		
	Total Irrigated Area		9.4	
	Pump sets	11587		
	No. of Tractors	31*		

Source – District Socio-economic Review -2014-15 (Directorate of Economic & Statistics, Govt. of Maharashtra)

* District Socio-economic Review –2006-07 (Directorate of Economic & Statistics, Govt. of Maharashtra)

	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	--	25% ground water exploited	
	Wastewater availability and use	--	--	
	Ground water quality			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

1.7 Area under major field crops & horticulture etc.

1.7	Major Field crops cultivated	Area ('000' ha)					
		Kharif		Rabi		Summer	Total
		Irrigated	Rainfed	Irrigated	Rainfed		
	Rice	30	70.49	0.1	--	--	77.3
	Finger millet	--	14.64	--	--	--	16.9
	Prosomillet	--	3.97	--	--	--	6.5
	Pulses- (Lablab bean, pigeon pea, cowpea, black gram,horse gram, etc.)	3.67	3.13	6.7	--	--	8.8
	Groundnut	--	2.2	0.1	--	--	2.3
	Horticultural crops – Fruits 2009-10	Total Area ('000' ha)					
	Mango	68.32					
	Cashew	109.11					
	Sapota						
	Other						
	Horticulture crops – Vegetables						
	Okra, Brinjal, Chilly, Cucurbits, Leafy vegetables etc.	2.36					
	Plantation crops						
	Coconut	5.2					
	Aracanut	3.4					
	Fodder crops	-					

Source :- Krishi Utpadan Karyakramachi Rupresha, Kharif and Rabi Hangam - 2010-11, Vibhagiy Sabha, Konkan Mahsul Vibhag.
Dept. of Agriculture, Govt. of Maharashtra

1.8	Livestock (2003)	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	273.5	178.3	451.9
	Crossbred cattle	9.2	16.2	25.5
	Non descriptive Buffaloes (local low yielding)	0.6	2.9	3.5
	Graded Buffaloes	0	0	44
	Goat	11.2	26.2	33.0
	Sheep	0.003	0.002	
	Others (Horse, Camel, Pig, Yak etc.)	-	-	-
	Commercial dairy farms (Number)			
1.9	Poultry	No. of farms	Total No. of birds	
	Commercial	<i>Data are not available</i>	279046	
	Backyard	-	1026034	

Source : Maharashtra Animal and Fisheries Science University, Nagpur

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)	
		67615	2436	160	2304	35	28
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
		Data are not available		40		Data are not available	
	B. Culture						
		Water Spread Area ('000' ha)		Yield (t/ha)		Production (tons)	
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)	0.125		0.7		87.5	
ii) Fresh water (Data Source: Fisheries Department)	0.876		0.2		175.2		

1.11 Production and Productivity of major crops

Production and Productivity of Major Crops										
1.11	Name of crop	Kharif		Rabi-Summer		Summer		Total		Crop residue as fodder ('000 tons)
		Production ('00' MT)	Productivity (kg/ha)	Production ('00' MT)	Productivity (kg/ha)	Production ('00' MT)	Productivity (kg/ha)	Production ('00' MT)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Rice	1979	2550	3	2500	--	--	2141	3037	
	Finger millet	210	1193	2	1000	--	--	205	1400	
	Prosomillet	37	578	-	-	--	--	23	589	
	Pulses (Lablab bean, pigeon pea, cowpea, black gram, horse gram, etc.)	12	600	25	439	--	--	37.37	549	
	Groundnut, niger and mustard	8	348	5 (Groundnut) 2 (others)	1000 2000	--	--	2.27	392	

Source :- Krishi Utpadan Karyakramachi Rupresha, Kharif and Rabi Hangam - 2010-11, Vibhagiy Sabha, Konkan Mahsul Vibhag.
Dept. of Agriculture, Govt. of Maharashtra

Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango							1890	3 t/ha	
	Cashew							991.76	1127 kg/ha	
	Coconuts							33509 lakh nuts	90 nuts/palm	

1.12	Sowing window for 5 major field crops	Rice	Finger millet	Groundnut	Black gram	Niger (Karala)
	Kharif- Rainfed	3 rd week of May to 2 nd week of June	1 st fortnight of June	to 2 nd week of June to 3 rd week of June	2 nd fortnight of July	1 st fortnight of June
	Kharif-Irrigated	-	-	-	-	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	2 nd week of Nov. to 2 nd week of December	-	2 nd week of December to 2 nd week of January	2 nd week of December to 2 nd week of January	-

1.13	What is the major contingency the district is prone to? (Tick mark)	Regular	Occasional	None
	Drought	--	✓	--
	Flood	--	✓ (June to Aug.)	--
	Cyclone	--	✓	--
	Hail storm	--	--	✓
	Heat wave	✓	--	--
	Cold wave	--	--	✓
	Frost	--	--	✓
	Sea water intrusion	✓	--	--
	Pests and disease outbreak (specify the names of the major pests and diseases) 1. Rice:- Bacterial blight, Blast 2. Finger millet :- Bacterial blight, Blast 3. Groundnut :- Leaf spot and rust of groundnut 4. Mango :- Hopper, Mealy bug, thrips, fruit fly, Anthracnose, Powdery mildew, Branch drying & post harvest rots 5. Cashew :- Tea mosquito bug, thrips, aphids, Anthracnose. 6. Sapota :- Fruit drop 7. Coconut :- Rhinoceros beetle, eriophyid mite 8. Areca nut :- Koleroga , Inflorescence blight and Ganoderma rot.	✓	-	--

	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 But not clear

Location map of Ratnagiri district



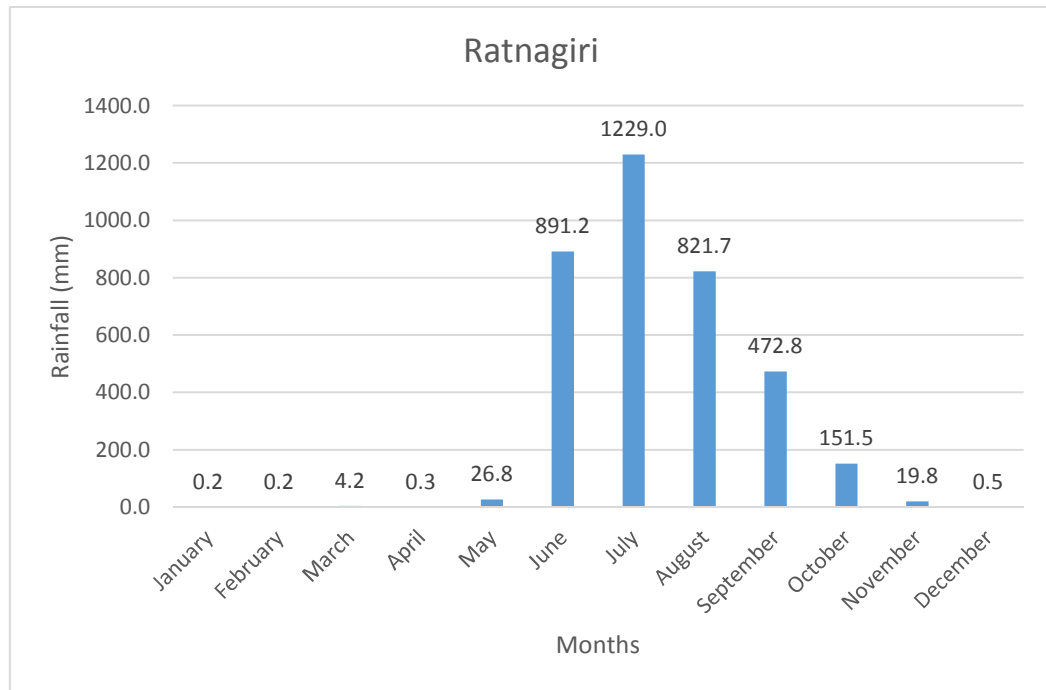


Fig: Mean monthly rainfall (mm) of Ratnagiri District.

Soil
map



Ratnagiri district (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 3 rd week of June	Upland medium deep to shallow soils	Rice	In case of failure of germination use very early duration variety (Ratnagiri – 73, Karjat-184)	<ul style="list-style-type: none"> Prepare the seedlings by mat nursery / Dapog method If raising of seedling in nursery is not possible, then use direct seeding method (dry or sprouted seeds) 	Procure the seed from Maharashtra State Seed Corporation
		Finger millet	No change	--	
		Proso millet	No change	--	
		Groundnut	No change	--	
		Niger	No change	--	
		Black gram	No change		
	Mid-land medium deep soils	Rice	In case of failure of germination use early duration variety (Ratnagiri-1, Ratnagiri-5, Ratnagiri-24, Ratnagiri-711, Karjat- 3, Karjat-4, Karjat-7.)	<ul style="list-style-type: none"> Prepare the seedlings by mat nursery / Dapog method If raising of 	Procure the seed from Maharashtra State Seed Corporation

	Low land deep soils	Rice	In case of failure of germination use mid late duration variety (Ratnagiri-4, Karjat-5, Karjat-9)	seedling in nursery is not possible, then use direct seeding method (dry or sprouted seeds)	
	Hill slope shallow soils	Finger millet	No change	---	
		Prosomillet	No change		

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 4 weeks 1 st week of July	Upland medium deep to shallow soils	Rice	Use very early duration variety (Ratnagiri – 73, Karjat-184)	1. Raise the crop by direct seeding method (dry or sprouted seeds)	Procure the seed from Maharashtra State Seed Corporation
		Finger millet	Cowpea (Var. Konkan Sadabahar), Black gram (TPU- 4)	-	
		Prosomillet	Oil Seed like niger (Var. IGP 76)	-	
		Groundnut	Use early duration variety (Phule pragati, SB- XI)	-	
		Niger	No change	--	
		Black gram	No change	--	
	Mid-land medium deep soils	Rice	Use very early duration variety (Ratnagiri – 73, Karjat-184)	Raise the crop by direct seeding method (dry or sprouted seeds)	Procure the seed from Maharashtra

	Low land deep soils	Rice	Use early duration variety (Ratnagiri-1, Ratnagiri-5, Ratnagiri-24, Ratnagiri-711, Karjat- 3, Karjat-4, Karjat-7.)		State Seed Corporation
	Hill slope shallow soils	Finger millet	Grow pulses like cowpea (Var. Konkan Sadabahar), black gram (TPU- 4) Oil Seed like Niger (Var. IGP 76)	--	
		Prosomillet			

Note :- ** Generally such type of situation has not occurred during past years

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 6 weeks 3 rd week of July	Upland medium deep to shallow soils	Not applicable Note :- ** Generally such type of situation has not occurred during past years			
	Mid-land medium deep soils				
	Low land deep soils				
	Hill slope shallow soils				

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation

** Delay by 8 weeks 2nd week of August	Upland medium deep to shallow soils	Not applicable Note :- ** Generally such type of situation has not occurred during past years			
	Mid-land medium deep soils				
	Low land deep soils				
	Hill slope shallow soils				
Condition			Suggested Contingency measures		
Early season drought (Normal onset)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Normal onset followed by 15-20 days dry spell at the time of transplanting	Upland medium deep to shallow soils	Rice	<ul style="list-style-type: none"> • Increase number of seedling per hill (5 to 6) or adopt closer spacing (15 x15 cm). • Increase 25% recommended dose of fertilizer. • For shortage of seedling prepare seedling by mat nursery using short duration variety. • Use thomba method. • Dusting with methyl parathion 2% dust @ 25 kg/ha to control armyworm in nursery. 	<ul style="list-style-type: none"> • Protective irrigation for nursery • Protective irrigation after transplanting 	Use water from the outside sources like farm ponds, nalas, streams, rivers for puddling operation
		Finger millet	<ul style="list-style-type: none"> • Increase 25% recommended dose of fertilizer • Adopt closer spacing (15 x15 cm) 	Protective irrigation after transplanting	Use water from the outside sources like farm ponds, nalas, streams, rivers, etc.
		Prosomillet			

		Groundnut	No change	<ul style="list-style-type: none">• Adopt weed management practices with dry land weeder.• Mulching with tree lopping or glyricidia leaves.• Protective irrigation.• 1 %n Spray of potassium.	
		Niger		---	
		Black gram		---	
	Mid-land medium deep soils	Rice	<ul style="list-style-type: none">• Increase number of seedling per hill (5 to 6) or adopt closer spacing (15 x15 cm)• Increase 25% recommended dose of fertilizer• For shortage of seedling prepare seedling by mat nursery using short duration variety.• Use thomba method• Dusting with methyl parathion 2% dust @ 25 kg/ha to control armyworm in nursery	<ul style="list-style-type: none">• Protective irrigation for nursery• Protective irrigation after transplanting	<ul style="list-style-type: none">• Use water from the outside sources like farm ponds, nalas, streams, rivers for puddling operation
	Low land deep soils	Rice			
	Hill slope shallow soils	Finger millet	<ul style="list-style-type: none">• Increase 25% recommended dose of fertilizer• Adopt closer spacing (15 x15 cm)	-	
		Prosomillet			
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 & moisture conservation measures	Remarks on Implementation

At vegetative stage	Upland medium deep to shallow soils	Rice	<ul style="list-style-type: none">• Protective irrigation.• Postpone the split dose of Nitrogen application till receipts of rain/protective irrigation• Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval.• Take three sprays of Tricyclazole 1g/lit of water for control of rice blast.	<ul style="list-style-type: none">•Adopt weed management practices.•Apply split dose of Nitrogen after restart of rains•Spray % potassium	Use water from the outside sources like farm ponds, nalas, streams, rivers for puddling operation	
		Finger millet	<ul style="list-style-type: none">• Protective irrigation			
		Prosomillet				
			Groundnut	<ul style="list-style-type: none">• Protective irrigation	<ul style="list-style-type: none">• Adopt weed management practices with dry land weeder.• Mulching with tree lopping or glyricidia leaves.• Spray % potassium	
			Niger			
			Black gram			
		Mid-land medium deep soils	Rice	<ul style="list-style-type: none">• Postpone the split dose of Nitrogen application till receipts of rain/protective	<ul style="list-style-type: none">• Adopt weed management	

	Low land deep soils	Rice	irrigation <ul style="list-style-type: none"> • Protective irrigation • Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval. • Take three sprays of Tricyclazole 1g/lit of water for control of rice blast 	practices. <ul style="list-style-type: none"> • Maintain the existing water level in the field. • Apply split dose of Nitrogen after restart of rains • Spray % potassium 	
	Hill slope shallow soils	Finger millet Prosomillet	<ul style="list-style-type: none"> • Give protective irrigation if possible. 	<ul style="list-style-type: none"> • Adopt weed management practices • Apply split dose of Nitrogen after restart of rains 	

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

At flowering/ fruiting stage	Upland medium deep to shallow soils	Rice	<ul style="list-style-type: none">• Protective irrigation• Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval.• Take three sprays of Tricyclazole 1g/lit of water for control of rice blast.	<ul style="list-style-type: none">• Adopt weed management practices.• Maintain the existing water level in the field.• Spray % potassium	
		Finger millet	<ul style="list-style-type: none">• Protective irrigation.	<ul style="list-style-type: none">• Adopt weed management practices with dry land weeder.• Mulching with tree lopping or glyricidia leaves• Spray % potassium	
		Prosomillet			
		Groundnut			
		Niger			
		Black gram			
	Mid-land medium deep soils	Rice	<ul style="list-style-type: none">• Protective irrigation.• Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval.	<ul style="list-style-type: none">• Adopt weed management practices.	
	Low land deep soils	Rice	<ul style="list-style-type: none">• Take three sprays of Tricyclazole 1g/lit of water for control of rice blast.	<ul style="list-style-type: none">• Maintain the existing water level in the field.• Spray % potassium	
	Hill slope shallow soils	Finger millet	<ul style="list-style-type: none">• Give protective irrigation if possible.	<ul style="list-style-type: none">• Adopt weed management practices	
		Prosomillet			

Condition			Suggested Contingency measures		
Terminal drought	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi crop planning	Remarks on Implementation
(Early withdrawal of monsoon)	Upland medium deep to shallow soils	Rice	Harvest crop at physiological maturity	<ul style="list-style-type: none"> • Carry out sowing of Rabi crops as early as possible (Cowpea, groundnut, water melon, leafy vegetables) • Raise the seedlings of chilli, brinjal, cabbage, knol knol) 	
		Finger millet			
		Prosomillet			
		Groundnut			
		Niger			
		Black gram			
	Mid-land medium deep soils	Rice	<ul style="list-style-type: none"> • Protective irrigation • Harvest crop at physiological maturity 	<ul style="list-style-type: none"> • Carry out sowing of Rabi crops as early as possible (Cowpea, Horse gram, mustard, sweet corn, groundnut, water melon, leafy vegetables) • Raise the seedlings of chilli, brinjal, cabbage, knol knol) 	
	Low land deep soils	Rice		<ul style="list-style-type: none"> • Carry out sowing of Rabi crops as early as possible (Cowpea, Horse gram, mustard, lab lab bean, sweet corn, groundnut, water melon, leafy vegetables) • Raise the seedlings of chilli, brinjal, cabbage, knol knol) 	
	Hill slope shallow soils	Finger millet	Harvest crop at physiological maturity	----	
		Prosomillet			

2.1.2 Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall	Mid and low land Medium deep to deep soils	Rice (Rabi season)	Use early duration variety (Ratnagiri 73, Ratnagiri-1, Karjat-184) or Grow short duration pulses viz. cowpea (Var. Konkan Sadabahar), under control irrigation and tail end area	<ul style="list-style-type: none"> • Dapog/mat technique of nursery raising. • Young seedling transplanting. • SRI Technique. 	Procure the seed from Maharashtra State Seed Corporation
		Groundnut	Use early duration variety (Phule pragati) or grow short duration pulses viz. Cowpea (Var. Konkan Sadabahar),	<ul style="list-style-type: none"> • If other source of irrigation is available sow the crop as per schedule. 	Procure the seed from Maharashtra State Seed Corporation
		Pulses (Cowpea, Horsegram, Green gram)	No change	<ul style="list-style-type: none"> • Use micro irrigation (drip or micro sprinkler) 	--
		Vegetables	Use early duration vegetables like Kartoli and leafy vegetables varieties Coriander: Dapoli-1 Radish: Japanies white long, Pusa ketaki Math: Math durangi, Co-1	<ul style="list-style-type: none"> • If other source of irrigation is available sow the crop as per schedule. • Use micro irrigation (drip or micro sprinkler) • Prepare the seedlings in portrays of vegetables (cucurbitaceous crops, brinjal, chilli) to avoid delay in transplanting. 	Procure the seed from Maharashtra State Seed Corporation

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	Mid and low land Medium deep to deep soils	Rice (Rabi season)	<ul style="list-style-type: none"> • Prefer early duration variety in low land situation (Ratnagiri 73, Ratnagiri -1) • Grow short duration pulses (cow pea, lab lab bean, horse gram), groundnut (Phule Pragati), vegetables in midland situation 	<ul style="list-style-type: none"> • Use SRI Technique for rice cultivation. • Adopt Weed management practices • Use micro irrigation (drip or micro sprinkler) 	<ul style="list-style-type: none"> • Procure the seed from Maharashtra State Seed Corporation
		Groundnut	Prefer short duration variety (Phule Pragati,)	<ul style="list-style-type: none"> • Adopt Weed management practices with dry weeder • Use micro irrigation (drip or micro sprinkler) • Adopt mulching 	<ul style="list-style-type: none"> • Procure the seed from Maharashtra State Seed Corporation
		Pulses (Cowpea, Horsegram, Green gram)	No change		--
		Vegetables	Grow Dolichos bean or adopt soil conservation measures for regular vegetables	<ul style="list-style-type: none"> • Adopt Weed management practices. • Use micro irrigation (drip or micro sprinkler) • Adopt mulching 	<ul style="list-style-type: none"> • Procure the seed from Maharashtra State Seed Corporation. • Necessity of practical training on drip irrigation and mulching
		Water melon	Either follow the soil conservation measures for water melon or grow short duration pulses		

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

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	Mid and low land Medium deep to deep soils	Rice (Rabi season)	Lablab bean, horse gram, black gram, cowpea, mustard on residual moisture under low land situation	• Minimum tillage and sowing of seed by dibbling.	• Procure the seed from Maharashtra a State Seed Corporation .
		Groundnut	If farm pond water is available go for short duration pulses like cowpea (Konkan Sadabahar) and leafy vegetables	• Adopt Weed management practices • Use micro irrigation (drip or micro sprinkler) • Adopt mulching	
		Pulses (Cowpea, Horsegram, Green gram)			
		Vegetables			
		Water melon			

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	Mid and low land Medium deep to deep soils	Rice (Rabi season)	Wal (lablab bean) - Var. Konkan Wal No. 1, Horse gram - Var. Dapoli - 1 on residual moisture under low land situation	<ul style="list-style-type: none">• Minimum tillage and sowing of seed by dibbling,• Relay cropping	<ul style="list-style-type: none">• Procure the seed from Maharashtra a State Seed Corporation .
		Groundnut	If farm pond water is available go for short duration pulses like cowpea (Konkan Sadabahar) and leafy vegetables	<ul style="list-style-type: none">• Adopt Weed management practices.• Use micro irrigation (drip or micro sprinkler).• Adopt mulching	
		Pulses (Cowpea, Horsegram, Green gram)			
		Vegetables			
		Water melon			

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	Mid and low land Medium deep to deep soils	Not applicable			

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
Rice	<ul style="list-style-type: none"> Spray Cartap Hydrochloride 50SP @ 1.2 g/lit for the management of case worm. Close water in the field and Drag rope over crop to dislodge the cases after that open the water at one end of the field to collect the cases which can be destroyed afterwards Drain out excess water and spray Propiconazol @ 1ml /lit of water to control sheath blight 	----	<ul style="list-style-type: none"> Drain out excess water and harvest the crop before lodging 	<ul style="list-style-type: none"> Immediate threshing and drying in shed
Finger millet	----	----	<ul style="list-style-type: none"> Harvest the crop before lodging 	Immediate threshing and drying in shed
Groundnut	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water 2.Spray mancozeb @ 2.5 g/lit of water to control Tikka and rust disease 	<ul style="list-style-type: none"> Drain out excess water and harvest the crop immediately 	<ul style="list-style-type: none"> Separate the pods immediately and dry in shade.
Niger	<ul style="list-style-type: none"> Drain out excess water 	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water. Harvest the crop at physiological maturity 	<ul style="list-style-type: none"> Immediate threshing and dry in shed
Black gram	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water 		
Horticulture				
Cucurbits	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water 	-----

Mango	<ul style="list-style-type: none"> Wait for congenial condition for application of Paclabutrastrol @ of 0.75 g/ a.i. per meter average canopy diameter 			
Cashew	--	-	-	-
Banana	<ul style="list-style-type: none"> Drain out excess water Propping with bamboo Spray Hexaconazol @ 1ml/lit of water for control of Sigatoka Leaf spot and blight At pre flowering stage 	<ul style="list-style-type: none"> Drain out excess water. Propping with bamboo 	<ul style="list-style-type: none"> Drain out excess water Propping with bamboo 	--
Heavy rainfall with high speed winds in a short span				
Rice	----	----	<ul style="list-style-type: none"> Drain out water and harvest the crop at maturity immediately if lodging take place 	<ul style="list-style-type: none"> Immediate threshing and drying in shed
Finger millet	-	-	<ul style="list-style-type: none"> Harvest the crop at maturity before its lodging. 	
Groundnut	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out water and harvest the crop immediately 	<ul style="list-style-type: none"> Separate the pods immediately and dry in shade.
Niger	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water 	-
Black gram	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water 	-Do-	<ul style="list-style-type: none"> Immediate threshing and dry in shed

Horticulture				
Cucurbitaceous crop	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water 	-----

Mango	<ul style="list-style-type: none"> • Prune the broken branches swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . • Also apply Bordeaux paste on cut surface and trunk. 	<ul style="list-style-type: none"> • Prune the broken branches swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . Also apply Bordeaux paste on cut surface and trunk. • Spray Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water for anthracnose. 	<ul style="list-style-type: none"> • Swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . Also apply Bordeaux paste on cut surface and trunk. • Collect and utilize fallen fruit immediately for suitable processing. 	<ul style="list-style-type: none"> • Swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water. • Also apply Bordeaux paste on cut surface and trunk.
Cashew		<ul style="list-style-type: none"> • Swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water. • Also apply Bordeaux paste on cut surface and trunk. 		----
Banana	<ul style="list-style-type: none"> • Drain out excess water • Propping with bamboo 	<ul style="list-style-type: none"> • Drain out excess water • Propping with bamboo • Flowers of broken plant may be used as vegetable 	<ul style="list-style-type: none"> • Drain out excess water • Propping with bamboo • Fruit of broken plants may be used as vegetable. 	----
Outbreak of pests and diseases due to unseasonal rains				
Rice	<ul style="list-style-type: none"> • Spraying of Carbendazim 0.1% or Copper oxy chloride 0.25% or 	<ul style="list-style-type: none"> • Spraying of Carbendazim 0.1% or 	-	-

	tricyclazole 0.1% to control blast disease	Copper oxy chloride 0.25% or tricyclazole 0.1% to control blast disease		
Fingermillets	-	-	-	-
Groundnut	<ul style="list-style-type: none"> • Spraying with carbendazim 0.1% or Propiconazole 0.1% or Tridemorph 0.1% to control early and late leaf spot 	<ul style="list-style-type: none"> • Spraying with carbendazim 0.1% or Propiconazole 0.1% or Tridemorph 0.1% to control early and late leaf spot 	-	-
Niger	-	-	-	-----
Black gram	-	-	-	-----
Horticulture				
Cucurbitaceous crop	----	----	<ul style="list-style-type: none"> • Install Rakshak trap 4 per ha (Cue lure) to control fruit fly • Spray with Copper Oxy Chloride @ 2.5 g/lit of water to control Downey mildew 	----
Mango	<ul style="list-style-type: none"> • Take spray of Lambda Cyhalothrin 5 EC @ 0.6 ml/lit of water and second spray of Imidachloprid 17.8 EC @ 0.3 ml/lit of water for control of mango hopper, shoot borer . • Spray Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water for anthracnose 	<ul style="list-style-type: none"> • Spraying with 0.2% W.P. sulphur dust or 0.05% hexaconazol to control powdery mildew. 	<ul style="list-style-type: none"> • Install Rakshak trap 4 per ha (Methyl eugenol) to control fruit fly 	<ul style="list-style-type: none"> • Dipping fruits in hot water at 52°C for 10 min. after harvest to control post harvest rot.
Cashew	First spray with Profenophos 40EC 1ml/ lit of water, second spray with Lamda cyhalothrin 0.6 ml/ lit of water and third spray with prophenophos 1ml /lit of water @	-	-	-

	interval of one month. Sprays starting from leaf flush to control tea mosquito bug.			
Sapota	--	<ul style="list-style-type: none"> Spraying of Metalaxyl + Mancozeb containing complex fungicide @ 0.2% to control fruit drop 	-	<ul style="list-style-type: none"> Collect and destroy the fallen and infected fruits

2.3 Floods

Condition	Suggested contingency measure			
Transient water logging/ partial inundation	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Rice	<ul style="list-style-type: none"> If washed out resowing of nursery by using mat nursery/sowing of sprouted seed on puddled field 	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water. Immediate harvesting, threshing and drying in shed
Finger millet	Not applicable	Not applicable	Not applicable	Not applicable
Groundnut				
Niger				
Black gram				
Horticulture (Vegetables)				
Cucurbitaceous crop	Not applicable	Not applicable	Not applicable	Not applicable
Continuous submergence for more than 2 days				
Rice	<ul style="list-style-type: none"> If washed out resowing of nursery by using mat nursery/sowing of sprouted seed on puddled field 	<ul style="list-style-type: none"> Drain out excess water Apply second dose (40%) of nitrogen after submergence is over 	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water. Immediate harvesting, threshing and dry in shed
Finger millet	Not applicable	Not applicable	Not applicable	Not applicable
Groundnut				
Niger				
Black gram				
Horticulture (Vegetables)				

Cucurbits	Not applicable	Not applicable	Not applicable	Not applicable
-----------	----------------	----------------	----------------	----------------

Sea water intrusion				
Rice	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water. Irrigate the affected area with fresh water and drain out, If wash out resowing of nursery with salt tolerant varieties like Panvel -1 and Panvel -2 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water. Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> 1.Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water. Immediate harvesting, threshing and drying in shed.
Fingermilletts	Not applicable			
Groundnut				
Niger				
Black gram				
Horticulture (Vegetables)				
Cucurbitaceous crop	Not applicable	Not applicable	Not applicable	Not applicable
Coconut	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out Mound the crop with soil 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out

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				
Mango	<ul style="list-style-type: none"> • Cover with shed net /Protective irrigation • Water spray 	<ul style="list-style-type: none"> • Water spray / 1% potassium nitrate spray 	<ul style="list-style-type: none"> • Collect dropped fruits and use it for suitable processing 	<ul style="list-style-type: none"> • Collect dropped fruits and use it for suitable processing
Cashew	<ul style="list-style-type: none"> • Cover with shed net /Protective irrigation Water spray 	<ul style="list-style-type: none"> • Protective irrigation 	<ul style="list-style-type: none"> • Protective irrigation 	----
Coconut	<ul style="list-style-type: none"> • Cover with shed net. • Water spray 	<ul style="list-style-type: none"> • Frequent irrigation 	<ul style="list-style-type: none"> • Frequent irrigation 	<ul style="list-style-type: none"> • Frequent irrigation
Arecanut	<ul style="list-style-type: none"> • Cover with shed net. • Water spray 	<ul style="list-style-type: none"> • Frequent irrigation 	<ul style="list-style-type: none"> • Frequent irrigation 	Frequent irrigation
Cold wave	Not applicable			
Frost	Not applicable			
Hailstorm				
Mango	—	—	<ul style="list-style-type: none"> • Collect and destroy the fallen fruit to avoid the further built-up of pest and disease 	<ul style="list-style-type: none"> • Collect the fallen fruit to avoid the further built-up of pest and disease
Cyclone				
Mango	<ul style="list-style-type: none"> • Support the young seedlings/grafts 	<ul style="list-style-type: none"> • Proper pruning and disposal of damaged or broken branches 	<ul style="list-style-type: none"> • Proper pruning of damage or broken branches • Collect dropped fruits and use it for suitable processing 	<ul style="list-style-type: none"> • Proper pruning of damage or broken branches • Collect dropped fruits and use it for suitable processing
Cashew	<ul style="list-style-type: none"> • Support the young seedlings/grafts 	<ul style="list-style-type: none"> • Proper pruning and disposal of damaged or broken branches 	<ul style="list-style-type: none"> • Proper pruning of damage or broken branches • Collect fallen nuts market it. 	<ul style="list-style-type: none"> • Proper pruning of damage or broken branches • Collect fallen nuts and store
Coconut	<ul style="list-style-type: none"> • Support the young seedlings 	<ul style="list-style-type: none"> • Immediate disposal of damaged trunk 	<ul style="list-style-type: none"> • Collect fallen tender nuts, market it. 	<ul style="list-style-type: none"> • Collect fallen tender nuts market it.
Arecanut	<ul style="list-style-type: none"> • Support the young seedlings 	<ul style="list-style-type: none"> • Immediate disposal of damaged trunk 	<ul style="list-style-type: none"> • Collect fallen tender nuts market 	<ul style="list-style-type: none"> • Collect fallen tender nuts market it.

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

Drought	Suggested contingency measures		
	Before the event	During the event	After the event
Feed and fodder availability	<ul style="list-style-type: none"> ➤ Conservation of green fodder as silage dry fodder as hay in flush season for utilization in lean period ➤ Dry fodder available should be processed i.e. Urea treatment of crop residues to enhance their nutritive value. For this inputs such as training of livestock owners, material like urea, polythene sheet etc may be provided free of cost to the livestock owners. ➤ Judicial use of available feed resources by the livestock owners. ➤ Non conventional feed resources such as Neem seed Cake/ Sal seed Meal/ Mango seed Kernels/ Babul pods etc should be collected and stored. ➤ Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains, Govt. Godowns wastes, grains unfit for human consumption etc. should be procured for productive animals. ➤ Urea molasses mineral blocks (UMMB) may be reserved with NDDDB, Anand, Gujarat for emergency supply as concentrate. ➤ Sugarcane bagasse, cane tops and molasses form important byproducts. Sugarcane bagasse- is an important feed resource for ruminants. ➤ Tree leaves are easily available. Leaves of neem, mango, banyan, pipal, babul, subabul, mahuva, etc. can be used as green fodder. Tree leaves are good source of protein, calcium, Vitamin A and hence should be reserved for feeding during drought. ➤ Cactus is primarily found in deserts hence it is easily available during scarcity also. As such it is not used for feeding animals but during scarcity it can be used. ➤ Mineral mixture should be procured and stored for supply. ➤ Fodder Banks: Grasses & tree leaves: Grasses from periphery of forest area wastelands & farmlands & Dry fallen forest tree leaves may be harvested & stored as 	<ul style="list-style-type: none"> ➤ Judicious use of feed resources processed as per type of livestock possessed by the livestock owners. ➤ Distribution of fodder, UMMB blocks, and other feed resources stored in the affected area to the livestock owners as per the number and type of livestock possessed. ➤ Mineral supplementation – Mineral mixture be provided for the livestock @50 g/day/Anim. ➤ Disposal/Transfer of the animals in the area having feed resources availability. ➤ Concentrate feeding for productive animals to support minimum production & life saving of the important animals. ➤ Other non productive animals are to be fed at subsistence level. ➤ Use of food grains for biodiesel and distilleries should be stopped and the grains be spared for productive animals. ➤ Bypass protein concentrate ingredients may be provided in order to harvest maximum nutrients for productive animals particularly high productive crossbred cows. ➤ Top feeds should be used during scarcity period only. ➤ Oil seed cakes are good source of proteins and hence should be used for productive animals only. ➤ Feed supplements/ Additives needs 	<ul style="list-style-type: none"> ➤ Green fodder production in next Kharip season needs to be undertaken as a source of fodder at earliest. ➤ Mineral Supplementation should be continued. ➤ Concentrate feeding for productive animals so as to compensate the body condition and production. ➤ The animals must be brought into cyclic stage for reproduction. ➤ Young crossbred livestock needs to be attended properly so as to harness the high productivity. ➤ <i>Adlib.</i> feeding may be practiced with balancing the nutrients required. ➤ The unproductive/surplus livestock needs to be culled/disposed. ➤ Livestock suitable with the farming system practiced

	<p>hay in bales.</p> <ul style="list-style-type: none"> ➤ Fodder Bank: Crop Residues: The major cereals like rice & wheat straws are more important for this purpose. Next are coarse cereals, legumes, haulms left after removing grains from the crops. These may be stored in these banks to be established at each Taluka in the drought area. ➤ Govt. should provide support to farmers for making stacks, bailing & storage. ➤ State Animal feed resources Grid needs to be established so as to provide feed resources during scarcity period. ➤ Cattle camp sites needs to be identified. ➤ NGOs/Gorakshan Sanstha etc. needs to be identified. ➤ Anticipated number of livestock & feed resources to be provided needs to be assessed. ➤ Livestock registration should be compulsory with identification by tagging ➤ Preparedness of veterinary services to drought prone areas. ➤ Encourage farmers to cultivate fodder crops. ➤ Identification of the site for fodder depot. ➤ Facility to store fodder by creating centralized silage making facility with provision for transport. ➤ Forage production and storage of fodder in irrigated areas. ➤ Assessment of risk and vulnerability. ➤ Formation of village Disaster Management Committee. ➤ Establishment of drought monitoring system or early warning system. 	<p>to be used widely for productive animals.</p> <ul style="list-style-type: none"> ➤ Establishment of Cattle camps at identified sites. ➤ NGOs/Gorakshan Sanstha etc. identified to be involved for participation/ implementation. ➤ Feed resources @ 7 kg.dry fodder/day/adult animal for maintenance 2.0 kg. concentrate mixture/day/adult animal for supporting minimum milk production. ➤ Adaptation of proper distribution policy as per requirement with transport facility. ➤ Regular rest periods for working animals particularly bulls during hot period of the day. ➤ Capture and care of stray animals. ➤ The unproductive/surplus livestock needs to be culled/disposed. ➤ Sale of feed and fodder from the affected area to non affected area should be banned. ➤ Distribute fodder at reasonable rate. ➤ Monitoring feed and fodder prices. 	<p>only should be maintained.</p> <ul style="list-style-type: none"> ➤ Mechanization in agriculture needs to be encouraged. ➤ Feed processing needs to be encouraged in order to minimize the wastage of feed resources. ➤ <i>In-situ</i> storage and feeding of processed animal feed resources by the livestock owners needs to be encouraged. ➤ Readiness for feed and fodder bank as and when required for each districts with transport facility. ➤ Review of shortfalls in planning and refining action plan the before and during event.
--	--	---	--

	Suggested contingency measures		
Drought	Before the event	During the event	After the event

Drinking water	<ul style="list-style-type: none"> ➤ Water resources as in general are inadequate and hence the resources should be trapped and increased. ➤ Available rain water harvesting technique should be adopted i.e. farm ponds etc. ➤ Water conservations measures be adopted to increase water table like recharging of bore wells. ➤ Available water resources should be tapped and reserved. ➤ Water harvesting measures like farm ponds alternative water sources, Nala bunding/check dams etc. needs to be undertaken. ➤ Judicious use of water in agriculture i.e. through drip/sprinkler irrigation. ➤ Wastage of water needs to be curbed. ➤ Rain water harvesting measures needs to be implemented at village level. ➤ Proper utilization of Water to save water. ➤ Equal water distribution plan may be implemented. ➤ Cloud seeding desalination, recycle sewage water, transvasment river project etc. 	<ul style="list-style-type: none"> ➤ Special distribution and carrying capacity should be implemented from other available resources. ➤ Water should be used as per the requirement of animals (@10-15 lit/ 100 kg body weight). ➤ Drinking water should not be used for washing animals. ➤ Clean and chlorinated water be provided to prevent water borne diseases. ➤ Special distribution and carrying capacity should be supplemented from other available resources. ➤ Water for irrigation should be stopped. ➤ Judicious use of water for livestock. ➤ Supply of water through tankers during contingency. ➤ Private water resources such as wells shall be used for drinking water. ➤ Proper utilization of Water to save water. ➤ In vicinity of animal camp or chavani creation of borewell. 	<ul style="list-style-type: none"> ➤ Permanent water resources should be developed with campaign for public awareness. ➤ Steps should be taken to conserve water. ➤ Ensure fresh clean and cold water supply to livestock.
-----------------------	---	--	---

	Suggested contingency measures		
Drought	Before the event	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter with stock of life saving medicine for livestock. ➤ Vaccination of animals for various diseases according to season. ➤ Deworming and spraying be done to get rid of endoparasites and ectoparasites to keep the health of animals in good condition. ➤ Personnels should be trained for health and disease management through training ➤ List of trained personnel should be available at each district head quarter. 	<ul style="list-style-type: none"> ➤ Services of trained personnel need to be made available in affected area with sufficient supply of life saving medicine of livestock. ➤ A team of veterinary experts be deployed for health management of drought hit livestock. ➤ During occurrence of disease, affected animals should be kept isolated and treated properly and promptly. ➤ Vaccination against contagious diseases like HS, FMD, Theileriosis be carried out. ➤ Mineral mixture be provided to take care of deficiency disorders. ➤ Tick control measures be undertaken to prevent tick borne diseases in animals under stress. ➤ Deworming should be carried out. ➤ Feed additives/Tonics/Vitamin supplements should be provided. 	<ul style="list-style-type: none"> ➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during drought with stock of life saving medicine for livestock. ➤ There will be stress on animals due to deterioration of health during drought period. ➤ Concentrates and vitamin-mineral supplements be provided to minimize the stress on animals.

	<ul style="list-style-type: none"> ➤ Feed additives/Tonics/ Vitamin supplements should be stocked. ➤ Vaccines, Insecticides, disinfectants and dewormers needs to be stocked. ➤ Records/PM/ Carcass disposal arrangements needs to be ensured. ➤ Training of farmers for maintaining optimum health of animals, balance ration and recognize early signs of disease and managerial shortfalls. ➤ Create temporary shade shelters to prevent heat stress on the animals. (animal camps) ➤ Supply of Mineral and Vitamins mixture. ➤ Application of preventive and control measures of SP & MD. 	<ul style="list-style-type: none"> ➤ Post Mortem /record keeping/carcass disposal arrangements be effected. ➤ Restriction on movement of the animals to prevent the spread of diseases. ➤ Periodic disinfection and disinfestations of premises where animals are kept. ➤ Permission of only healthy and vaccinated animals in cattle market. ➤ By proper treatment with supervision and exercise over starvation. ➤ Special transport facility of mobile van for veterinary team be deployed 	<ul style="list-style-type: none"> ➤ The animals should be observed for signs of contagious diseases or deficiency disorders. ➤ Vaccination spraying and deworming programme needs to be undertaken. ➤ Record of affected livestock to be submitted for compensation of the loss. ➤ Farm disinfection and disinfestations. ➤ Assessment of losses due to mortality if any.
--	--	---	---

	Suggested contingency measures		
Floods	Before the event	During the event	After the event
Feed and fodder availability	<ul style="list-style-type: none"> ➤ Identification of flood prone zones and flood forecasting. ➤ Installation of early warning systems. ➤ Steps to prevent spoilage of food and water supply due to flood water. ➤ Dedicated helpline to emergency contact and communication at taluka level. ➤ Avoid construction of farm buildings in flood risk areas. ➤ Local ponds and canals regularly inspected and cleared off from obstruction ➤ Adequate stock of Tetanus toxoid. ➤ Change cropping pattern according to flood risk periods. ➤ Storage of available fodder at safe place before rainy season. ➤ Training of local personnel for disaster management. ➤ Dry fodder available should be processed i.e. Urea treatment of crop residues to enhance their nutritive value. For this inputs such as training of livestock owners, material like urea, polythene sheet etc may be provided free of cost to the livestock owners. 	<ul style="list-style-type: none"> ➤ Quick evacuation of livestock from flood prone areas before area become flooded ➤ Prevent outflow of manure pit in river ➤ Proper feed, vaccine, drugs, disinfectants and feed supplement distribution policy adopted with transport facility. ➤ Prevent spoilage of food and water supply ➤ Judicious use of feed resources processed as per type of livestock possessed by the livestock owners. ➤ Distribution of fodder, UMMB blocks, other feed resources stored in the affected area to the livestock owners as per the number and type of livestock possessed. 	<ul style="list-style-type: none"> ➤ Green fodder production in next Kharif season needs to be undertaken as a source of fodder at earliest. Fodder seed of improved fodder crop varieties needs to be distributed. ➤ Mineral Supplementation should be continued. ➤ Concentrate feeding for productive animals so as to compensate the body condition and production. ➤ The animals must be

	<ul style="list-style-type: none"> ➤ Judicial use of available feed resources by the livestock owners. ➤ Non conventional feed resources such as Neem seed Cake/ Sal seed Meal/ Mango seed Kernels/ Babul pods etc should be collected and stored. ➤ Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains, Govt Godowns wastes, grains unfit for human consumption etc. should be procured for productive animals. ➤ Urea molasses mineral blocks (UMMB) may be reserved with NDDDB, Anand, Gujarat for emergency supply as concentrate. ➤ Sugarcane bagasse, cane tops and molasses form important byproducts. Sugarcane bagasse- is an important feed resource for ruminants. ➤ Tree leaves are easily available. Leaves of neem, mango, banyan, pipal, babul, subabul, mahuva, etc. can be used as green fodder. Tree leaves are good source of protein, calcium, Vitamin A & hence should be reserved for feeding during drought. ➤ Cactus is primarily found in deserts hence it is easily available during scarcity also. As such it is not used for feeding animals but during scarcity it can be used. ➤ Mineral mixture should be procured and stored for supply. ➤ Fodder Banks: Grasses & tree leaves: Grasses from periphery of forest area wastelands & farmlands & Dry fallen forest tree leaves may be harvested & stored as hay in bales. ➤ Fodder Bank: Crop Residues: The major cereals like rice & wheat straws are more important for this purpose. Next are coarse cereals, legumes, haulms left after removing grains from the crops. These may be stored in these banks to be established at each Taluka in the drought area. ➤ Govt. should provide support to farmers for making stacks, baling & storage. ➤ State Animal feed resources Grid needs to be established so as to provide feed resources during scarcity period. ➤ Cattle camp sites needs to be identified. ➤ NGOs/Gorakshan Sanstha etc. needs to be identified. ➤ Anticipated number of livestock & feed resources to be 	<ul style="list-style-type: none"> ➤ Mineral supplementation – Mineral mixture be provided for the livestock @ 50 g/day/Anim. ➤ Disposal/Transfer of the animals in the area having feed resources availability. ➤ Concentrate feeding for productive animals to support minimum production & life saving of the important animals. ➤ Other non productive animals are to be fed at subsistence level. ➤ Use of food grains for biodiesel and distilleries should be stopped and the grains be spared for productive animals. ➤ Bypass protein concentrate ingredients may be provided in order to harvest maximum nutrients for productive animals particularly high productive crossbred cows. ➤ Top feeds should be used during scarcity period only. ➤ Oil seed cakes are good source of proteins and hence should be used for productive animals only. ➤ Feed supplements/ Additives needs to be used widely for productive animals. ➤ Establishment of Cattle camps at identified sites. ➤ NGOs/Gorakshan Sanstha etc. identified to be involved for participation/ implementation. ➤ Feed resources @ 7 kg.dry fodder/day/adult animal for maintenance 2.0 kg. concentrate mixture/day/adult animal for supporting minimum milk production. ➤ The stored feeds & fodder can be 	<p>brought into cyclic stage for reproduction.</p> <ul style="list-style-type: none"> ➤ Young crossbred livestock needs to be attended properly so as to harness the high productivity. ➤ <i>Adlib.</i> feeding may be practiced with balancing the nutrients required. ➤ The unproductive/surplus livestock needs to be culled/disposed. ➤ Livestock suitable with the farming system practiced only should be maintained. ➤ Mechanization in agriculture needs to be encouraged. ➤ Feed processing needs to be encouraged in order to minimize the wastage of feed resources. ➤ <i>In-situ</i> storage and feeding of processed animal feed resources by the livestock owners needs to be encouraged. ➤ Fodder resources should be exploited with sufficient transport facilities
--	--	--	---

	<p>provided needs to be assessed.</p> <ul style="list-style-type: none"> ➤ Information at every district head quarter regarding availability of fodder resources from other areas for exploitation should be made available. A storehouse can be prepared at a highest point in the city where feeds & fodder (silage) can be stored for emergency use 	<p>used to feed the animals & if it is short then Fodder resources should be exploited with sufficient transport facilities from other areas of the district.</p>	<p>from other areas of the district even after the event.</p>
--	---	---	---

	Suggested contingency measures		
Floods	Before the event	During the event	After the event
Drinking water	<ul style="list-style-type: none"> ➤ Sufficient storage capacity should be made available particularly during rainy season in view of the forecasting of the flood. Rain water harvesting should be done in all districts. Every district should be made self-sufficient. Every district has plenty of rain water which should be harvested so that these areas should become self-sufficient & if required they should be able to provide water to other dry areas too. The rain water should not be wasted in sea. ➤ Shelters & temporary camps should be set up at a height in city area as well as in suburbs after choosing the right location for each area. Same provisions should be done in other Konkan districts. ➤ Bore well facilities should be exploited in districts for supply of clean water. Contamination of local water resources due to flood water should be prevented ➤ Potable drinking water source should be there to supply water to animals. ➤ Every society should implement rain harvesting system, so that water can be stored for use whole year long. Water problem likely to be faced in future. Water harvesting measures like farm ponds alternative water sources, Nala bunding/check dams etc. needs to be undertaken. ➤ Judicious use of water in agriculture i.e. through drip/sprinkler irrigation. ➤ Wastage of water needs to be curbed. ➤ Rain water harvesting measures needs to be implemented even at village level with establishment of water Storage and Purification facility 	<ul style="list-style-type: none"> ➤ Sufficient facility for transportation with advanced proper planning should be made in the areas of each district. ➤ During flood condition there will be polluted water, whatever potable drinking water source is available should be used with almost care. ➤ Disinfection of drinking water i.e. chlorination of water should be carried out Stop use of drinking water for animals from contaminated water resources. ➤ Disinfection of the water for consumption of the animals should be carried out to prevent water-borne diseases. Aerosol spray of the disinfectant for preventing spread of airborne infections should be carried out. Shelters & temporary camps for displaced animals should be set up with proper sanitation facilities. ➤ Judicious use of water for livestock. ➤ Water tankers provision ➤ Private water resources such as wells shall be used for drinking water availability only. 	<ul style="list-style-type: none"> ➤ Sufficient infrastructure facility for transportation with advanced proper planning should be made in the areas of each district. ➤ Clean disinfected water from bore well or rain harvested water may be supplied to the animals as water-borne infections are common after floods. ➤ Sources of potable drinking water should be tapped for its proper use. ➤ Permanent water resources should be developed with campaign for public awareness. ➤ Water storage facility created away from the flooded area.

--	--	--	--

	Suggested contingency measures		
Floods	Before the event	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter for flood affected areas with stock of life saving medicine for livestock. ➤ Vaccination of animals for various diseases according to season. ➤ Deworming and spraying be done to get rid of endoparasites and ectoparasites to keep the health of animals in good condition. ➤ Stock of life saving medicine be made. ➤ Disaster management team of veterinarians be constituted at district/taluka/panchayat level. ➤ Training to veterinarians in health and disease management during flood disaster be given. ➤ Awareness amongst farmers regarding health care practices during flood disaster be undertaken. ➤ Feedadditives/Tonics/ Vitamin supplements should be stocked. ➤ Vaccines /Dewormers needs to be stocked. ➤ Records/PM/ Carcass disposal arrangements needs to be ensured. ➤ In flood prone area pucca cattle 	<ul style="list-style-type: none"> ➤ Services of trained personnel need to be made available in affected area with sufficient supply of life saving medicine of livestock. ➤ Shifting of the animals at suitable place for temporary shelter. ➤ Disaster management team of veterinarians be deployed. ➤ Makeshift Veterinary medical facilities should be created at the site nearer to disaster place. ➤ Various referral centres in the disease diagnostics should be roped in for detection of infections which cannot be diagnosed at field level. ➤ Various diagnostic facility with modern techniques should be made available at Tahsil level besides district level so that more number of farmers may approach for diagnosis & treatment. ➤ Adequate nutrition including vitamin-mineral supplements should be given to animals to keep their health in proper condition. ➤ During occurrence of contagious diseases, affected animals should be kept isolated and treated properly. Isolation and treatment of ailing animals viz. hypothermia, wound, diarrhoea and pneumonia be undertaken. ➤ Vaccination against HS, BQ and FMD in bovines and PPR and enterotoxaemia in small ruminants should be undertaken. ➤ Deworming and spraying of apparently healthy animals be carried out. ➤ Use of antivenum in snake bite cases. ➤ Feed additives/Tonics/Vitamin supplements should be provided. Vaccination and deworming programme needs to be undertaken. ➤ Post Mortem /record keeping/carcass disposal arrangements be effected. ➤ Disinfect the premises with bleaching powder and 	<ul style="list-style-type: none"> ➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during flood with stock of life saving medicine for livestock. ➤ After flood condition there are chances of occurrence of specific diseases. ➤ Preventive measures should be taken to reduce occurrence of diseases. Vaccination and deworming programme needs to be undertaken. ➤ Animals should closely be observed for new/re-emerging diseases. ➤ Proper disposal of carcass is very important in flood affected areas from public health point of view. Methods of disposing of dead animals include burning, burying and composting ➤ Disinfection of animal sheds with 2% formaldehyde / 4% caustic soda. ➤ Provide proper shelter to protect animals from cold and rain.

	shed should be constructed. ➤ Preparation of walls and hips to keep flood water away from village. ➤ Supply of Mineral and Vitamins mixture. ➤ Application of preventive and control measures of SP & MD.	lime. ➤ Turn off electrical power. ➤ Training of farmers for maintaining optimum health of animals, balance ration and recognize early signs of disease and managerial shortfalls during floods. ➤ During severe regular flood, shifting of village away from river or changing the path of river away from village.	➤ Record of affected livestock to be submitted for compensation of the loss. ➤ In regular flood prone areas defenses such as levees, bunds, reservoirs and weirs should be used for future preventions.
--	--	---	--

	Suggested contingency measures		
Cyclone	Before the event	During the event	After the event
Feed and fodder availability	➤ There should be availability of fodder depot one each for every district. ➤ Information at every district head quarter regarding availability of fodder resources from other areas for exploitation should be made available. A storehouse can be prepared at a highest point in the district where feeds & fodder (silage) can be stored for emergency use. The store house should have proper walls on all sides with one entrance to avoid effect of cyclone. ➤ Feed & fodder should be stored as emergency stock in Govt. warehouses which can be distributed to areas that need them	➤ Adaptation of proper distribution policy as per requirement with transport facility. ➤ The stored feeds & fodder can be used to feed the animals & if it is short then Fodder resources should be exploited with sufficient transport facilities from other areas of the district	➤ Readiness for feed and fodder bank as and when required for each districts with transport facility should be created.

	Suggested contingency measures		
Cyclone	Before the event	During the event	After the event
Drinking water	➤ Water resources as in general are inadequate and hence the resources should be trapped and increased. ➤ Rain water harvesting should be done in all districts. Every district should be made self-sufficient. Each district has plenty of rain water which should be harvested so that these areas are self-sufficient & if required they should be able to provide water to other	➤ Special distribution and carrying capacity should be implemented from other available resources. ➤ Rain harvested water & bore well water should be disinfected & provided to the animals. ➤ Special distribution and carrying capacity should be implemented from other available resources. ➤ Disinfection of the water for consumption of the animals should be carried out to prevent water-	➤ Permanent water resources should be developed even after the event with campaign for public

	<p>dry areas too. The rain water should not be wasted in sea.</p> <ul style="list-style-type: none"> ➤ Walls of the well should be constructed much above the ground level to avoid contamination 	<p>borne diseases. Aerosol spray of the disinfectant for preventing spread of airborne infections should be carried out. Shelters & temporary camps for displaced animals should be set up with proper sanitation facilities</p>	<p>awareness.</p>
	Suggested contingency measures		
Cyclone	Before the event	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter for cyclone affecting areas with stock of life saving medicine for livestock. ➤ Vaccination against common infections like FMD, swine fever, black quarter, anthrax, haemorrhagic septicaemia, etc. should be given to animals. ➤ Stock of medicines should be kept available for use during cyclone. ➤ The walls and roofs of the cow sheds should be well secured. ➤ Loose poles & tree branches should be removed, which may become harmful during extreme wind. ➤ Supply of Mineral and Vitamins mixture. ➤ Application of preventive and control measures of SP & MD. 	<ul style="list-style-type: none"> ➤ Keep watch on weather and listen to radio or TV and make others alert by warning. ➤ Shift the animals at safer place or in well secured cattle sheds. ➤ The wall and roofs of the cow sheds should be well secured. ➤ Loose poles & tree branches should be removed, which may become harmful during extreme wind. ➤ Services of trained personnel need to be made available in cyclone affected area with sufficient supply of life saving medicine of livestock. ➤ Makeshift Veterinary medical facilities should be created at the site nearer to disaster place. ➤ Various referral centers in the disease diagnostics should be roped in for detection of infections which cannot be diagnosed at field level. ➤ Various diagnostic facility with modern techniques should be made available at Tahsil level besides district level so that more number of farmers may approach for diagnosis & treatment. 	<ul style="list-style-type: none"> ➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during cyclone with stock of life saving medicine for livestock. ➤ Do not free the animals unless all clear or officially advised it is safe.

2.5.2

Poultry

	Suggested contingency measures		
Drought	Before the event^s	During the event	After the event
Shortage of feed ingredients	<ul style="list-style-type: none"> ➤ There should be availability of feed, feed ingredients and mineral mixtures with sufficient storage capacity for every district. ➤ Registration of poultry farms made compulsory to make it easier to be prepared and provide quick help to the 	<ul style="list-style-type: none"> ➤ Adaptation of proper distribution policy as per requirement with transport facility. ➤ Supply of feed ingredients through government channel to the end users at reduced price. ➤ Make sure that birds receive adequate quantity and essential nutrients through 	<ul style="list-style-type: none"> ➤ Readiness for feed, feed ingredients and mineral mixtures as and when required for each districts with transport facility. ➤ Strategies to minimize the effects of stress due to drought

	<p>farmers</p> <ul style="list-style-type: none"> ➤ Storage of feed ingredients of previous year in sufficient quantity to use in scarcity period. ➤ Identification and storage of locally available feed ingredients as an substitute for scarce ingredients. ➤ A farm disaster kit should be prepared in advance. The kit should be placed in a central location and everyone should know where it is. The contents of the kit must be checked regularly to ensure fresh and complete supplies. The following items should be included in the kit in addition to the items that are used everyday: <ul style="list-style-type: none"> – Updated list of all farms with information about birds, their location and records of feeding, vaccination, tests. – Basic first aid kit. – Handling equipment & cages. – Waterer and feeders. – Sanitation and disinfection equipments & chemicals. – Other safety and emergency items for vehicles and trailers, e.g., Extra tyres, winches, tools, etc. ➤ Maize grain is limiting source as a feed ingredient in poultry feed. ➤ Store maize for poultry feed. ➤ Substitute feed ingredient should be tapped as replacement for maize grain which can be used for poultry feed. ➤ Concentrate ingredients such as Grains, brans, & oilseed cakes, low grade grains, Govt. Godowns wastes, grains unfit for human consumption etc. should be procured. ➤ Ban on export of oilseed meals needs to 	<p>feed to minimize stress and to prevent occurrence of disease outbreaks.</p> <ul style="list-style-type: none"> ➤ Crucial use of available feed avoiding excess feeding and wastage of the feed. ➤ Stored feed ingredients will be utilized during contingency. ➤ Birds should be evacuated and taken to shelters as soon as there is news of an imminent disaster. Every flock must have some form of durable and visible identification. ➤ There should be arrangements for appropriate transport, suitable for birds. Stranded birds should be rescued and taken to safer places. ➤ If the stranded place is considered safe for the next week or so, the birds may be left there but should be provided with feed and drinking water. ➤ Arrangements should be made so that veterinary and Para- veterinary personnel can quickly reach all affected farms to provide necessary measures. ➤ Officials and other personnel engaged in relief work should also gather intelligence on the extent and nature of the damage to individual farms and villages so that appropriate relief measures can be implemented. ➤ Adequate nutrition should be given to birds to keep their health in proper condition. ➤ The available ingredients as poultry feed should be used with utmost care. ➤ Non-conventional feed ingredients can also be tapped to use as a poultry feed taking into consideration the anti-nutritional factors present in it. ➤ Alternate day feeding for broilers. ➤ Avoid feed wastage. ➤ Restricted feeding for layers. 	<p>by optimum feeding and management of the flock.</p> <ul style="list-style-type: none"> ➤ Use of mineral and vitamin supplements to reduce stress. ➤ Follow up of affected livestock for adequate feed supply. ➤ Proper utilization of the resources should be carried out. The situation should be assessed properly and decision has to be taken on which birds to be treated first and how. ➤ The birds that are in very poor condition with no chance of recovery should be culled in humane manner. ➤ The dead birds should be disposed off in hygienic manner by burial or incineration. ➤ The situation at the farm also should be assessed and the corrective measures should be taken as soon as possible. All damages should be repaired and shed should be made functional. Disinfection of the premises and shed should be carried to prevent spread of diseases. ➤ The stress on poultry due to shortage of feed during drought period can be minimized by proper feeding of the birds after drought period. ➤ Ad lib. feeding to compensate the egg production. ➤ Feed additives may be used to maximize production
--	---	---	--

	be implemented. ➤ Feed required for broilers 3.5 kg./bird for six weeks. For Layers 55 kg /layer bird for a period of 72 weeks.	➤ Poor layer birds to be culled. ➤ Broiler rear up to 4 weeks only. ➤ Use of feed additives be enhanced to maximize the feed efficiency.	
--	--	--	--

	Suggested contingency measures		
Drought	Before the event	During the event	After the event
Drinking water	➤ Water resources as in general are inadequate and hence the resources should be trapped and increased. ➤ Conservation of water for drought period. ➤ Water conservations measures adopted to increase water table like recharging of bore wells. ➤ Available water resources should be tapped and reserved. ➤ Leak proof water supply systems. ➤ Available rain water harvesting technique should be adopted i.e. farm ponds etc. ➤ Water conservations measures be adopted to increase water table. ➤ Judicious use of water. ➤ Use of nipples as waterers.	➤ Special distribution and carrying capacity should be implemented from other available resources for poultry. ➤ Optimum use of available water as per the requirement of birds. ➤ Supply of adequate water to farms with transportation facility. ➤ Supply of water through tankers during contingency. ➤ Judicious use of water. ➤ Use of nipples as waterers.	➤ Permanent water resources should be developed even after the event with campaign for public awareness. ➤ Evaluation and fine tuning of the contingency majors. ➤ Ensure clean, cold water supply to birds. ➤ Steps should be taken to conserve water and to develop permanent water resources. ➤ Fresh and ad lib. water should be provided.

	Suggested contingency measures		
Drought	Before the event ^s	During the event	After the event
Health and disease management	➤ Personnel should be trained for health and disease management of poultry through trainings and list of trained personnel should be available at each district head quarter with stock of medicine, mineral mixture and vaccine for poultry.	➤ Services of trained personnel need to be made available in affected area with sufficient supply of medicine, mineral mixture and vaccine for poultry. ➤ Immediate attention to diseased birds by veterinarians. ➤ Regular visits of veterinarians to detect diseased birds and veterinary care ➤ Vaccination of birds if necessary. ➤ If there is occurrence of disease, affected birds should be kept isolated and treated properly and promptly.	➤ Routine training programmed as a refresher course need to be implemented in relation to health and disease management during drought with stock of life saving medicine and vaccine for poultry to prevent outbreak. Proper disposal system of poultry carcasses. ➤ Efforts to minimize effects of stress through optimum feeding, management and veterinary care. ➤ Assessment of losses due to mortality if any. ➤ Proper disposal of carcass.

	<ul style="list-style-type: none"> ➤ Regular and strict vaccination of birds. ➤ Vaccination of wild birds through water whenever possible. ➤ Deworming of birds before and after drought period. ➤ Appointment of veterinarian on farms made compulsory 	<ul style="list-style-type: none"> ➤ Periodic disinfection and disinfestations of farm and premises. ➤ Measures to minimize risk of spreading contagious diseases. ➤ Birds should be checked for injury/ signs of disease. ➤ Antibiotic through water ➤ Anti-stress supplements ➤ Multivitamin supplements ➤ Bio-security measures to be implemented. ➤ Proper disposal of poultry carcass. 	<ul style="list-style-type: none"> ➤ There will be stress on birds due to deterioration of health during drought period. Hence proper feeding should be done to minimize the stress on birds by supplying vitamin supplements. ➤ Birds should be tested at regular interval to confirm that they are free of contagious diseases. ➤ Proper disposal of birds died of various diseases. ➤ Vaccination. ➤ Replacement of stock.
--	---	---	--

	Suggested contingency measures		
Flood	Before the event	During the event	After the event
Shortage of feed ingredients	<ul style="list-style-type: none"> ➤ Poultry owners needs to be advised to be in readiness for- ➤ Alternate poultry sheds with feed stock at safe places. ➤ Displacement of stock- transport arrangements. ➤ Registration of poultry farms made compulsory to make it easier to be prepared and provide quick help to the farmers ➤ Measures to avoid spoilage of feed stores due to water. ➤ Construction of feed stores to stores feed sufficient for at least one month. ➤ Farmers will be encouraged to purchase and store the feed ingredient when it is cheaply available in the market. ➤ Information at every district head quarter regarding availability of feed and feed ingredients and mineral mixture resources from other areas. 	<ul style="list-style-type: none"> ➤ Shifting of birds at Alternate poultry sheds with feed stock at safe places. ➤ Stress reducing measures to be adopted. ➤ Feed and feed ingredients resources should be exploited with sufficient transport facilities from other areas of the district. ➤ Adequate nutrition should be given to birds to keep their health in proper condition. ➤ Judicious use of available feed. 	<ul style="list-style-type: none"> ➤ Shifting at original site after repair of the shades and restoration of the necessary facilities. ➤ Proper feeding should be done to minimize the stress on birds ➤ Ensure good quality feed and fodder supply to birds ➤ Feed and feed ingredients resources should be exploited with sufficient transport facilities from other areas of the district even after the event.

	Suggested contingency measures		
Flood	Before the event	During the event	After the event

Drinking water	<ul style="list-style-type: none"> ➤ Arrangement of clean and hygienic water. ➤ Leak and contamination proof water supply system. ➤ Installations of the watering systems targeted to optimum use of available water avoiding water wastage. ➤ Source of water should be away from flood affected areas. ➤ Sufficient storage capacity should be made available particularly during rainy season in view of the forecasting of flood. ➤ Encourage the farmers for rain water harvesting. ➤ Proper utilization of Water to save water. 	<ul style="list-style-type: none"> ➤ Sufficient facility for transportation with advanced proper planning should be made in the areas of each district. ➤ Water treatment to avoid entry of pathogens through drinking water. ➤ Judicious use of potable chlorinated water. ➤ Avoid contamination of wells and tube wells by flood water. ➤ Proper utilization of Water to save water. ➤ Supply of water through tankers during contingency. ➤ Water purification measures for ensuring hygienic water supply. 	<ul style="list-style-type: none"> ➤ Actions to rectify the water related issues observed during flood period. ➤ Ensure potable water supply to birds. ➤ Sufficient infrastructure facility for transportation with advanced proper planning should be made in the areas of each district. ➤ Sources of potable drinking water should be tapped for its proper use. ➤ Use of disinfected water. ➤ Arrangements of hygienic water supply.
-----------------------	--	---	--

	Suggested contingency measures		
Flood	Before the event	During the event	After the event
Health and disease management	<p>Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter for flood affecting areas with stock of medicine, mineral mixture and vaccine for poultry.</p> <p>Vaccination and deworming schedule should be observed strictly.</p> <p>Additional deworming can be carried out before and after floods.</p> <p>Medicine store facility with availability of adequate drugs at each farm and veterinary dispensaries.</p> <p>Training of farmers to identify signs of common contagious diseases particularly to</p>	<p>Services of trained personnel need to be made available in affected area with sufficient supply of medicine, mineral mixture and vaccine.</p> <p>During flood if it is difficult to shift and manage large number of birds, they should be slaughter and sent to cold storage.</p> <p>Vaccination against contagious diseases.</p> <p>Proper disposal of birds died of diseases particularly contagious diseases.</p> <p>Disinfection of sheds be undertaken.</p>	<p>Routine training programmed as a refresher course need to be implemented in relation to health and disease management during flood with stock of medicine and vaccine for poultry to prevent outbreak. Proper disposal system of poultry carcasses.</p> <p>Cleaning and disinfection of poultry farms.</p> <p>Monitoring for disease outbreaks in birds through regular farm visits by veterinarian.</p> <p>Proper disposal of carcass is very important in flood affected areas from public health point of view.</p> <p>Vaccination for RD and IBD to avoid outbreaks .</p> <p>Anti-stress treatment of birds is important to prevent mortality.</p>

	<p>avoid outbreaks.</p> <p>Do not built poultry house on nalla or stream or otherwise remove the birds before monsoon from such poultry house.</p>	<p>Immediate veterinary help to the farms.</p> <p>Adequate proper feeding and management.</p>	<p>Preventive measures should be taken to reduce occurrence of diseases, particularly use of antibiotics in drinking water.</p> <p>Hygienic measures should be followed.</p> <p>Birds should be served for emerging infectious diseases.</p> <p>Restriction on movement of the birds.</p> <p>Compensation of the loss.</p>
--	--	---	--

	Suggested contingency measures		
Cyclone	Before the event	During the event	After the event
Shortage of feed ingredients	Information at every district head quarter regarding availability of feed and feed ingredients and mineral mixture resources from other areas with storage facility.	➤ Feed and feed ingredients resources should be exploited with sufficient transport and storage facilities from other areas of the district.	➤ Feed and feed ingredients resources should be exploited with sufficient transport and storage facilities from other areas of the district even after the event.
	Suggested contingency measures		
Cyclone	Before the event	During the event	After the event
Drinking water	Sufficient storage capacity should be made available particularly during rainy season in view of the forecasting of the cyclone.	➤ Sufficient facility for transportation with advanced proper planning should be made in the areas of each district.	➤ Sufficient infrastructure facility for transportation with advanced proper planning should be made in the areas of each district

	Suggested contingency measures		
Cyclone	Before the event	During the event	After the event
Health and disease management	Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter during heat and cold waves with stock of life saving medicine, vaccine, feed and mineral mixture for poultry.	➤ Services of trained personnel need to be made available in affected area with facilities to overcome heat waves through water availability and cold through proper closed shelter with sufficient supply of medicine and vaccine for poultry. During heat fogging system should be ready and during cold	➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during heat and cold waves with stock of medicine and vaccine for poultry and sufficient arrangement.

		artificial heat through electricity need to be provided. ➤ Detection & treatment of ailing birds. ➤ Vaccination against contagious diseases. ➤ Antistressor preparations or multivitamins preparations through drinking water during stress. ➤ <i>Ad. lib.</i> Cold water availability ➤ Supply of medicine and vaccine for poultry. ➤ Feed in cool hrs and increase the frequency of feeding with high density feeds. ➤ Mineral & Vitamin supplementation	➤ Anti- stress to relieve stress. ➤ Birds should be monitored for occurrence of diseases. ➤ Vaccination to avoid outbreaks. ➤ Proper disposal of poultry carcasses.
--	--	---	--

2.5.3

Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture			
Marine	Not applicable		
Inland			
(i) Shallow water depth due to insufficient rains/inflow	Need to implement cost-effective water efficiency and conservation measures in very early stage to handle the drought. Strategic plan should be made to construct bunds & conserve water in drought prone areas.	In severe drought condition Most of the stock can be harvested immediately while Some portion of the local aquatic species should be transfer to the less affected areas so as to conserve them and reintroduce in its regional habitat.	Water policies should be determined If we want to restore our inland fishery resources. Need to set up hatcheries for drought affected fish species to avoid their extinction, and the conserved species once again need to be reintroduced in their original habitats after achieving desired aquatic environment.
(ii) Changes in water quality	Regular monitoring of water quality	Need to harvest the stock to minimize economic losses before mass mortality due to undesired water quality.	After achieving desired water quality, conserved species once again need to be reintroduced in their original habitats.

(iii) Any other	Gene bank should be made for all indigenous local commercially & ecologically important species.	To conserve the endangered species breeding and rearing indoor facility may be created for future restoration.	The conserved species once again need to be reintroduced in their original habitats after achieving desired aquatic environment.
-----------------	--	--	--

B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Water temperature may get raised and also Dissolved Oxygen level may get declined, hence efforts should made to increase the depth of pond & avoid water seepage by using bentonite clay, plastic liners etc. Also artificial oxygenation systems as aerators etc. should be incorporated in aquaculture system.	Water recycling with the aid of potential filtration systems can be applied if available. Provide artificial oxygenation. If water level is too much low, can lead to mass mortality due to environmental stress hence it will be better to harvest the stock immediately.	Construction of small reservoirs or dams should be newly developed in drought prone area. Identifying culturable air breathing species / hardy species (e.g. <i>Notopterus</i> , <i>Clarius</i> , <i>Puntius</i> etc.) suitable to the regional aquatic environment.
(ii) Impact of salt load build up in ponds / change in water quality	Throughout the culture period salinity & other parameters should be checked for regular intervals. Fresh water storage ponds should be developed at aquaculture site.	Fresh water from the storage ponds can be utilized for maintaining salinity.	Identifying best suitable euryhaline spp. (Pearl spot, Sea bass, Rabbit fish , mullets etc.) for the culture which can tolerate wide range of salinity.
(iii) Any other	--	--	--

2) Floods			
A. Capture			
Marine	<p>Disaster preparedness mission through Sea walls, Embankment. In future early warning systems and evacuation strategy planning for flood prone areas.</p> <p>Plan of Preventive measures against the epidemiological diseases, like malaria, cholera, <i>dengue</i> etc. among coastal communities .</p> <p>Educating coastal population about Disaster mitigation and provision of good transport means in coastal areas prior to the Flooding event which will be helpful for rescue operations.</p>	<p>Aid to populations at the affected zones and shelters.</p> <p>Affected population should be provided with adequate food & medicines in time.</p>	<p>National & international financial support for research on the various aspects of the flood will be needed for future strategies.</p> <p>Microfinance to the affected population by Governmental & Non Governmental Organization to reconstruct their socio-economic status.</p> <p>Control of vector-borne endemic and epidemic diseases.</p> <p>Mangrove plantation & conservation strategies should be adopted in estuarine region for minimizing future risk.</p>
Inland	<p>In future early warning systems and evacuation strategy planning for flood prone areas.</p> <p>Awareness of People living in rural zones, or urban margins with regards to the geography of their area as they do not take into account whether they are on a river's flood plain, an unstable hillside, a dry river bed in a flooding area, etc., when they (fisheries community) build their houses.</p> <p>More emphasis should be given on the maintenance of public infrastructure, such as highways, secondary roads and bridges prior to the flooding event which will be helpful for rescue operations.</p> <p>Awareness should be created for using good materials for their</p>	<p>Aid to populations at the affected zones and shelters.</p> <p>Timely help to populations at the affected zones and shelters.</p> <p>Affected population should be provided with adequate food & medicines in time.</p>	<p>Diversifying course of flooding river to minimize socio-economic losses.</p> <p>Microfinance to the affected population by Governmental & Non Governmental Organization to reconstruct their socio-economic status.</p>

	construction of houses. Strategic planning to build up local rescue teams in flood prone areas.		
(i) Average compensation paid due to loss of human life	Not applicable		
(ii) No. of boats / nets/damaged	Not applicable		
(iii) No. of houses damaged	Not applicable		
(iv) Loss of stock	Not applicable		
(v) Changes in water quality	Not applicable		
(vi) Health and diseases	Preventive measures of Plan of the Health Ministry for the prevention of epidemiological diseases, like malaria, cholera, <i>dengue</i> etc. & vaccination in flood prone area.	Affected population should be provided with adequate food & medicines in time.	Control of vector-borne endemic and epidemic diseases.

B. Aquaculture			
(i) Inundation with flood water	Early warning systems should be developed to minimize future risk. Elevating the height of peripheral dykes of the aquaculture ponds. Providing elevated net fencing on the bunds to the avoid loss of fish during flooding.	Need to harvest the stock as early as possible to minimize economic losses	Drain out excess water, disinfecting and refilling the ponds with water and restocking by adopting standard aquaculture protocols.
(ii) Water contamination and changes in water quality	Elevating the peripheral dykes of the aquaculture ponds.	Need to harvest the stock as early as possible to minimize economic losses	Drain out all the water from the pond and refill it with good quality water for future crop.
(iii) Health and diseases	Adequate vaccination of fish stocks prior to flooding event is	In situ observations & analysis of health status of cultivable species and stress inducing factors and	Quarantining of culture pond before next stocking.

	recommended to minimize the risk.	recommendation of treatments to specific diseases.	
(iv) Loss of stock and inputs (feed, chemicals etc)	Elevating the peripheral dykes of the aquaculture ponds and good indoor storage facility for inputs.	Early harvest of the stock and transport of inputs to the safer places.	Use new stock.
(v) Infrastructure damage (pumps, aerators, huts etc)	Elevating the peripheral dykes of the aquaculture ponds and good indoor storage facility for the pumps & aerators in flood condition.	Transport of the pumps, aerators etc. to the safer places.	Insurance and micro-finance for repair and maintenance of the infrastructure.
(vi) Any other	-	-	-

3. Cyclone / Tsunami			
A.Capture			
Marine	<p>Timely Communication of weather forecasting to fishermen</p> <p>Implementation of Tsunami detection & warning system in Indian ocean and evacuation strategy planning for Cyclone / Tsunami prone area.</p> <p>Disaster preparedness mission through Sea walls, Embankment</p> <p>Provision of Wave breakers & dry docks for fishing vessel security.</p> <p>Encouragement and financial incentives should be given to fishermen to carry Safety Devices on their fishing crafts.</p> <p>Educating coastal population about Disaster mitigation and provision of good transport means in coastal areas prior to the Cyclone / Tsunami event which will be helpful for rescue</p>	<p>Timely aid to coastal populations at the affected zones and provision of shelters.</p> <p>Affected population should be provided with adequate food & medicines in time.</p>	<p>Microfinance to the affected population by Governmental & Non Governmental Organization to rebuild their socio-economic status.</p> <p>Control of vector-borne endemic and epidemic diseases;</p> <p>National & international financial support for research on the various aspects of the Cyclone / Tsunami will be needed for the planning of future strategies.</p> <p>Mangrove conservation, plantation strategies should be adopted in estuarine / coastal region for minimizing future risk</p>

	operations. Preventive measures for the prevention of epidemiological diseases, like malaria, cholera, dengue etc		
(i) Average compensation paid due to loss of fishermen lives	---	---	---
(ii) Avg. no. of boats / nets/damaged	---	---	---
(iii) Avg. no. of houses damaged	---	---	---
Inland	Timely Communication of weather forecasting to fishermen Encouragement and financial incentives should be given to fishermen to carry safety devices on their fishing crafts.	Timely aid to coastal populations at the affected zones and provision of shelters. Affected population should be provided with adequate food & medicines in time.	Microfinance to the affected population by Governmental & Non Governmental Organization to rebuild their socio-economic status. Rehabilitation of fishermen communities.
B. Aquaculture			
(i) Overflow / flooding of ponds	Elevating the peripheral dykes of the aquaculture ponds Early warning systems should be developed to minimize future risk.	In very initial stage prior to flooding, need to harvest the stock as early as possible to minimize economic losses. In severe condition nothing can be controlled.	Drain out excess water, disinfecting and refilling the ponds with water and restocking by adopting standard aquaculture protocols.
(ii) Changes in water quality (fresh water / brackish water ratio)	Elevating the peripheral dykes of the aquaculture ponds. Regular monitoring of water quality.	Fresh water from the storage ponds can be utilized for maintaining salinity.	Drain out excess water, After achieving desired water quality , restocking by adopting standard aquaculture protocols.
(iii) Health and diseases	Adequate vaccination of the stocks prior to this is recommended to minimize the risk	In situ observations & analysis of health status of cultivable species and stress inducing factors and recommendation of treatments to specific diseases.	Disinfecting / Quarantining of culture pond before the next stocking.
(iv) Loss of stock and inputs (feed, chemicals etc)	Elevating the peripheral dykes of the aquaculture ponds and good indoor storage facility for inputs.	Early harvest of the stock and transport of inputs to the safer places.	Use new stock.

(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	Elevating the peripheral dykes of the aquaculture ponds and Initial provision of good indoor storage facility for pumps & aerators .	Transport of the pumps, aerators etc. to the safer places.	Insurance and microfinance with low interest from Govt. for the repair and maintenance of the infrastructure.
(vi) Any other	---	---	---
4. Heat wave and cold wave			
A. Capture			
Marine	Not applicable		
Inland	Not applicable		
B. Aquaculture			
(i) Changes in pond environment (water quality)	Depth of the aquaculture ponds should be increased to minimize thermal stress. Plantation at the peripheral dykes of aquaculture ponds can be recommended.	Aerators should properly utilized for the good circulation of water maintaining good pond environment.	Identification of best suitable eurythermic spp. for aquaculture to tolerate wide temperature range.
(ii) Health and Disease management	Maintaining water parameters at desired levels can reduce the stressful condition & can avoid disease.	Aerators should properly utilized for the good circulation of water maintaining optimum water quality.	Early warning systems should be developed to minimize future risk. Identification of hardy species for aquaculture practices.
(iii) Any other	---	---	---

^a based on forewarning wherever available

SINDHUDURGA

State: MAHARASHTRA

Agriculture Contingency Plan for District: SINDHUDURG

1.0 District Agriculture profile					
1.1	Agro-Climatic/Ecological Zone				
	Agro Ecological Sub Region (ICAR)	Central and south Sahyadris, hot moist, subhumid to humid eco-subregion (19.2)			
	Agro-Climatic Zone (Planning Commission)	Western Coast Plains and Ghat region (XII)			
	Agro Climatic Zone (NARP)	South Konkan Coastal Zone (MH-1)			
	List all the districts or part thereof falling under the NARP Zone	Ratnagiri and Sindhudurg			
	Geographic coordinates of district headquarters	Latitude	Longitude		Altitude
		16°10' 30.42" N 15°37'.16.40"N	73° 44'42.89" E 73 °19' 74.18 E		213 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Dr. Haladavnekar P.C., Associate Director of Research, Regional Fruit Research Station, Vengurle- 417 516, Dist. Sindhudurg (M.S.)			
	Mention the KVK located in the district	Krishi Vigyan Kendra, Kirlos, Tal. Malvan, Dist. Sindhudurg (M.S.)- 416510			
	Name and address of the nearest Agromet Field Unit for agro- advisories in the zone	Technical Officer, Integrated Agro Advisory Services, Agricultural Research Station, Mulde, Dist. Sindhudurg (M.S.)			
1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	3047.7	91	First week of June	2 nd week of October
	NE Monsoon(Oct-Dec):	---	---	-	-
	Post monsoon showers (Oct.- Dec)	195.6	9	-	-
	Winter (Nov-Feb)	7.7	0	-	-
	Summer (Mar-May)	41.1	2	-	-
	Annual	3292.1	102	-	-

1.3	Land use pattern of the district (latest statistics)	Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	504	163	55.5	21	1	65	35	122	16	42

Source: District Socio-economic Review, 2014-15(Directorate of Economic & Statistics, Govt. of Maharashtra)

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))	Area ('000'ha)	Percent (%) of total
	Deep soils	57.17	11.34
	Medium deep soils	192.28	38.15
	Shallow soils	254.53	50.50

Source :- NBSS & LUP, Nagpur

1.5	Agricultural land use	Area ('000'ha)	Cropping intensity %
	Net sown area	163	102.4
	Area sown more than once	4	
	Gross cropped area	167	

Source – District Socio-economic Review -2014-15 (Directorate of Economic & Statistics, Govt. of Maharashtra)

1.6	Irrigation	Area ('000'ha)		
	Net irrigated area	28.86		
	Gross irrigated area	30.95		
	Rainfed area	127		
	Sources of Irrigation	Number	Area ('000'ha)	Percentage of total irrigated area
	Canals		7.6	44.7
	Tanks	-	-	-
	Open wells	4772	9.2	54.1
	Bore wells	110	0.2	1.2
	Lift irrigation schemes	1451		

	Micro-irrigation			
	Other sources (please specify)			
	Total Irrigated Area		17.0	
	Pump sets	2529		
	No. of Tractors	35		

Source – District Socio-economic Review -2014-15 (Directorate of Economic & Statistics, Govt. of Maharashtra)

	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tahasils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	--	--	
	Critical	--	--	
	Semi- critical	--	--	
	Safe	--	--	
	Wastewater availability and use	--	--	
	Ground water quality			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

1.7 Area under major field crops & horticulture etc.

1.7	Major Field crops cultivated	Area ('000' ha)					
		<i>Kharif</i>		Rabi		Summer	Total
		Irrigated	Rainfed	Irrigated	Rainfed		
	Rice	--	60.54	3.9	--	1.276	78.7
	Finger millet	--	1.64	0.5	--	0.059	3.7
	Proso millet	--	0.3	-	--	--	0.3
	Pulses (Lab lab bean, black gram, horse gram, cowpea, etc.)	--	1.4	0.66	--	--	6.0
	Groundnut	--	1.14	0.74	--	--	5.8
	Niger, sunflower	--		0.1	--	--	
	Sugarcane	--	--	0.62	--	--	0.62

--	--	--	--	--	--	--	--

	Horticultural crops – Fruits	Total Area ('000'ha)
	Mango	31.36
	Cashew	60.6
	Sapota	0.2
	Other fruit crops	80.93
	Horticulture crops – Vegetables	
	Okra, Brinjal, Chilli and Leafy vegetables etc.	0.7 (2001-02)
	Plantation crops	
	Coconut	16.5
	Areca nut	0.8
	Fodder crops	3.9 (2001-02)

Source :- Krishi Utpadan Karyakramachi Rupresha, Kharif and Rabi Hangam - 2010-11, Vibhagiy Sabha, Konkan Mahsul Vibhag.
Dept. of Agriculture, Govt. of Maharashtra

1.8	Livestock	Male	Female	Total
	Non descriptive Cattle (local low yielding)	116386	70998	147410
	Crossbred cattle	4360	7730	12090
	Non descriptive Buffaloes (local low yielding)	194	953	66935
	Graded Buffaloes	0	0	0
	Goat	10193	21050	28125
	Sheep	0	0	11
	Others (Camel, Pig, Yak etc.)			1747
	Commercial dairy farms (Number)			
1.9	Poultry	No. of farms	Total No. of birds	
	Commercial	<i>Data are not available</i>	769151	
	Backyard	-		

Source : Maharashtra Animal and Fisheries Science University, Nagpur

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.) Number of processing unit
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
			27838	1498	1165	79276	
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
		Data are not available		23		Data are not available	
	B. Culture						
		Water Spread Area ('000'ha)		Yield (t/ha)	Production (tons)		
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)	1.6		11.67	18675		
	ii) Fresh water (Data Source: Fisheries Department)	0.492		0.02	9.84		

1.11 Production and Productivity of major crops

Production and Productivity of major crops										
1.11	Name of crop	Kharif		Rabi-Summer		Summer		Total		Crop residue as fodder ('000 tons)
		Produc tion ('00'MT)	Produc tivity (kg/ha)	Produc tion ('00'MT)	Produc tivity (kg/ha)	Produc tion ('00' M t)	Produc tivity (kg/ha)	Produc tion ('00' MT)	Produc tivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Rice	2015	3257	77	1833	--	--	2196	2787	
	Finger millet	27	1677	4	1000	--	--	37	1121	

	Proso millet	2	500	-	-	--	--	2	500	
	Pulses (Lab lab bean, black gram, horse gram, cowpea, etc.)	4.8	563	20	444	--	--	29	475	
	Groundnut and other oil seed	26	2314	80 (Groundnut) 1 others)	2352 1000	--	--	97	1702	

Source :- Krishi Utpadan Karyakramachi Rupresha, Kharif and Rabi Hangam - 2010-11, Vibhagiy Sabha, Konkan Mahsul Vibhag.

Dept. of Agriculture, Govt. of Maharashtra

Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango							839.28	3 MT/ha	
	Cashew							684.79	1127	
	Coconuts							166920000 nuts	90 nuts/palm	
	Sapota							5.00	2.5 MT/ha	

1.12	Sowing window for 5 major field crops	Rice	Finger millet	Groundnut	Niger (Karla)	Sugarcane
	Kharif- Rainfed	3 rd week of June to 4 th week of June	3 rd week of June-4 th week of June	2 nd week of June - 2 nd week of July	2 nd week of June- 3 rd week of June	-
	Kharif-Irrigated	-	-	-	-	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	2 nd week of Nov- 2 nd week of December.		2 nd week of December - 2 nd week of January	2 nd week of Oct - 2 nd week of Nov. (Cowpea, Wal, Horse gram, Sunflower) Green gram - February	2 nd week of December - 2 nd week of January
1.13	What is the major contingency the district is prone to? (Tick mark)			Regular	Occasional	None
	Drought			--	✓	--
	Flood			--	✓ (June to August)	--
	Cyclone			--	✓	--
	Hail storm			--	✓	-

	Heat wave	✓	-	--
	Cold wave	--	--	✓
	Frost	--	✓ (Nov.-Dec.)	--
	Sea water intrusion	✓	-	--
	Pests and disease outbreak (specify for major pests and diseases) 1. Rice:- Bacterial blight, Blast 2. Finger millet :- Bacterial blight, Blast 3. Groundnut :- Leaf spot and rust of groundnut 4. Mango :- Hopper, Mealy bug, thrips, fruit fly, Anthracnose, Powdery mildew, Branch drying & post harvest rots 5. Cashew :- Tea mosquito bug, thrips, aphids, Anthracnose. 6. Coconut :- Rhinoceros beetle, eriophyid mite 7. Areca nut :- Koleroga , Inflorescence blight and Ganoderma rot.	✓	-	--
	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 , legend missing

Annexure I- Location map



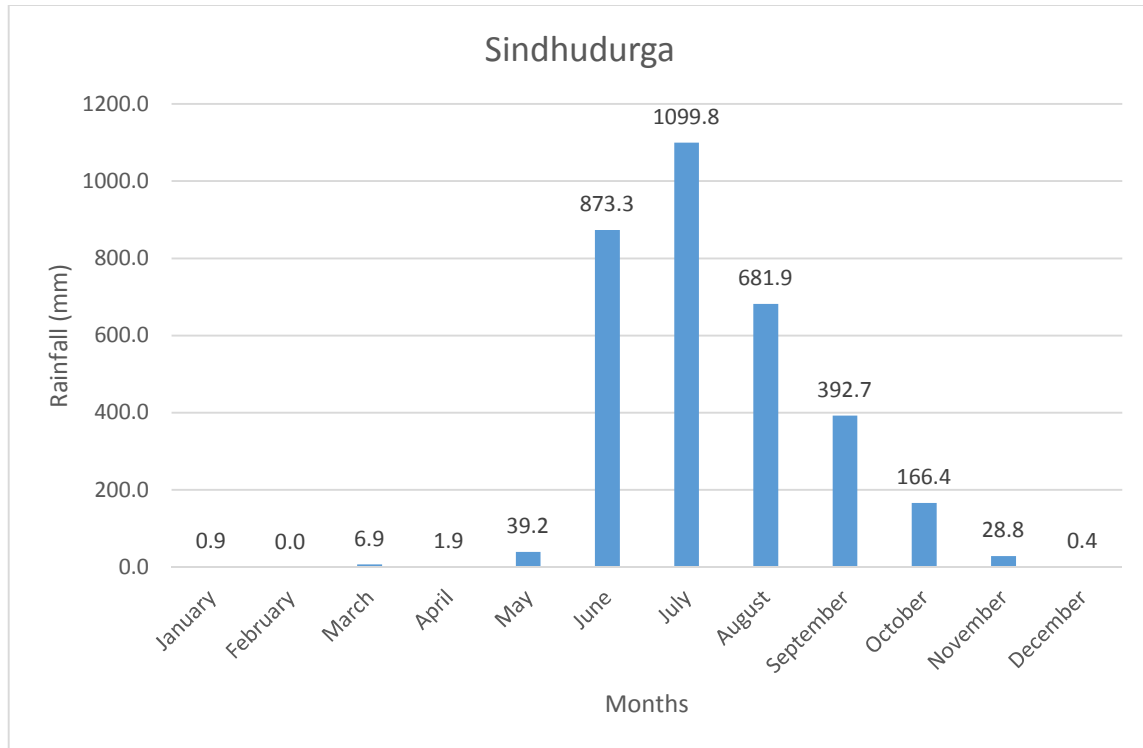
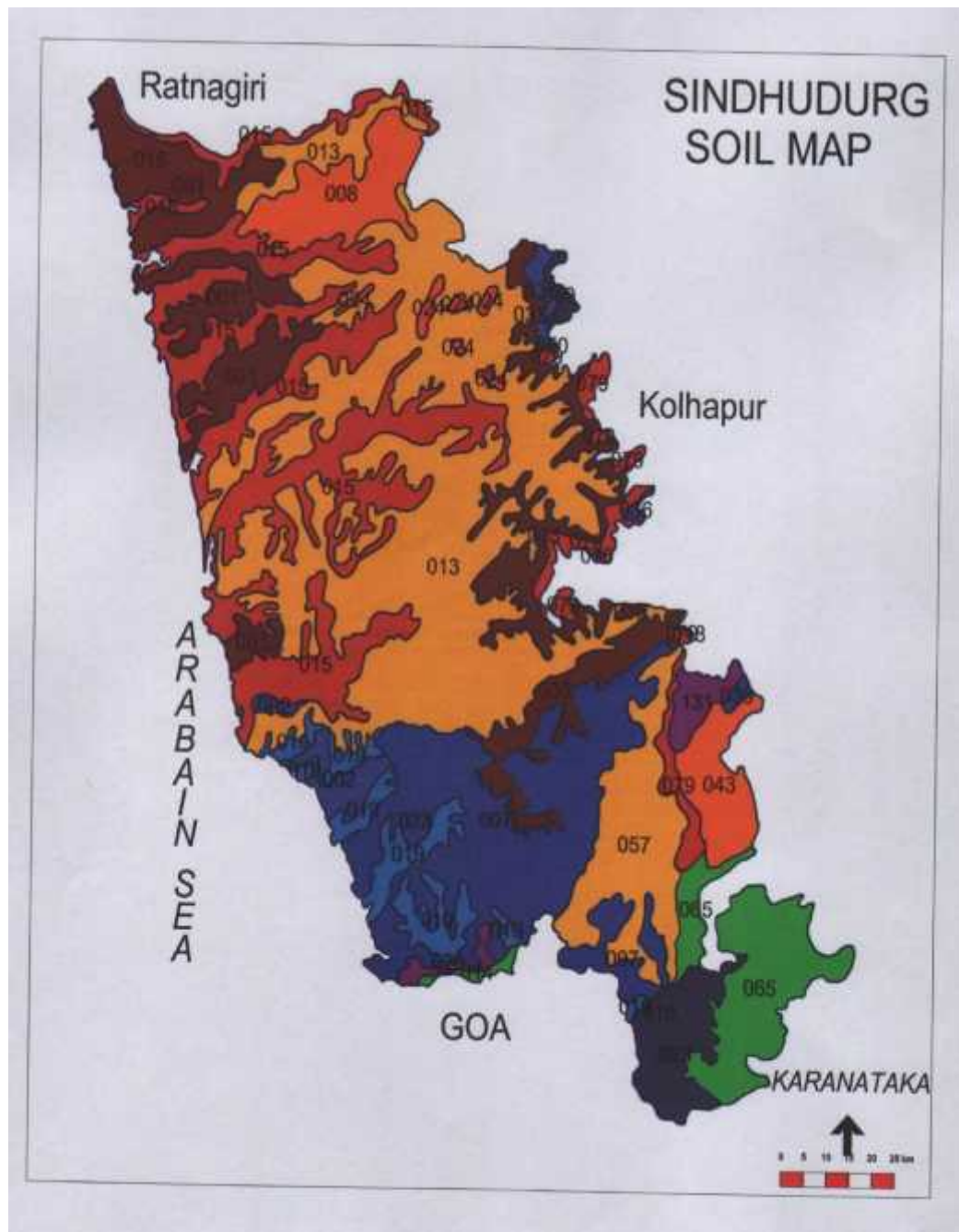
Annexure - 2

Fig: Mean monthly rainfall (mm) of Sindhudurga District.

Annexure - 3



Soil map Sindhudurg district (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 (3 rd week of June)*	a) Upland medium deep to shallow soils	Rice	In case of failure of germination use very early duration variety (Ratnagiri – 73, Karjat-184)	<ul style="list-style-type: none"> • Prepare the seedlings by mat nursery / Dapog method • If raising of seedling in nursery is not possible, then use direct seeding method (dry or sprouted seeds) 	Procure the seed from Maharashtra State Seed Corporation
		Finger millet	No change		
		Prosomillet	No change		
		Groundnut	No change		
		Niger	No change		
		Sugarcane	No change		
	b) Mid-land medium deep soils	Rice	In case of failure of germination use early duration variety (Ratnagiri-1, Ratnagiri-5, Ratnagiri-24, Ratnagiri-711, Karjat- 3, Karjat-4, Karjat-7.)	<ul style="list-style-type: none"> • Prepare the seedlings by mat nursery / Dapog method • If raising of 	Procure the seed from Maharashtra State Seed Corporation

	c) Low land deep soils	Rice	In case of failure of germination use mid late duration variety (Ratnagiri-4, Karjat-5, Karjat-9)	seedling in nursery is not possible, then use direct seeding method (dry or sprouted seeds)	
	d) Hill slope shallow soils	Finger millet	No change	---	
		Prosomillet	No change	---	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agonomic measures	Remarks on Implementation
** Delay by 4 weeks (1 st Week of July)	a) Upland medium deep to shallow soils	Rice	Use very early duration variety (Ratnagiri – 73, Karjat-184)	1. Raise the crop by direct seeding method (dry or sprouted seeds)	Procure the seed from Maharashtra State Seed Corporation
		Finger millet	Cowpea (Var. Konkan Sadabahar), Black gram (TPU- 4) Oil Seed like niger (Var. IGP 76)		
		Prosomillet			
		Groundnut	Use early duration variety (Phule pragati, SB- XI)	--	
		Niger	No change	--	
		Sugarcane	No change	Irrigation as per requirement	
	b) Mid-land medium deep soils	Rice	Use very early duration variety (Ratnagiri – 73, Karjat-184)	Raise the crop by direct seeding method (dry or	Procure the seed from Maharashtra State Seed

	c) Low land deep soils	Rice	Use early duration variety (Ratnagiri-1, Ratnagiri-5, Ratnagiri-24, Ratnagiri-711, Karjat- 3, Karjat-4, Karjat-7.)	sprouted seeds)	Corporation
	d) Hill slope shallow soils	Finger millet	Grow pulses like cowpea (Var. Konkan Sadabahar), black gram (TPU- 4)		
		Prosomillet	Oil Seed like Niger (Var. IGP 76)		

Note :- ** Generally such type of situation has not occurred during past years

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 6 weeks (3 rd week of July)	a) Upland medium deep to shallow soils	Not applicable Note :- ** Generally such type of situation has not occurred during past years			
	b) Mid-land medium deep soils				
	c) Low land deep soils				
	d) Hill slope shallow soils				

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
** Delay by 8 weeks	a) Upland medium deep to shallow soils	Not applicable Note :- ** Generally such type of situation has not occurred during past years			

(1 st Week of August)	b) Mid-land medium deep soils	
	c) Low land deep soils	
	d) Hill slope shallow soils	

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	Major Farming situation	Normal 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.	a) Upland medium deep to shallow soils	Rice	• Re-raising nursery by mat technique	• Protective irrigation/mulching between row of seedling with glyricidia	
		Finger millet	Use short duration variety (H.R. 374) and delay sowing till monsoon restart.	Protective irrigation	
		Groundnut	Sow after monsoon restart	---	
		Niger	No change	---	
		Sugarcane	No change	Protective irrigation	
	b) Mid-land medium deep soils	Rice	----	Protective irrigation	
	c) Low land deep soils	Rice	----	Protective irrigation	
	d) Hill slope	Finger millet	Use short duration variety and delay	Protective irrigation	

	shallow soils	Prosomillet	sowing till monsoon restart	Protective irrigation	
--	---------------	-------------	-----------------------------	-----------------------	--

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Normal onset followed by 15-20 days dry spell at the time of transplanting	a) Upland medium deep to shallow soils	Rice	<ul style="list-style-type: none"> • Increase number of seedling per hill (5 to 6) or adopt closer spacing (15 x15 cm). • Increase 25% recommended dose of fertilizer. • For shortage of seedling prepare seedling by mat nursery using short duration variety. • Use thomba method. • Dusting with methyl parathion 2% dust @ 25 kg/ha to control armyworm in nursery. 	<ul style="list-style-type: none"> • Protective irrigation for nursery • Protective irrigation after transplanting 	Use water from the outside sources like farm ponds, nalas, streams, rivers for puddling operation
		Finger millet	<ul style="list-style-type: none"> • Increase 25% recommended dose of fertilizer • Adopt closer spacing (15 x15 cm) 	Protective irrigation after transplanting	Use water from the outside sources like farm ponds, nalas, streams, rivers, etc.
		Prosomillet			
		Groundnut	No change	<ul style="list-style-type: none"> • Adopt weed management practices with dry land weeder. • Mulching with tree lopping or glyricidia leaves. • Protective irrigation. • 1 %n Spray of potassium. 	
		Sugarcane			

		Niger		--	
	b) Mid-land medium deep soils	Rice	<ul style="list-style-type: none"> • Increase number of seedling per hill (5 to 6) or adopt closer spacing (15 x15 cm) • Increase 25% recommended dose of fertilizer 	<ul style="list-style-type: none"> • Protective irrigation for nursery 	<ul style="list-style-type: none"> • Use water from the outside sources like farm ponds, nalas, streams, rivers for puddling operation
	c) Low land deep soils	Rice	<ul style="list-style-type: none"> • For shortage of seedling prepare seedling by mat nursery using short duration variety. • Use thomba method • Dusting with methyl parathion 2% dust @ 25 kg/ha to control armyworm in nursery 	<ul style="list-style-type: none"> • Protective irrigation after transplanting 	
	d) Hill slope shallow soils	Finger millet	<ul style="list-style-type: none"> • Increase 25% recommended dose of fertilizer • Adopt closer spacing (15 x15 cm) 		
		Prosomillet			

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 & moisture conservation measures	Remarks on Implementation

At vegetative stage	a) Upland medium deep to shallow soils	Rice	<ul style="list-style-type: none">• Protective irrigation.• Postpone the split dose of Nitrogen application till receipts of rain/protective irrigation• Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval.• Take three sprays of Tricyclazole 1g/lit of water for control of rice blast.	<ul style="list-style-type: none">• Adopt weed management practices.• Apply split dose of Nitrogen after restart of rains• Spray % potassium	Use water from the outside sources like farm ponds, nalas, streams, rivers for puddling operation
		Finger millet	<ul style="list-style-type: none">• Protective irrigation.		
		Prosomillet			
		Groundnut	Protective irrigation	<ul style="list-style-type: none">• Adopt weed management practices with dry land weeder.• Mulching with tree lopping or glyricidia leaves.• Spray % potassium	
		Niger			
	Sugarcane				
	b) Mid-land medium deep soils	Rice	<ul style="list-style-type: none">• Postpone the split dose of Nitrogen application till	<ul style="list-style-type: none">• Adopt weed management	

	c) Low land deep soils	Rice	receipts of rain/protective irrigation <ul style="list-style-type: none"> • Protective irrigation • Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval. • Take three sprays of Tricyclazole 1g/lit of water for control of rice blast 	practices. <ul style="list-style-type: none"> • Maintain the existing water level in the field. • Apply split dose of Nitrogen after restart of rains • Spray % potassium 	
	d) Hill slope shallow soils	Finger millet Prosomillet	<ul style="list-style-type: none"> • Give protective irrigation if possible. 	<ul style="list-style-type: none"> • Adopt weed management practices • Apply split dose of Nitrogen after restart of rains 	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measure	Remarks on Implementation
At flowering/ fruiting stage	a) Upland medium deep to shallow soils	Rice	<ul style="list-style-type: none"> • Protective irrigation • Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval. • Take three sprays of Tricyclazole 1g/lit of water for control of rice blast. 	<ul style="list-style-type: none"> • Adopt weed management practices. • Maintain the existing water level in the field. • Spray % potassium 	

		Finger millet	<ul style="list-style-type: none"> Protective irrigation. 	<ul style="list-style-type: none"> Adopt weed management practices with dry land weeder. Mulching with tree lopping or glyricidia leaves Spray % potassium 	
		Prosomillet			
		Groundnut			
		Niger			
		Sugarcane			
	b) Mid-land medium deep soils	Rice	<ul style="list-style-type: none"> Protective irrigation. Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval. Take three sprays of Tricyclazole 1g/lit of water for control of rice blast. 	<ul style="list-style-type: none"> Adopt weed management practices. Maintain the existing water level in the field. Spray % potassium 	
	c) Low land deep soils	Rice			
	d) Hill slope shallow soils	Finger millet	<ul style="list-style-type: none"> Give protective irrigation if possible. 	<ul style="list-style-type: none"> Adopt weed management practices 	
		Prosomillet			

Condition			Suggested Contingency measures		
Terminal drought	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi crop planting	Remarks on Implementation
(Early withdrawal of monsoon)	a) Upland medium deep to shallow	Rice	Harvest crop at physiological maturity	<ul style="list-style-type: none"> Carry out sowing of Rabi crops as early as possible (Cowpea, groundnut, 	Use of farm pound for protective irrigation of crops
		Finger millet			
		Prosomillet			

	soils	Groundnut		water melon, leafy vegetables) • Raise the seedlings of chilli, brinjal, cabbage, knol knol)	
		Niger	No change		
		Sugarcane	No change	Protective irrigation	
	b) Mid-land medium deep soils	Rice	• Protective irrigation • Harvest crop at physiological maturity	• Carry out sowing of Rabi crops as early as possible (Cowpea, Horse gram, mustard, sweet corn, groundnut, water melon, leafy vegetables) • Raise the seedlings of chilli, brinjal, cabbage, knol knol)	
	c) Low land deep soils	Rice			
	d) Hill slope shallow soils	Finger millet	Harvest crop at physiological maturity	----	
		Prosomillet			

2.1.3 Irrigated situation

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

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall	Mid and low land Medium deep to deep soils	Rice (Rabi season)	Use early duration variety (Ratnagiri 73, Ratnagiri-1, Karjat-184) or Grow short duration pulses viz. cowpea (Var. Konkan Sadabahar), under control irrigation and tail end area	<ul style="list-style-type: none"> • Dapog/mat technique of nursery raising. • Young seedling transplanting. • SRI Technique. 	Procure the seed from Maharashtra State Seed Corporation
		Groundnut	Use early duration variety (Phule pragati) or grow short duration pulses viz. Cowpea (Var. Konkan Sadabahar),	<ul style="list-style-type: none"> • If other source of irrigation is available sow the crop as per schedule. 	Procure the seed from Maharashtra State Seed Corporation
		Pulses (Cowpea, Horsegram, Green gram)	No change	<ul style="list-style-type: none"> • Use micro irrigation (drip or micro sprinkler) 	
		Vegetables	Use early duration vegetables like Kartoli and leafy vegetables varieties Coriander: Dapoli-1 Radish: Japanies white long, Pusa ketaki Math: Math durangi, Co-1	<ul style="list-style-type: none"> • If other source of irrigation is available sow the crop as per schedule. • Use micro irrigation (drip or micro sprinkler) • Prepare the seedlings in portrays of vegetables (cucurbitaceous crops, brinjal, chilli) to avoid delay in transplanting. 	Procure the seed from Maharashtra State Seed Corporation
		Water melon	--	Use black polythene mulch	
		Sugarcane	---	If other source of irrigation is available sow the crop as per schedule.	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Limited release of water in canals due to low rainfall	Mid and low land Medium deep to deep soils	Rice (Rabi season)	<ul style="list-style-type: none"> • Prefer early duration variety in low land situation (Ratnagiri 73, Ratnagiri -1) • Grow short duration pulses (cow pea, lab lab bean, horse gram), groundnut (Phule Pragati), vegetables in midland situation 	<ul style="list-style-type: none"> • Use SRI Technique for rice cultivation. • Adopt Weed management practices • Use micro irrigation (drip or micro sprinkler) 	<ul style="list-style-type: none"> • Procure the seed from Maharashtra State Seed Corporation
		Groundnut	Prefer short duration variety (Phule Pragati,)	<ul style="list-style-type: none"> • Adopt Weed management practices with dry weeder • Use micro irrigation (drip or micro sprinkler) • Adopt mulching 	<ul style="list-style-type: none"> • Procure the seed from Maharashtra State Seed Corporation
		Pulses (Cowpea, Horsegram, Green gram)	No change		
		Vegetables	Grow Dolichous bean or adopt soil conservation measures for regular vegetables	<ul style="list-style-type: none"> • Adopt Weed management practices. • Use micro irrigation (drip or micro sprinkler) • Adopt mulching 	<ul style="list-style-type: none"> • Procure the seed from Maharashtra State Seed Corporation. • Necessity of practical training on drip irrigation and mulching
		Water melon	Either follow the soil conservation measures for water melon or grow short duration pulses		
		Sugarcane	No change	Protective irrigation	

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	Mid and low land Medium deep to deep soils	Rice (Rabi season)	Lab lab bean, horse gram, black gram, cowpea, mustard on residual moisture under low land situation	• Minimum tillage and sowing of seed by dibbling.	• Procure the seed from Maharashtra State Seed Corporation.
		Groundnut	If farm pond water is available go for short duration pulses like cowpea (Konkan Sadabahar) and leafy vegetables	• Adopt Weed management practices • Use micro irrigation (drip or micro sprinkler) • Adopt mulching	
		Pulses (Cowpea, horsegram, green gram)			
		Vegetables			
		Water melon			
		Sugarcane	--	Protective irrigation	

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	Mid and low land Medium deep to deep soils	Rice (Rabi season)	Wal (lablab bean) - Var. Konkan Wal No. 1, Horse gram - Var. Dapoli - 1 on residual moisture under low land situation	<ul style="list-style-type: none">• Minimum tillage and sowing of seed by dibbling,• Relay cropping	<ul style="list-style-type: none">• Procure the seed from Maharashtra State Seed Corporation.
		Groundnut	If farm pond water is available go for short duration pulses like cowpea (Konkan Sadabahar) and leafy vegetables	<ul style="list-style-type: none">• Adopt Weed management practices.• Use micro irrigation (drip or micro sprinkler).• Adopt mulching	
		Pulses (Cowpea, horsegram, green gram)			
		Vegetables			
		Water melon			
		Sugarcane		Protective irrigation	

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

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	Mid and low land Medium deep to deep soils	Not applicable			
Any other condition (specify)		----	----	----	----

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

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	<ul style="list-style-type: none"> Spray Cartap Hydrochloride 50SP @ 1.2 g/lit for the management of case worm.. Close water in the field and Drag rope over crop to dislodge the cases after that open the water at one end of the field to collect the cases which can be destroyed afterwards Drain out excess water and spray Propiconazol @ 1ml /lit of water to control sheath blight 	----	<ul style="list-style-type: none"> Drain out excess water and harvest the crop before lodging 	<ul style="list-style-type: none"> Immediate threshing and drying in shed

Fingermilletts	----	----	• Harvest the crop before lodging	Immediate threshing and drying in shed
Groundnut	• Drain out excess water	• Drain out excess water 2.Spray mancozeb @ 2.5 g/lit of water to control Tikka and rust disease	• Drain out excess water and harvest the crop immediately	• Separate the pods immediately and dry in shade.
Niger	• Drain out excess water	• Drain out excess water	• Drain out excess water. • Harvest the crop at physiological maturity	• Immediate threshing and dry in shed
Sugarcane	Drain out excess water Tie the sugarcane at grand growth stage	Drain out excess water	Drain out water and harvest at physiological maturity stage	Send immediately for crushing
Horticulture				
Cucurbitaceous crop	• Drain out excess water	• Drain out excess water	• Drain out excess water	-----
Mango	• Wait for congenial condition for application of Paclabutrastol @ of 0.75 g/ a.i. per meter average canopy diameter			
Cashew	--	-	-	-
Banana	• Drain out excess water • Propping with bamboo • Spray Hexaconazol @ 1ml/lit of water for control of Sigatoka Leaf spot and blight At pre flowering stage	• Drain out excess water. • Propping with bamboo	• Drain out excess water • Propping with bamboo	--
Pineapple	Drain out excess water	Drain out excess water	Drain out excess water	----
Heavy rainfall with high speed winds in a short span				
Rice	----	----	• Drain out water and harvest the crop at maturity immediately if lodging take place	• Immediate threshing and drying in shed
Fingermilletts	-	-	• Harvest the crop at maturity before its lodging.	
Groundnut	• Drain out excess water	• Drain out excess water	• Drain out water and harvest the crop immediately	• Separate the pods immediately and dry in shade.
Niger	• Drain out excess water	• Drain out excess water	• Drain out excess water	-

Sugarcane	Drain out excess water Tie the sugarcane at grand growth stage	Drain out excess water	Drain out water and harvest at physiological maturity stage	Send immediately for crushing
Horticulture				
Cucurbitaceous crop	• Drain out excess water	• Drain out excess water	• Drain out excess water	-----
Mango	<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . • Also apply Bordeaux paste on cut surface and trunk. 	<ul style="list-style-type: none"> • Prune the broken branches swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . Also apply Bordeaux paste on cut surface and trunk. • Spray Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water for anthracnose. 	<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . Also apply Bordeaux paste on cut surface and trunk. • Collect and utilize fallen fruit immediately for suitable processing. 	<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water. • Also apply Bordeaux paste on cut surface and trunk.
Cashew		<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water. • Also apply Bordeaux paste on cut surface and trunk. 		----
Banana	<ul style="list-style-type: none"> • Drain out excess water • Propping with bamboo 	<ul style="list-style-type: none"> • Drain out excess water • Propping with bamboo • Flowers of broken plant may be used as vegetable 	<ul style="list-style-type: none"> • Drain out excess water • Propping with bamboo • Fruit of broken plants may be used as vegetable. 	----
Pineapple	Drain out excess water	Drain out excess water	Drain out excess water	----

Outbreak of pests and diseases due to unseasonal rains				
Rice	<ul style="list-style-type: none"> • Spraying of Carbendazim 0.1% or Copper oxy chloride 0.25% or tricyclazole 0.1% to control blast disease 	<ul style="list-style-type: none"> • Spraying of Carbendazim 0.1% or Copper oxy chloride 0.25% or tricyclazole 0.1% to control blast disease 	-	-
Fingermillet	-	-	-	-
Groundnut	<ul style="list-style-type: none"> • Spraying with carbendazim 0.1% or Propiconazole 0.1% or Tridemorph 0.1% to control early and late leaf spot 	<ul style="list-style-type: none"> • Spraying with carbendazim 0.1% or Propiconazole 0.1% or Tridemorph 0.1% to control early and late leaf spot 	-	-
Niger	-	-	-	-
Sugarcane	----	----	-	-----
Horticulture				-----
Cucurbitaceous crop	----	----	<ul style="list-style-type: none"> • Install Rakshak trap 4 per ha (Cue lure) to control fruit fly • Spray with Copper Oxy Chloride @ 2.5 g/lit of water to control Downey mildew 	----
Mango	<ul style="list-style-type: none"> • Take spray of Lambda Cyhalothrin 5 EC @ 0.6 ml/lit of water and second spray of Imidachloprid 17.8 EC @ 0.3 ml/lit of water for control of mango hopper, shoot borer . • Spray Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water for anthracnose 	<ul style="list-style-type: none"> • Spraying with 0.2% W.P. sulphur dust or 0.05% hexaconazol to control powdery mildew. 	<ul style="list-style-type: none"> • Install Rakshak trap 4 per ha (Methyl eugenol) to control fruit fly 	<ul style="list-style-type: none"> • Dipping fruits in hot water at 52°C for 10 min. after harvest to control post harvest rot.
Cashew	<ul style="list-style-type: none"> • Spray with Profenophos 0.05 % after the rains to control tea mosquito bug. 	-	-	-
Acecanut	-	Spraying with 1% Bordeaux mixture or 0.37% copper oxychloride or root feeding	----	----

		four times at monthly intervals (June to sept.) with fosetyl AL 0.3% to control kolerog		
Sapota	-	<ul style="list-style-type: none"> Spraying of Metalaxyl + Mancozeb containing complex fungicide @ 0.2% to control fruit drop 	-	<ul style="list-style-type: none"> Collect and destroy the fallen and infected fruits

2.3 Floods

Condition	Suggested contingency measure			
Transient water logging/ partial inundation ¹	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Rice	<ul style="list-style-type: none"> If washed out resowing of nursery by using mat nursery/sowing of sprouted seed on puddled field 	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water. Immediate harvesting, threshing and drying in shed
Fingermillet	Not applicable	Not applicable	Not applicable	Not applicable
Groundnut				
Niger				
Sugarcane				
Horticulture (Vegetables)				
Cucurbitaceous crop	Not applicable	Not applicable	Not applicable	Not applicable
Continuous submergence for more than 2 days				
Rice	<ul style="list-style-type: none"> If washed out resowing of nursery by using mat nursery/sowing of sprouted seed on puddled field 	<ul style="list-style-type: none"> Drain out excess water Apply second dose (40%) of nitrogen after submergence is over 	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water. Immediate harvesting, threshing and dry in shed
Fingermillet	Not applicable	Not applicable	Not applicable	Not applicable
Groundnut				
Niger				
Sugarcane				

Horticulture (Vegetables)				
Cucurbitaceous crop	Not applicable	Not applicable	Not applicable	Not applicable
Sea water intrusion				
Rice	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water. Irrigate the affected area with fresh water and drain out, If wash out resowing of nursery with salt tolerant varieties like Panvel -1 and Panvel -2 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water. Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water. Immediate harvesting, threshing and drying in shed.
Fingermilletts	Not applicable			
Groundnut				
Niger				
Black gram				
Horticulture (Vegetables)				
Cucurbitaceous crop	Not applicable	Not applicable	Not applicable	Not applicable
Coconut	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out Mound the crop with soil 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out

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				
Mango	• Cover with shed net /Protective	• Water spray / 1%	• Collect dropped fruits and use it	• Collect dropped fruits and use it

	irrigation • Water spray	potassium nitrate spray	for suitable processing	for suitable processing
Cashew	• Cover with shed net /Protective irrigation Water spray	• Protective irrigation	• Protective irrigation	----
Coconut	• Cover with shed net. • Water spray	• Frequent irrigation	• Frequent irrigation	• Frequent irrigation
Arecanut	• Cover with shed net. • Water spray	• Frequent irrigation	• Frequent irrigation	Frequent irrigation
Cold wave	Not applicable			
Frost	Not applicable			
Hailstorm				
Mango	—	—	• Collect and destroy the fallen fruit to avoid the further built-up of pest and disease	• Collect the fallen fruit to avoid the further built-up of pest and disease
Cyclone				
Mango	• Support the young seedlings/grafts	• Proper pruning and disposal of damaged or broken branches	• Proper pruning of damage or broken branches • Collect dropped fruits and use it for suitable processing	• Proper pruning of damage or broken branches • Collect dropped fruits and use it for suitable processing
Cashew	• Support the young seedlings/grafts	• Proper pruning and disposal of damaged or broken branches	• Proper pruning of damage or broken branches • Collect fallen nuts market it.	• Proper pruning of damage or broken branches • Collect fallen nuts and store
Coconut	• Support the young seedlings	• Immediate disposal of damaged trunk	• Collect fallen tender nuts, market it.	• Collect fallen tender nuts market it.
Arecanut	• Support the young seedlings	• Immediate disposal of damaged trunk	• Collect fallen tender nuts market	• Collect fallen tender nuts market it.

2.6 Contingent strategies for Livestock, Poultry & Fisheries

2.6.1 Livestock

Drought	Suggested contingency measures		
	Before the event ^s	During the event	After the event
Feed and fodder availability	<ul style="list-style-type: none"> ➤ Conservation of green fodder as silage dry fodder as hay in flush season for utilization in lean period ➤ Dry fodder available should be processed i.e. Urea treatment of crop residues to enhance their nutritive value. For this inputs such as training of livestock owners, material like urea, polythene sheet etc may be provided free of cost to the livestock owners. ➤ Judicial use of available feed resources by the livestock owners. ➤ Non conventional feed resources such as Neem seed Cake/ Sal seed Meal/ Mango seed Kernels/ Babul pods etc should be collected and stored. ➤ Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains, Govt. Godowns wastes, grains unfit for human consumption etc. should be procured for productive animals. ➤ Urea molasses mineral blocks (UMMB) may be reserved with NDDDB, Anand, Gujarat for emergency supply as concentrate. ➤ Sugarcane bagasse, cane tops and molasses form important byproducts. Sugarcane bagasse- is an important feed resource for ruminants. ➤ Tree leaves are easily available. Leaves of neem, mango, banyan, pipal, babul, subabul, mahuva, etc. can be used as green fodder. Tree leaves are good source of protein, calcium, Vitamin A and hence should be reserved for feeding during drought. ➤ Cactus is primarily found in deserts hence it is easily available during scarcity also. As such it is not used for feeding animals but during scarcity it can be used. ➤ Mineral mixture should be procured and stored for supply. ➤ Fodder Banks: Grasses & tree leaves: Grasses from periphery of forest area wastelands & farmlands & Dry fallen forest tree leaves may be harvested & stored as hay in bales. ➤ Fodder Bank: Crop Residues: The major cereals like rice & wheat straws are more important for this purpose. Next are coarse cereals, legumes, haulms 	<ul style="list-style-type: none"> ➤ Judicious use of feed resources processed as per type of livestock possessed by the livestock owners. ➤ Distribution of fodder, UMMB blocks, other feed resources stored in the affected area to the livestock owners as per the number and type of livestock possessed. ➤ Mineral supplementation – Mineral mixture be provided for the livestock@50 g/day/Anim. ➤ Disposal/Transfer of the animals in the area having feed resources availability. ➤ Concentrate feeding for productive animals to support minimum production & life saving of the important animals. ➤ Other non productive animals are to be fed at subsistence level. ➤ Use of food grains for biodisel and distillaries should be stopped and the grains be spared for productive animals. ➤ Bypass protein concentrate ingredients may be provided in order to harvest maximum nutrients for productive animals particularly high productive crossbred cows. ➤ Top feeds should be used during scarcity period only. ➤ Oil seed cakes are good source of proteins and hence should be used for productive animals only. ➤ Feed supplements/ Additives needs to be used widely for 	<ul style="list-style-type: none"> ➤ Green fodder production in next Kharip season needs to be undertaken as a source of fodder at earliest. ➤ Mineral Supplementation should be continued. ➤ Concentrate feeding for productive animals so as to compensate the body condition and production. ➤ The animals must be brought into cyclic stage for reproduction. ➤ Young crossbred livestock needs to be attended properly so as to harness the high productivity. ➤ <i>Adlib.</i> feeding may be practiced with balancing the nutrients required. ➤ The unproductive/surplus livestock needs to be culled/disposed. ➤ Livestock suitable with the farming system practiced only should be maintained. ➤ Mechanization in agriculture needs to be encouraged. ➤ Feed processing needs to be encouraged in order to minimize the wastage of feed resources. ➤ <i>In-situ</i> storage and feeding of processed animal feed resources by the livestock owners needs to be encouraged. ➤ Readiness for feed and

	<p>left after removing grains from the crops. These may be stored in these banks to be established at each Taluka in the drought area.</p> <ul style="list-style-type: none"> ➤ Govt. should provide support to farmers for making stacks, bailing & storage. ➤ State Animal feed resources Grid needs to be established so as to provide feed resources during scarcity period. ➤ Cattle camp sites needs to be identified. ➤ NGOs/Gorakshan Sanstha etc. needs to be identified. ➤ Anticipated number of livestock & feed resources to be provided needs to be assessed. ➤ Livestock registration should be compulsory with identification by tagging ➤ Preparedness of veterinary services to drought prone areas. ➤ Encourage farmers to cultivate fodder crops. ➤ Identification of the site for fodder depot. ➤ Facility to store fodder by creating centralized silage making facility with provision for transport. ➤ Forage production and storage of fodder in irrigated areas. ➤ Assessment of risk and vulnerability. ➤ Formation of village Disaster Management Committee. ➤ Establishment of drought monitoring system or early warning system. 	<p>productive animals.</p> <ul style="list-style-type: none"> ➤ Establishment of Cattle camps at identified sites. ➤ NGOs/Gorakshan Sanstha etc. identified to be involved for participation/ implementation. ➤ Feed resources @ 7 kg.dry fodder/ day/adult animal for maintenance 2.0 kg. concentrate mixture/day/adult animal for supporting minimum milk production. ➤ Adaptation of proper distribution policy as per requirement with transport facility. ➤ Regular rest periods for working animals particularly bulls during hot period of the day. ➤ Capture and care of stray animals. ➤ The unproductive/surplus livestock needs to be culled/disposed. ➤ Sale of feed and fodder from the affected area to non affected area should be banned. ➤ Distribute fodder at reasonable rate. ➤ Monitoring feed and fodder prices. 	<p>fodder bank as and when required for each districts with transport facility.</p> <ul style="list-style-type: none"> ➤ Review of shortfalls in planning and refining action plan the before and during event.
--	---	--	--

	Suggested contingency measures		
Drought	Before the event ^s	During the event	After the event
Drinking water	<ul style="list-style-type: none"> ➤ Water resources as in general are inadequate and hence the resources should be trapped and increased. ➤ Available rain water harvesting technique should be adopted i.e. farm ponds etc. ➤ Water conservations measures be adopted to increase water table like recharging of bore wells. 	<ul style="list-style-type: none"> ➤ Special distribution and carrying capacity should be implemented from other available resources. ➤ Water should be used as per the requirement of animals (@10-15 lit/ 100 kg body weight). 	<ul style="list-style-type: none"> ➤ Permanent water resources should be developed with campaign for public awareness. ➤ Steps should be

	<ul style="list-style-type: none"> ➤ Available water resources should be tapped and reserved. ➤ Water harvesting measures like farm ponds alternative water sources, Nala bunding/check dams etc. needs to be undertaken. ➤ Judicious use of water in agriculture i.e. through drip/sprinkler irrigation. ➤ Wastage of water needs to be curbed. ➤ Rain water harvesting measures needs to be implemented at village level. ➤ Proper utilization of Water to save water. ➤ Equal water distribution plan may be implemented. ➤ Cloud seeding desalination, recycle sewage water, transvasment river project etc. 	<ul style="list-style-type: none"> ➤ Drinking water should not be used for washing animals. ➤ Clean and chlorinated water be provided to prevent water borne diseases. ➤ Special distribution and carrying capacity should be supplemented from other available resources. ➤ Water for irrigation should be stopped. ➤ Judicious use of water for livestock. ➤ Supply of water through tankers during contingency. ➤ Private water resources such as wells shall be used for drinking water. ➤ Proper utilization of Water to save water. ➤ In vicinity of animal camp or chavani creation of borewell. 	<p>taken to conserve water.</p> <ul style="list-style-type: none"> ➤ Ensure fresh clean and cold water supply to livestock.
--	--	--	--

	Suggested contingency measures		
Drought	Before the event ^s	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter with stock of life saving medicine for livestock. ➤ Vaccination of animals for various diseases according to season. ➤ Deworming and spraying be done to get rid of endoparasites and ectoparasites to keep the health of animals in good condition. ➤ Personnels should be trained for health and disease management through training ➤ List of trained personnel should be available at each district head quarter. ➤ Feedadditives/Tonics/ Vitamin 	<ul style="list-style-type: none"> ➤ Services of trained personnel need to be made available in affected area with sufficient supply of life saving medicine of livestock. ➤ A team of veterinary experts be deployed for health management of drought hit livestock. ➤ During occurrence of disease, affected animals should be kept isolated and treated properly and promptly. ➤ Vaccination against contagious diseases like HS, FMD, Theileriosis be carried out. ➤ Mineral mixture be provided to take care of deficiency disorders. ➤ Tick control measures be undertaken to prevent tick borne diseases in animals under stress. ➤ Deworming should be carried out. 	<ul style="list-style-type: none"> ➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during drought with stock of life saving medicine for livestock. ➤ There will be stress on animals due to deterioration of health during drought period. ➤ Concentrates and vitamin-mineral supplements be provided to minimize the stress on animals. ➤ The animals should be observed for signs of contagious diseases or deficiency disorders. ➤ Vaccination spraying and deworming programme needs to

	<p>supplements should be stocked.</p> <ul style="list-style-type: none"> ➤ Vaccines, Insecticides, disinfectants and dewormers needs to be stocked. ➤ Records/PM/ Carcass disposal arrangements needs to be ensured. ➤ Training of farmers for maintaining optimum health of animals, balance ration and recognize early signs of disease and managerial shortfalls. ➤ Create temporary shade shelters to prevent heat stress on the animals. (animal camps) ➤ Supply of Mineral and Vitamins mixture. ➤ Application of preventive and control measures of SP & MD. 	<ul style="list-style-type: none"> ➤ Feed additives/Tonics/Vitamin supplements should be provided. ➤ Post Mortem /record keeping/carcass disposal arrangements be effected. ➤ Restriction on movement of the animals to prevent the spread of diseases. ➤ Periodic disinfection and disinfection of premises where animals are kept. ➤ Permission of only healthy and vaccinated animals in cattle market. ➤ By proper treatment with supervision and exercise over starvation. ➤ Special transport facility of mobile van for veterinary team be deployed. 	<p>be undertaken.</p> <ul style="list-style-type: none"> ➤ Record of affected livestock to be submitted for compensation of the loss. ➤ Farm disinfection and disinfection. ➤ Assessment of losses due to mortality if any.
--	---	--	--

	Suggested contingency measures		
Floods	Before the event ^s	During the event	After the event
Feed and fodder availability	<ul style="list-style-type: none"> ➤ Identification of flood prone zones and flood forecasting. ➤ Installation of early warning systems. ➤ Steps to prevent spoilage of food and water supply due to flood water. ➤ Dedicated helpline to emergency contact and communication at taluka level. ➤ Avoid construction of farm buildings in flood risk areas. ➤ Local ponds and canals regularly inspected and cleared off from obstruction ➤ Adequate stock of Tetanus toxoid. ➤ Change cropping pattern according to flood risk periods. ➤ Storage of available fodder at safe place before rainy season. ➤ Training of local personnel for disaster management. ➤ Dry fodder available should be processed i.e. Urea 	<ul style="list-style-type: none"> ➤ Quick evacuation of livestock from flood plain areas before area become flooded ➤ Prevent outflow of manure pit in river ➤ Proper feed, vaccine, drugs, disinfectants and feed supplement distribution policy adopted with transport facility. ➤ Prevent spoilage of food and water supply ➤ Judicious use of feed resources processed as per type of livestock possessed by the livestock owners. ➤ Distribution of fodder, UMMB blocks, and other feed resources stored in the affected area to the 	<ul style="list-style-type: none"> ➤ Green fodder production in next Kharif season needs to be undertaken as a source of fodder at earliest. Fodder seed of improved fodder crop varieties needs to be distributed. ➤ Mineral Supplementation should be continued. ➤ Concentrate feeding for productive animals so as to compensate the body condition and production. ➤ The animals must be brought into cyclic stage for reproduction. ➤ Young crossbred livestock needs to be attended

	<p>treatment of crop residues to enhance their nutritive value. For this inputs such as training of livestock owners, material like urea, polythene sheet etc may be provided free of cost to the livestock owners.</p> <ul style="list-style-type: none"> ➤ Judicial use of available feed resources by the livestock owners. ➤ Non conventional feed resources such as Neem seed Cake/ Sal seed Meal/ Mango seed Kernels/ Babul pods etc should be collected and stored. ➤ Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains, Govt Godowns wastes, grains unfit for human consumption etc. should be procured for productive animals. ➤ Urea molasses mineral blocks (UMMB) may be reserved with NDDB, Anand, Gujarat for emergency supply as concentrate. ➤ Sugarcane bagasse, cane tops and molasses form important byproducts. Sugarcane bagasse- is an important feed resource for ruminants. ➤ Tree leaves are easily available. Leaves of neem, mango, banyan, pipal, babul, subabul, mahuva, etc. can be used as green fodder. Tree leaves are good source of protein, calcium, Vitamin A & hence should be reserved for feeding during drought. ➤ Cactus is primarily found in deserts hence it is easily available during scarcity also. As such it is not used for feeding animals but during scarcity it can be used. ➤ Mineral mixture should be procured and stored for supply. ➤ Fodder Banks: Grasses & tree leaves: Grasses from periphery of forest area wastelands & farmlands & Dry fallen forest tree leaves may be harvested & stored as hay in bales. ➤ Fodder Bank: Crop Residues: The major cereals like rice & wheat straws are more important for this purpose. Next are coarse cereals, legumes, haulms left after removing grains from the crops. These may be stored in these banks to be established at each Taluka in the drought area. 	<p>livestock owners as per the number and type of livestock possessed.</p> <ul style="list-style-type: none"> ➤ Mineral supplementation – Mineral mixture be provided for the livestock @ 50 g/day/Anim. ➤ Disposal/Transfer of the animals in the area having feed resources availability. ➤ Concentrate feeding for productive animals to support minimum production & life saving of the important animals. ➤ Other non productive animals are to be fed at subsistence level. ➤ Use of food grains for biodisel and distillaries should be stopped and the grains be spared for productive animals. ➤ Bypass protein concentrate ingredients may be provided in order to harvest maximum nutrients for productive animals particularly high productive crossbred cows. ➤ Top feeds should be used during scarcity period only. ➤ Oil seed cakes are good source of proteins and hence should be used for productive animals only. ➤ Feed supplements/ Additives needs to be used widely for productive animals. ➤ Establishment of Cattle camps at identified sites. ➤ NGOs/Gorakshan Sanstha etc. identified to be involved for participation/ implementation. ➤ Feed resources @ 7 kg.dry fodder/day/adult animal for 	<p>properly so as to harness the high productivity.</p> <ul style="list-style-type: none"> ➤ <i>Adlib.</i> feeding may be practiced with balancing the nutrients required. ➤ The unproductive/surplus livestock needs to be culled/disposed. ➤ Livestock suitable with the farming system practiced only should be maintained. ➤ Mechanization in agriculture needs to be encouraged. ➤ Feed processing needs to be encouraged in order to minimize the wastage of feed resources. ➤ <i>In-situ</i> storage and feeding of processed animal feed resources by the livestock owners needs to be encouraged. ➤ Fodder resources should be exploited with sufficient transport facilities from other areas of the district even after the event.
--	--	---	--

	<ul style="list-style-type: none"> ➤ Govt. should provide support to farmers for making stacks, bailing & storage. ➤ State Animal feed resources Grid needs to be established so as to provide feed resources during scarcity period. ➤ Cattle camp sites needs to be identified. ➤ NGOs/Gorakshan Sanstha etc. needs to be identified. ➤ Anticipated number of livestock & feed resources to be provided needs to be assessed. ➤ Information at every district head quarter regarding availability of fodder resources from other areas for exploitation should be made available. A storehouse can be prepared at a highest point in the city where feeds & fodder (silage) can be stored for emergency use. 	<p>maintainance 2.0 kg. concentrate mixture/day/adult animal for supporting minimum milk production.</p> <ul style="list-style-type: none"> ➤ The stored feeds & fodder can be used to feed the animals & if it is short then Fodder resources should be exploited with sufficient transport facilities from other areas of the district. 	
--	---	--	--

	Suggested contingency measures		
	Before the event ^s	During the event	After the event
Floods			
Drinking water	<ul style="list-style-type: none"> ➤ Sufficient storage capacity should be made available particularly during rainy season in view of the forecasting of the flood. Rain water harvesting should be done in all districts. Every district should be made self-sufficient. Every district has plenty of rain water which should be harvested so that these areas should become self-sufficient & if required they should be able to provide water to other dry areas too. The rain water should not be wasted in sea. ➤ Shelters & temporary camps should be set up at a height in city area as well as in suburbs after choosing the right location for each area. Same provisions should be done in other Konkan districts. ➤ Bore well facilities should be exploited in districts for supply of clean water. Contamination of local water resources due to flood water should be prevented ➤ Potable drinking water source should be there to supply water to animals. ➤ Every society should implement rain harvesting system, so that water can be stored for use whole year long. Water problem likely to be faced in future. 	<ul style="list-style-type: none"> ➤ Sufficient facility for transportation with advanced proper planning should be made in the areas of each district. ➤ During flood condition there will be polluted water, whatever potable drinking water source is available should be used with almost care. ➤ Disinfection of drinking water <i>i.e.</i> chlorination of water should be carried out Stop use of drinking water for animals from contaminated water resources. ➤ Disinfection of the water for consumption of the animals should be carried out to prevent water-borne diseases. Aerosol spray of the disinfectant for preventing spread of airborne infections should be carried out. 	<ul style="list-style-type: none"> ➤ Sufficient infrastructure facility for transportation with advanced proper planning should be made in the areas of each district. ➤ Clean disinfected water from bore well or rain harvested water may be supplied to the animals as water-borne infections are common after floods. ➤ Sources of potable drinking water should be tapped for its proper use. ➤ Permanent water resources should be developed with campaign for public awareness. ➤ Water storage facility created away from the

	<p>Water harvesting measures like farm ponds alternative water sources, Nala bunding/check dams etc. needs to be undertaken.</p> <ul style="list-style-type: none"> ➤ Judicious use of water in agriculture i.e. through drip/sprinkler irrigation. ➤ Wastage of water needs to be curbed. ➤ Rain water harvesting measures needs to be implemented even at village level with establishment of water Storage and Purification facility 	<p>Shelters & temporary camps for displaced animals should be set up with proper sanitation facilities.</p> <ul style="list-style-type: none"> ➤ Judicious use of water for livestock. ➤ Water tankers provision ➤ Private water resources such as wells shall be used for drinking water availability only. 	flooded area.
	Suggested contingency measures		
Floods	Before the event^s	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter for flood affected areas with stock of life saving medicine for livestock. ➤ Vaccination of animals for various diseases according to season. ➤ Deworming and spraying be done to get rid of endoparasites and ectoparasites to keep the health of animals in good condition. ➤ Stock of life saving medicine be made. ➤ Disaster management team of veterinarians be constituted at district/taluka/panchayat level. ➤ Training to veterinarians in health and disease management during flood disaster be given. ➤ Awareness amongst farmers regarding health care practices during flood disaster be undertaken. ➤ Feedadditives/Tonics/ Vitamin supplements should be stocked. 	<ul style="list-style-type: none"> ➤ Services of trained personnel need to be made available in affected area with sufficient supply of life saving medicine of livestock. ➤ Shifting of the animals at suitable place for temporary shelter. ➤ Disaster management team of veterinarians be deployed. ➤ Makeshift Veterinary medical facilities should be created at the site nearer to disaster place. ➤ Various referral centres in the disease diagnostics should be roped in for detection of infections which cannot be diagnosed at field level. ➤ Various diagnostic facility with modern techniques should be made available at Tahsil level besides district level so that more number of farmers may approach for diagnosis & treatment. ➤ Adequate nutrition including vitamin-mineral supplements should be given to animals to keep their health in proper condition. ➤ During occurrence of contagious diseases, affected animals should be kept isolated and treated properly. Isolation and treatment of ailing animals viz. hypothermia, wound, diarrhoea and pneumonia be undertaken. ➤ Vaccination against HS, BQ and FMD in bovines and PPR and enterotoxaemia in small ruminants should be undertaken. ➤ Deworming and spraying of apparently healthy animals be carried out. 	<ul style="list-style-type: none"> ➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during flood with stock of life saving medicine for livestock. ➤ After flood condition there are chances of occurrence of specific diseases. ➤ Preventive measures should be taken to reduce occurrence of diseases. Vaccination and deworming programme needs to be undertaken. ➤ Animals should closely be observed for new/re-emerging diseases. ➤ Proper disposal of carcass is very important in flood affected areas from public health point of view. Methods of disposing of dead animals include burning, burying and composting

	<ul style="list-style-type: none"> ➤ Vaccines /Dewormers needs to be stocked. ➤ Records/PM/ Carcass disposal arrangements needs to be ensured. ➤ In flood prone area pucca cattle shed should be constructed. ➤ Preparation of walls and hips to keep flood water away from village. ➤ Supply of Mineral and Vitamins mixture. ➤ Application of preventive and control measures of SP & MD. 	<ul style="list-style-type: none"> ➤ Use of antivenum in snake bite cases. ➤ Feed additives/Tonics/Vitamin supplements should be provided. Vaccination and deworming programme needs to be undertaken. ➤ Post Mortem /record keeping/carcass disposal arrangements be effected. ➤ Disinfect the premises with bleaching powder and lime. ➤ Turn off electrical power. ➤ Training of farmers for maintaining optimum health of animals, balance ration and recognize early signs of disease and managerial shortfalls during floods. ➤ During severe regular flood, shifting of village away from river or changing the path of river away from village. 	<ul style="list-style-type: none"> ➤ Disinfection of animal sheds with 2% formaldehyde / 4% caustic soda. ➤ Provide proper shelter to protect animals from cold and rain. ➤ Record of affected livestock to be submitted for compensation of the loss. ➤ In regular flood prone areas defenses such as levees, bunds, reservoirs and weirs should be used for future preventions.
	Suggested contingency measures		
Cyclone	Before the event^s	During the event	After the event
Feed and fodder availability	<ul style="list-style-type: none"> ➤ There should be availability of fodder depot one each for every district. ➤ Information at every district head quarter regarding availability of fodder resources from other areas for exploitation should be made available. A storehouse can be prepared at a highest point in the district where feeds & fodder (silage) can be stored for emergency use. The store house should have proper walls on all sides with one entrance to avoid effect of cyclone. ➤ Feed & fodder should be stored as emergency stock in Govt. warehouses which can be distributed to areas that need them. 	<ul style="list-style-type: none"> ➤ Adaptation of proper distribution policy as per requirement with transport facility. ➤ The stored feeds & fodder can be used to feed the animals & if it is short then Fodder resources should be exploited with sufficient transport facilities from other areas of the district. 	<ul style="list-style-type: none"> ➤ Readiness for feed and fodder bank as and when required for each districts with transport facility should be created.

	Suggested contingency measures		
Cyclone	Before the event^s	During the event	After the event
Drinking water	<ul style="list-style-type: none"> ➤ Water resources as in general are inadequate and hence the resources should be trapped and increased. ➤ Rain water harvesting should be done in all districts. Every district should be made self-sufficient. Each district has plenty of rain water 	<ul style="list-style-type: none"> ➤ Special distribution and carrying capacity should be implemented from other available resources. ➤ Rain harvested water & bore well water should be disinfected & provided to the animals. ➤ Special distribution and carrying capacity should 	<ul style="list-style-type: none"> ➤ Permanent water resources should be developed even after the

	<p>which should be harvested so that these areas are self-sufficient & if required they should be able to provide water to other dry areas too. The rain water should not be wasted in sea.</p> <ul style="list-style-type: none"> ➤ Walls of the well should be constructed much above the ground level to avoid contamination. 	<p>be implemented from other available resources.</p> <ul style="list-style-type: none"> ➤ Disinfection of the water for consumption of the animals should be carried out to prevent water-borne diseases. Aerosol spray of the disinfectant for preventing spread of airborne infections should be carried out. Shelters & temporary camps for displaced animals should be set up with proper sanitation facilities 	<p>event with campaign for public awareness.</p>
	Suggested contingency measures		
Cyclone	Before the event^s	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter for cyclone affecting areas with stock of life saving medicine for livestock. ➤ Vaccination against common infections like FMD, swine fever, black quarter, anthrax, haemorrhagic septicaemia, etc. should be given to animals. ➤ Stock of medicines should be kept available for use during cyclone. ➤ The walls and roofs of the cow sheds should be well secured. ➤ Loose poles & tree branches should be removed, which may become harmful during extreme wind. ➤ Supply of Mineral and Vitamins mixture. ➤ Application of preventive and control measures of SP & MD. 	<ul style="list-style-type: none"> ➤ Keep watch on weather and listen to radio or TV and make others alert by warning. ➤ Shift the animals at safer place or in well secured cattle sheds. ➤ The wall and roofs of the cow sheds should be well secured. ➤ Loose poles & tree branches should be removed, which may become harmful during extreme wind. ➤ Services of trained personnel need to be made available in cyclone affected area with sufficient supply of life saving medicine of livestock. ➤ Makeshift Veterinary medical facilities should be created at the site nearer to disaster place. ➤ Various referral centers in the disease diagnostics should be roped in for detection of infections which cannot be diagnosed at field level. ➤ Various diagnostic facility with modern techniques should be made available at Tahsil level besides district level so that more number of farmers may approach for diagnosis & treatment. 	<ul style="list-style-type: none"> ➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during cyclone with stock of life saving medicine for livestock. ➤ Do not free the animals unless all clear or officially advised it is safe.

2.6.2 Poultry

	Suggested contingency measures		
Drought	Before the event^s	During the event	After the event
Shortage of feed ingredients	<ul style="list-style-type: none"> ➤ There should be availability of feed, feed ingredients and mineral mixtures with sufficient storage capacity for 	<ul style="list-style-type: none"> ➤ Adaptation of proper distribution policy as per requirement with transport facility. ➤ Supply of feed ingredients through 	<ul style="list-style-type: none"> ➤ Readiness for feed, feed ingredients and mineral mixtures as and when required

	<p>every district.</p> <ul style="list-style-type: none"> ➤ Registration of poultry farms made compulsory to make it easier to be prepared and provide quick help to the farmers ➤ Storage of feed ingredients of previous year in sufficient quantity to use in scarcity period. ➤ Identification and storage of locally available feed ingredients as a substitute for scarce ingredients. ➤ A farm disaster kit should be prepared in advance. The kit should be placed in a central location and everyone should know where it is. The contents of the kit must be checked regularly to ensure fresh and complete supplies. The following items should be included in the kit in addition to the items that are used everyday: <ul style="list-style-type: none"> – Updated list of all farms with information about birds, their location and records of feeding, vaccination, tests. – Basic first aid kit. – Handling equipment & cages. – Waterer and feeders. – Sanitation and disinfection equipments & chemicals. – Other safety and emergency items for vehicles and trailers, e.g., Extra tyres, winches, tools, etc. ➤ Maize grain is limiting source as a feed ingredient in poultry feed. ➤ Store maize for poultry feed. ➤ Substitute feed ingredient should be tapped as replacement for maize grain which can be used for poultry feed. ➤ Concentrate ingredients such as Grains, brans, & oilseed cakes, low grade 	<p>government channel to the end users at reduced price.</p> <ul style="list-style-type: none"> ➤ Make sure that birds receive adequate quantity and essential nutrients through feed to minimize stress and to prevent occurrence of disease outbreaks. ➤ Crucial use of available feed avoiding excess feeding and wastage of the feed. ➤ Stored feed ingredients will be utilized during contingency. ➤ Birds should be evacuated and taken to shelters as soon as there is news of an imminent disaster. Every flock must have some form of durable and visible identification. ➤ There should be arrangements for appropriate transport, suitable for birds. Stranded birds should be rescued and taken to safer places. ➤ If the stranded place is considered safe for the next week or so, the birds may be left there but should be provided with feed and drinking water. ➤ Arrangements should be made so that veterinary and Para- veterinary personnel can quickly reach all affected farms to provide necessary measures. ➤ Officials and other personnel engaged in relief work should also gather intelligence on the extent and nature of the damage to individual farms and villages so that appropriate relief measures can be implemented. ➤ Adequate nutrition should be given to birds to keep their health in proper condition. ➤ The available ingredients as poultry feed should be used with utmost care. ➤ Non-conventional feed ingredients can also be tapped to use as a poultry feed taking into consideration the anti- 	<p>for each districts with transport facility.</p> <ul style="list-style-type: none"> ➤ Strategies to minimize the effects of stress due to drought by optimum feeding and management of the flock. ➤ Use of mineral and vitamin supplements to reduce stress. ➤ Follow up of affected livestock for adequate feed supply. ➤ Proper utilization of the resources should be carried out. The situation should be assessed properly and decision has to be taken on which birds to be treated first and how. ➤ The birds that are in very poor condition with no chance of recovery should be culled in humane manner. ➤ The dead birds should be disposed off in hygienic manner by burial or incineration. ➤ The situation at the farm also should be assessed and the corrective measures should be taken as soon as possible. All damages should be repaired and shed should be made functional. Disinfection of the premises and shed should be carried to prevent spread of diseases. ➤ The stress on poultry due to shortage of feed during drought period can be minimized by proper feeding of the birds after drought period. ➤ Ad lib. feeding to compensate the egg production.
--	---	---	--

	grains, Govt. Godowns wastes, grains unfit for human consumption etc. should be procured. ➤ Ban on export of oilseed meals needs to be implemented. ➤ Feed required for broilers 3.5 kg./bird for six weeks. For Layers 55 kg /layer bird for a period of 72 weeks.	nutritional factors present in it. ➤ Alternate day feeding for broilers. ➤ Avoid feed wastage. ➤ Restricted feeding for layers. ➤ Poor layer birds to be culled. ➤ Broiler rear up to 4 weeks only. ➤ Use of feed additives be enhanced to maximize the feed efficiency.	➤ Feed additives may be used to maximize production
--	---	--	---

	Suggested contingency measures		
Drought	Before the event ^s	During the event	After the event
Drinking water	➤ Water resources as in general are inadequate and hence the resources should be trapped and increased. ➤ Conservation of water for drought period. ➤ Water conservations measures adopted to increase water table like recharging of bore wells. ➤ Available water resources should be tapped and reserved. ➤ Leak proof water supply systems. ➤ Available rain water harvesting technique should be adopted i.e. farm ponds etc. ➤ Water conservations measures be adopted to increase water table. ➤ Judicious use of water. ➤ Use of nipples as waterers.	➤ Special distribution and carrying capacity should be implemented from other available resources for poultry. ➤ Optimum use of available water as per the requirement of birds. ➤ Supply of adequate water to farms with transportation facility. ➤ Supply of water through tankers during contingency. ➤ Judicious use of water. ➤ Use of nipples as waterers.	➤ Permanent water resources should be developed even after the event with campaign for public awareness. ➤ Evaluation and fine tuning of the contingency majors. ➤ Ensure clean, cold water supply to birds. ➤ Steps should be taken to conserve water and to develop permanent water resources. ➤ Fresh and ad lib. water should be provided.

	Suggested contingency measures		
Drought	Before the event ^s	During the event	After the event
Health and disease management	➤ Personnel should be trained for health and disease management of poultry through trainings and list of	➤ Services of trained personnel need to be made available in affected area with sufficient supply of medicine, mineral mixture and vaccine for poultry. ➤ Immediate attention to diseased birds by	➤ Routine training programmed as a refresher course need to be implemented in relation to health and disease management during drought with stock of life saving medicine and vaccine for poultry to prevent outbreak. Proper

	<p>trained personnel should be available at each district head quarter with stock of medicine, mineral mixture and vaccine for poultry.</p> <ul style="list-style-type: none"> ➤ Regular and strict vaccination of birds. ➤ Vaccination of wild birds through water whenever possible. ➤ Deworming of birds before and after drought period. ➤ Appointment of veterinarian on farms made compulsory. 	<p>veterinarians.</p> <ul style="list-style-type: none"> ➤ Regular visits of veterinarians to detect diseased birds and veterinary care ➤ Vaccination of birds if necessary. ➤ If there is occurrence of disease, affected birds should be kept isolated and treated properly and promptly. ➤ Periodic disinfection and disinfestations of farm and premises. ➤ Measures to minimize risk of spreading contagious diseases. ➤ Birds should be checked for injury/ signs of disease. ➤ Antibiotic through water ➤ Anti-stress supplements ➤ Multivitamin supplements ➤ Bio-security measures to be implemented. ➤ Proper disposal of poultry carcass. 	<p>disposal system of poultry carcasses.</p> <ul style="list-style-type: none"> ➤ Efforts to minimize effects of stress through optimum feeding, management and veterinary care. ➤ Assessment of losses due to mortality if any. ➤ Proper disposal of carcass. ➤ There will be stress on birds due to deterioration of health during drought period. Hence proper feeding should be done to minimize the stress on birds by supplying vitamin supplements. ➤ Birds should be tested at regular interval to confirm that they are free of contagious diseases. ➤ Proper disposal of birds died of various diseases. ➤ Vaccination. ➤ Replacement of stock.
--	--	---	---

	Suggested contingency measures		
Floods	Before the event ^s	During the event	After the event
Shortage of feed ingredients	<ul style="list-style-type: none"> ➤ Poultry owners needs to be advised to be in readiness for- ➤ Alternate poultry sheds with feed stock at safe places. ➤ Displacement of stock- transport arrangements. ➤ Registration of poultry farms made compulsory to make it easier to be prepared and provide quick help to the farmers ➤ Measures to avoid spoilage of feed stores due to water. ➤ Construction of feed stores to stores feed sufficient for at least one month. ➤ Farmers will be encouraged to purchase and store the feed ingredient when it is cheaply available in the market. ➤ Information at every district head quarter regarding availability of feed and feed ingredients and 	<ul style="list-style-type: none"> ➤ Shifting of birds at Alternate poultry sheds with feed stock at safe places. ➤ Stress reducing measures to be adopted. ➤ Feed and feed ingredients resources should be exploited with sufficient transport facilities from other areas of the district. ➤ Adequate nutrition should be given to birds to keep their health in proper condition. ➤ Judicious use of available feed. 	<ul style="list-style-type: none"> ➤ Shifting at original site after repair of the shades and restoration of the necessary facilities. ➤ Proper feeding should be done to minimize the stress on birds ➤ Ensure good quality feed and fodder supply to birds ➤ Feed and feed ingredients resources should be exploited with sufficient transport facilities from other areas of the district even after the event.

	mineral mixture resources from other areas.		
	Suggested contingency measures		
Floods	Before the event^s	During the event	After the event
Drinking water	<ul style="list-style-type: none"> ➤ Arrangement of clean and hygienic water. ➤ Leak and contamination proof water supply system. ➤ Installations of the watering systems targeted to optimum use of available water avoiding water wastage. ➤ Source of water should be away from flood affected areas. ➤ Sufficient storage capacity should be made available particularly during rainy season in view of the forecasting of flood. ➤ Encourage the farmers for rain water harvesting. ➤ Proper utilization of Water to save water. 	<ul style="list-style-type: none"> ➤ Sufficient facility for transportation with advanced proper planning should be made in the areas of each district. ➤ Water treatment to avoid entry of pathogens through drinking water. ➤ Judicious use of potable chlorinated water. ➤ Avoid contamination of wells and tube wells by flood water. ➤ Proper utilization of Water to save water. ➤ Supply of water through tankers during contingency. ➤ Water purification measures for ensuring hygienic water supply. 	<ul style="list-style-type: none"> ➤ Actions to rectify the water related issues observed during flood period. ➤ Ensure potable water supply to birds. ➤ Sufficient infrastructure facility for transportation with advanced proper planning should be made in the areas of each district. ➤ Sources of potable drinking water should be tapped for its proper use. ➤ Use of disinfected water. ➤ Arrangements of hygienic water supply.
	Suggested contingency measures		
Floods	Before the event^s	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter for flood affecting areas with stock of medicine, mineral mixture and vaccine for poultry. ➤ Vaccination and deworming schedule should be observed strictly. ➤ Additional deworming can be carried out before and after floods. ➤ Medicine store facility with availability of adequate drugs at each farm and veterinary dispensaries. ➤ Training of farmers to identify 	<ul style="list-style-type: none"> ➤ Services of trained personnel need to be made available in affected area with sufficient supply of medicine, mineral mixture and vaccine. ➤ During flood if it is difficult to shift and manage large number of birds, they should be slaughtered and sent to cold storage. ➤ Vaccination against contagious diseases. ➤ Proper disposal of birds died of diseases particularly contagious 	<ul style="list-style-type: none"> ➤ Routine training programmed as a refresher course need to be implemented in relation to health and disease management during flood with stock of medicine and vaccine for poultry to prevent outbreak. Proper disposal system of poultry carcasses. ➤ Cleaning and disinfection of poultry farms. ➤ Monitoring for disease outbreaks in birds through regular farm visits by veterinarian. ➤ Proper disposal of carcass is very important in flood affected areas from public health point of view. ➤ Vaccination for RD and IBD to avoid outbreaks . ➤ Anti-stress treatment of birds is important to prevent mortality. ➤ Preventive measures should be taken to reduce occurrence of diseases, particularly use of antibiotics in drinking water.

	<p>signs of common contagious diseases particularly to avoid outbreaks.</p> <p>➤ Do not built poultry house on nalla or stream or otherwise remove the birds before monsoon from such poultry house.</p>	<p>diseases.</p> <p>➤ Disinfection of sheds be undertaken.</p> <p>➤ Immediate veterinary help to the farms.</p> <p>➤ Adequate proper feeding and management.</p>	<p>➤ Hygienic measures should be followed.</p> <p>➤ Birds should be served for emerging infectious diseases.</p> <p>➤ Restriction on movement of the birds.</p> <p>➤ Compensation of the loss.</p>
	Suggested contingency measures		
Cyclone	Before the event^s	During the event	After the event
Shortage of feed ingredients	<p>➤ Information at every district head quarter regarding availability of feed and feed ingredients and mineral mixture resources from other areas with storage facility.</p>	<p>➤ Feed and feed ingredients resources should be exploited with sufficient transport and storage facilities from other areas of the district.</p>	<p>➤ Feed and feed ingredients resources should be exploited with sufficient transport and storage facilities from other areas of the district even after the event.</p>
	Suggested contingency measures		
Cyclone	Before the event^s	During the event	After the event
Drinking water	<p>➤ Sufficient storage capacity should be made available particularly during rainy season in view of the forecasting of the cyclone.</p>	<p>➤ Sufficient facility for transportation with advanced proper planning should be made in the areas of each district.</p>	<p>➤ Sufficient infrastructure facility for transportation with advanced proper planning should be made in the areas of each district.</p>

	Suggested contingency measures		
Cyclone	Before the event^s	During the event	After the event
Health and disease management	<p>➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter during heat and cold waves with stock of life saving medicine, vaccine,</p>	<p>➤ Services of trained personnel need to be made available in affected area with facilities to overcome heat waves through water availability and cold through proper closed shelter with sufficient supply of medicine and vaccine for poultry. During heat fogging system should be ready and during cold artificial heat through electricity need to be provided.</p> <p>➤ Detection & treatment of ailing birds.</p> <p>➤ Vaccination against contagious diseases.</p> <p>➤ Antistressor preparations or multivitamins preparations through drinking water during stress.</p> <p>➤ <i>Ad. lib.</i> Cold water availability</p> <p>➤ Supply of medicine and vaccine for poultry.</p> <p>➤ Feed in cool hrs and increase the frequency of feeding with</p>	<p>➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during heat and cold waves with stock of medicine and vaccine for poultry and sufficient arrangement.</p> <p>➤ Anti- stress to relieve stress.</p> <p>➤ Birds should be monitored for occurrence of diseases.</p> <p>➤ Vaccination to avoid</p>

	feed and mineral mixture for poultry.	high density feeds. ➤ Mineral & Vitamin supplementation	outbreaks. ➤ Proper disposal of poultry carcasses.
--	---------------------------------------	--	---

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event ^a	During the event	After the event
1) Drought			
A. Capture			
Marine	Not applicable	Not applicable	Not applicable
Inland			
(i) Shallow water depth due to insufficient rains/inflow	Need to implement cost-effective water efficiency and conservation measures in very early stage to handle the drought. Strategic plan should be made to construct bunds & conserve water in drought prone areas.	In severe drought condition Most of the stock can be harvested immediately while Some portion of the local aquatic species should be transfer to the less affected areas so as to conserve them and reintroduce in its regional habitat.	Water policies should be determined If we want to restore our inland fishery resources. Need to set up hatcheries for drought affected fish species to avoid their extinction, and the conserved species once again need to be reintroduced in their original habitats after achieving desired aquatic environment.
(ii) Changes in water quality	Regular monitoring of water quality	Need to harvest the stock to minimize economic losses before mass mortality due to undesired water quality.	After achieving desired water quality, conserved species once again need to be reintroduced in their original habitats.
(iii) Any other	Gene bank should be made for all indigenous local commercially & ecologically important species.	To conserve the endangered species breeding and rearing indoor facility may be created for future restoration.	The conserved species once again need to be reintroduced in their original habitats after achieving desired aquatic environment.
B. Aquaculture			

(i) Shallow water in ponds due to insufficient rains/inflow	Water temperature may get raised and also Dissolved Oxygen level may get declined, hence efforts should be made to increase the depth of pond & avoid water seepage by using bentonite clay, plastic liners etc. also artificial oxygenation systems as aerators etc. should be incorporated in aquaculture system.	Water recycling with the aid of potential filtration systems can be applied if available. Provide artificial oxygenation. If water level is too much low, can lead to mass mortality due to environmental stress hence it will be better to harvest the stock immediately.	Construction of small reservoirs or dams should be newly developed in drought prone area. Identifying culturable air breathing species / hardy species (e.g. <i>Notopterus</i> , <i>Clarius</i> , <i>Puntius</i> etc.) suitable to the regional aquatic environment.
(ii) Impact of salt load build up in ponds / change in water quality	Throughout the culture period salinity & other parameters should be checked for regular intervals. Fresh water storage ponds should be developed at aquaculture site.	Fresh water from the storage ponds can be utilized for maintaining salinity.	Identifying best suitable euryhaline spp. (Pearl spot, Sea bass, Rabbit fish, mullets etc.) for the culture which can tolerate wide range of salinity.
(iii) Any other	--	--	--

2) Floods			
A. Capture			

Marine	<p>Disaster preparedness mission through Sea walls, Embankment. In future early warning systems and evacuation strategy planning for flood prone areas.</p> <p>Plan of Preventive measures against the epidemiological diseases, like malaria, cholera, <i>dengue</i> etc. among coastal communities .</p> <p>Educating coastal population about Disaster mitigation and provision of good transport means in coastal areas prior to the Flooding event which will be helpful for rescue operations.</p>	<p>Aid to populations at the affected zones and shelters.</p> <p>Affected population should be provided with adequate food & medicines in time.</p>	<p>National & international financial support for research on the various aspects of the flood will be needed for future strategies.</p> <p>Microfinance to the affected population by Governmental & Non Governmental Organization to reconstruct their socio-economic status.</p> <p>Control of vector-borne endemic and epidemic diseases.</p> <p>Mangrove plantation & conservation strategies should be adopted in estuarine region for minimizing future risk.</p>
Inland	<p>In future early warning systems and evacuation strategy planning for flood prone areas.</p> <p>Awareness of People living in rural zones, or urban margins with regards to the geography of their area as they do not take into account whether they are on a river's flood plain, an unstable hillside, a dry river bed in a flooding area, etc., when they (fisheries community) build their houses.</p> <p>More emphasis should be given on the maintenance of public infrastructure, such as highways, secondary roads and bridges prior to the flooding event which will be helpful for rescue operations.</p> <p>Awareness should be created for using good materials for their construction of houses.</p> <p>Strategic planning to build up local rescue teams in flood prone areas.</p>	<p>Aid to populations at the affected zones and shelters.</p> <p>Timely help to populations at the affected zones and shelters.</p> <p>Affected population should be provided with adequate food & medicines in time.</p>	<p>Diversifying course of flooding river to minimize socio-economic losses.</p> <p>Microfinance to the affected population by Governmental & Non Governmental Organization to reconstruct their socio-economic status.</p>
(i) Average compensation paid due to loss of human life	Not applicable		
(ii) No. of boats / nets/damaged	Not applicable		

(iii) No. of houses damaged	Not applicable		
(iv) Loss of stock	Not applicable		
(v) Changes in water quality	Not applicable		
(vi) Health and diseases	Preventive measures of Plan of the Health Ministry for the prevention of epidemiological diseases, like malaria, cholera, <i>dengue</i> etc. & vaccination in flood prone area.	Affected population should be provided with adequate food & medicines in time.	Control of vector-borne endemic and epidemic diseases.

B. Aquaculture			
(ii) Inundation with flood water	Early warning systems should be developed to minimize future risk. Elevating the height of peripheral dykes of the aquaculture ponds. Providing elevated net fencing on the bunds to the avoid loss of fish during flooding.	Need to harvest the stock as early as possible to minimize economic losses	Drain out excess water, disinfecting and refilling the ponds with water and restocking by adopting standard aquaculture protocols.
(ii) Water contamination and changes in water quality	Elevating the peripheral dykes of the aquaculture ponds.	Need to harvest the stock as early as possible to minimize economic losses	Drain out all the water from the pond and refill it with good quality water for future crop.
(iii) Health and diseases	Adequate vaccination of fish stocks prior to flooding event is recommended to minimize the risk.	In situ observations & analysis of health status of cultivable species and stress inducing factors and recommendation of treatments to specific diseases.	Quarantining of culture pond before next stocking.
(iv) Loss of stock and inputs (feed, chemicals etc)	Elevating the peripheral dykes of the aquaculture ponds and good indoor storage facility for inputs.	Early harvest of the stock and transport of inputs to the safer places.	Use new stock.
(v) Infrastructure damage (pumps, aerators, huts etc)	Elevating the peripheral dykes of the aquaculture ponds and good indoor storage facility for the pumps & aerators in flood condition.	Transport of the pumps, aerators etc. to the safer places.	Insurance and micro-finance for repair and maintenance of the infrastructure.

(vi) Any other	-	-	-

3. Cyclone / Tsunami			
A.Capture			
Marine	<p>Timely Communication of weather forecasting to fishermen</p> <p>Implementation of Tsunami detection & warning system in Indian ocean and evacuation strategy planning for Cyclone / Tsunami prone area.</p> <p>Disaster preparedness mission through Sea walls, Embankment</p> <p>Provision of Wave breakers & dry docks for fishing vessel security.</p> <p>Encouragement and financial incentives should be given to fishermen to carry Safety Devices on their fishing crafts.</p> <p>Educating coastal population about Disaster mitigation and provision of good transport means in coastal areas prior to the Cyclone / Tsunami event which will be helpful for rescue operations.</p> <p>Preventive measures for the prevention of epidemiological diseases, like malaria, cholera, dengue etc</p>	<p>Timely aid to coastal populations at the affected zones and provision of shelters.</p> <p>Affected population should be provided with adequate food & medicines in time.</p>	<p>Microfinance to the affected population by Governmental & Non Governmental Organization to rebuild their socio-economic status.</p> <p>Control of vector-borne endemic and epidemic diseases;</p> <p>National & international financial support for research on the various aspects of the Cyclone / Tsunami will be needed for the planning of future strategies.</p> <p>Mangrove conservation, plantation strategies should be adopted in estuarine / coastal region for minimizing future risk</p>
(i) Average compensation paid due to loss of fishermen lives	---	---	---
(ii) Avg. no. of boats / nets/damaged	---	---	---

(iii) Avg. no. of houses damaged	---	---	---
Inland	Timely Communication of weather forecasting to fishermen Encouragement and financial incentives should be given to fishermen to carry safety devices on their fishing crafts	Timely aid to coastal populations at the affected zones and provision of shelters. Affected population should be provided with adequate food & medicines in time.	Microfinance to the affected population by Governmental & Non Governmental Organization to rebuild their socio-economic status. Rehabilitation of fishermen communities.
B. Aquaculture			
(i) Overflow / flooding of ponds	Elevating the peripheral dykes of the aquaculture ponds Early warning systems should be developed to minimize future risk.	In very initial stage prior to flooding, need to harvest the stock as early as possible to minimize economic losses. In severe condition nothing can be controlled.	Drain out excess water, disinfecting and refilling the ponds with water and restocking by adopting standard aquaculture protocols.
(ii) Changes in water quality (fresh water / brackish water ratio)	Elevating the peripheral dykes of the aquaculture ponds. Regular monitoring of water quality.	Fresh water from the storage ponds can be utilized for maintaining salinity.	Drain out excess water, After achieving desired water quality, restocking by adopting standard aquaculture protocols.
(iii) Health and diseases	Adequate vaccination of the stocks prior to this is recommended to minimize the risk	In situ observations & analysis of health status of cultivable species and stress inducing factors and recommendation of treatments to specific diseases.	Disinfecting / Quarantining of culture pond before the next stocking.
(iv) Loss of stock and inputs (feed, chemicals etc)	Elevating the peripheral dykes of the aquaculture ponds and good indoor storage facility for inputs.	Early harvest of the stock and transport of inputs to the safer places.	Use new stock.
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	Elevating the peripheral dykes of the aquaculture ponds and Initial provision of good indoor storage facility for pumps & aerators .	Transport of the pumps, aerators etc. to the safer places.	Insurance and microfinance with low interest from Govt. for the repair and maintainance of the infrastucture.
(vi) Any other	---	---	---
4. Heat wave and cold wave			

A. Capture			
Marine	Not applicable		
Inland	Not applicable		
B. Aquaculture			
(i) Changes in pond environment (water quality)	Depth of the aquaculture ponds should be increased to minimize thermal stress. Plantation at the peripheral dykes of aquaculture ponds can be recommended.	Aerators should properly utilized for the good circulation of water maintaining good pond environment.	Identification of best suitable eurythermic spp. for aquaculture to tolerate wide temperature range.
(ii) Health and Disease management	Maintaining water parameters at desired levels can reduce the stressful condition & can avoid disease.	Aerators should properly utilized for the good circulation of water maintaining optimum water quality.	Early warning systems should be developed to minimize future risk. Identification of hardy species for aquaculture practices.
(iii) Any other	---	---	---

^a based on forewarning wherever available

RAIGAD

State: MAHARASHTRA
Agriculture Contingency Plan for District: RAIGAD

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Sub Region (ICAR)	Western Ghats And Coastal Plain, Hot Humid-Perhumid Eco-Region (19.3) Western Ghats And Coastal Plain, Hot Humid-Perhumid Eco-Region (19.1)		
	Agro-Climatic Zone (Planning Commission)	West Coast Plains And Ghat Region (XII)		
	Agro Climatic Zone (NARP)	North Konkan Coastal Zone (MH-2)		
	List all the districts or part thereof falling under the NARP Zone	Thane and Raigad		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		18°30'56.71" N 17 ° 51 '19.80' N	94°15'37.25" E 72 °51' 73.40" E	38 M
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Dr. L. S. Chavan, Associate Director of Research, Regional Agricultural Research Station, Karjat- 410 201 , Dist. Raigad		
	Mention the KVK located in the district	Krishi Vidyanan Kendra, Roha-402 109, Dist. Raigad		
	Name and address of the nearest Agromet Field Unit for agro-advisories in the zone	Technical Officer, Integrated Agro Advisory Services, Department of Agronomy, Dr. B.S. Konkan Krishi Vidyapeeth, Dapoli - 415 712, Dist. Ratnagiri (M.S.)		
1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset (specify week and month)
	SW monsoon (June-September):	2922.3	84	1 st week of June
	NE Monsoon(October -December):	-	-	-
	Post Monsoon shower	124.3	6	2 nd week of October
	Winter (January- February)	2.8	0	-
	Summer (March-May)	32.1	1	-
	Annual	3081.6	91	-

1.3	Land use pattern of the district (latest statistics)	Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	687	203	172.54	52	37	57	31	104	31	23

Source – District Socio-economic Review -2014-15 (Directorate of Economic & Statistics, Govt. of Maharashtra)

1.4	Major Soils (common names like red sandy loam deep soils) (Medium black soils)	Area ('000'ha)	Percent (%) of total geographical area
	Shallow soils	453.8	66.1
	Medium deep soils	233.0	33.9
	Deep soils	0.2	0.03

Source :- NBSS & LUP, Nagpur

1.5	Agricultural land use	Area ('000'ha)	Cropping intensity %
	Net sown area	203	114.8
	Area sown more than once	30	
	Gross cropped area	233	

Source – District Socio-economic Review -2014-15 (Directorate of Economic & Statistics, Govt. of Maharashtra)

1.6	Irrigation	Area ('000'ha)		
	Net irrigated area	7.16		
	Gross irrigated area	11.91		
	Rainfed area	188.1		
	Sources of Irrigation	Number	Area ('000'ha)	Percentage of total irrigated area
	Canals		5.6	37.6
	Tanks	-	-	-
	Open wells	5426	9.3	62.4

	Bore wells	85		
	Lift irrigation schemes			
	Micro-irrigation			
	Other sources (please specify)			
	Total Irrigated Area		14.9	
	Pump sets	13685		
	No. of Tractors	118		

Source – District Socio-economic Review -2014-15 (Directorate of Economic & Statistics, Govt. of Maharashtra)

	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tahsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	--	--	--
	Critical	--	--	--
	Semi- critical	--	--	--
	Safe	--	46% of ground water is exploited	--
	Wastewater availability and use	--	--	--
	Ground water quality			

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

1.7 Area under major field crops & horticulture etc.

1.7	Major Field crops cultivated	Area ('000'ha)				
		<i>Kharif</i>		<i>Rabi</i>		<i>Summer</i>
		Irrigated	Rainfed	Irrigated	Rainfed	Total
	Rice	--	124	6.2	--	130
	Pulses (Lab lab bean, cowpea, black gram, horse gram, etc.)	--	2.1	11.7	--	13.8
	Finger millets	--	11	--	--	11
	Prosomillet	--	1.3		--	3.9
	Groundnut	--	0.0	0.2	--	1
	Mustard and sasamum	--		0.1	--	
	Horticultural crops – Fruits	Total Area ('000'ha)				
	Mango	12.433				
	Cashew	12.7				
	Sapota	0.8				
	Other fruit crops	2.9				
	Horticulture crops – Vegetables					
	Okra, Brinja, Chillil and Leafy vegetables etc.	4.21				
	Plantation crops	-				
	Coconut	3.9				
	Arecanut	0.9				
	Fodder crops	38				

Source :- Krishi Utpadan Karyakramachi Rupresha, Kharif and Rabi Hangam - 2010-11, Vibhagiy Sabha, Konkan Mahsul Vibhag.
Dept. of Agriculture, Govt. of Maharashtra

1.8	Livestock	Male	Female	Total
	Non descriptive Cattle (local low yielding)	213658	181850	395508
	Crossbred cattle	3922	6410	10332
	Non descriptive Buffaloes (local low yielding)	5601	57306	62907
	Graded Buffaloes	0	0	0
	Goat	35674	88249	123923
	Sheep	56	70	126
	Others (Camel, Pig, Yak etc.)			
	Commercial dairy farms (Number)			NA

1.9	Poultry	No. of farms	Total No. of birds
	Commercial	Data are not available	3576786
	Backyard	Data are not available	956925

Source : Maharashtra Animal and Fisheries Science University, Nagpur

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)	
	65430	2588	640	271880		39	
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
		-		555		-	
	B. Culture						
		Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)	
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)	Data are not available		Data are not available		39.505	
	ii) Fresh water (Data Source: Fisheries Department)	Data are not available		Data are not available		1.0	

1.11 Production and Productivity of major crops (Average of last 5 years)

1.11	Name of crop	<i>Kharif</i>		Rabi-Summer		Summer		Total		Crop residue as fodder ('000 tons)
		Production (00't)	Productivity (kg/ha)	Production (00't)	Productivity (kg/ha)	Production ('00 t)	Productivity (kg/ha)	Production (00't)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Rice	3425	2411	228	2651	---	---	3205	2426	-
	Finger millet	80	777	-	-	---	---	80	777	-
	Proso millet	99	548	-	-	---	---	23	548	-
	Pulses	40	667	57	479	---	---	73	510	--
	Groundnut	0.04	1600	4	2000	---	---	8	800	-
	Mustard and sasamum	0.024	300	1	500					-

Source :- Krishi Utpadan Karyakramachi Rupresha, Kharif and Rabi Hangam - 2010-11, Vibhagiy Sabha, Konkan Mahsul Vibhag.
Dept. of Agriculture, Govt. of Maharashtra

		Total production (00't)	Total Productivity (Kg/ha)
1	Mango	179.3	1512
2	Cashew	11.4	366
3	Coconuts	172 Lack nuts	42 nut /plam
4	Sapota	7.8	4200

Source – District Socio-economic Review –2014-15 (Directorate of Economic & Statistics, Govt. of Maharashtra)

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Rice	Finger millets	Groundnut	Wal (Lablab bean)	Blackgram
	Kharif- Rainfed	25 th May to 25 th June	1 st fortnight of June	--	--	----
	Kharif-Irrigated					
	Rabi- Rainfed					
	Rabi-Irrigated	2 nd fortnight of November		2 nd fortnight of December	15 th October to 15 th November (Cowpea, Wal, Horse gram, Black gram, Green gram)	

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) 1. Rice :- : Stem borer, Bacterial blight, Blast 2. Finger millet :- Bacterial blight, Blast 3. Groundnut :- Early and late leaf spot 4. Mango :- Mealy bug, thrips, fruit fly 5. Cashew :- Tea mosquito bug, thrips, 6. Areca nut :- Koleroga, Inflorescence blight and Ganoderma rot.. 7. Coconut :- Rhinoceros beetle, eriophyid mite 8. Pulses :- Damping off & Cuscuta	✓		
	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: No
		Soil map as Annexure 3	Enclosed: Yes

Annexure 1



Annexure - 2

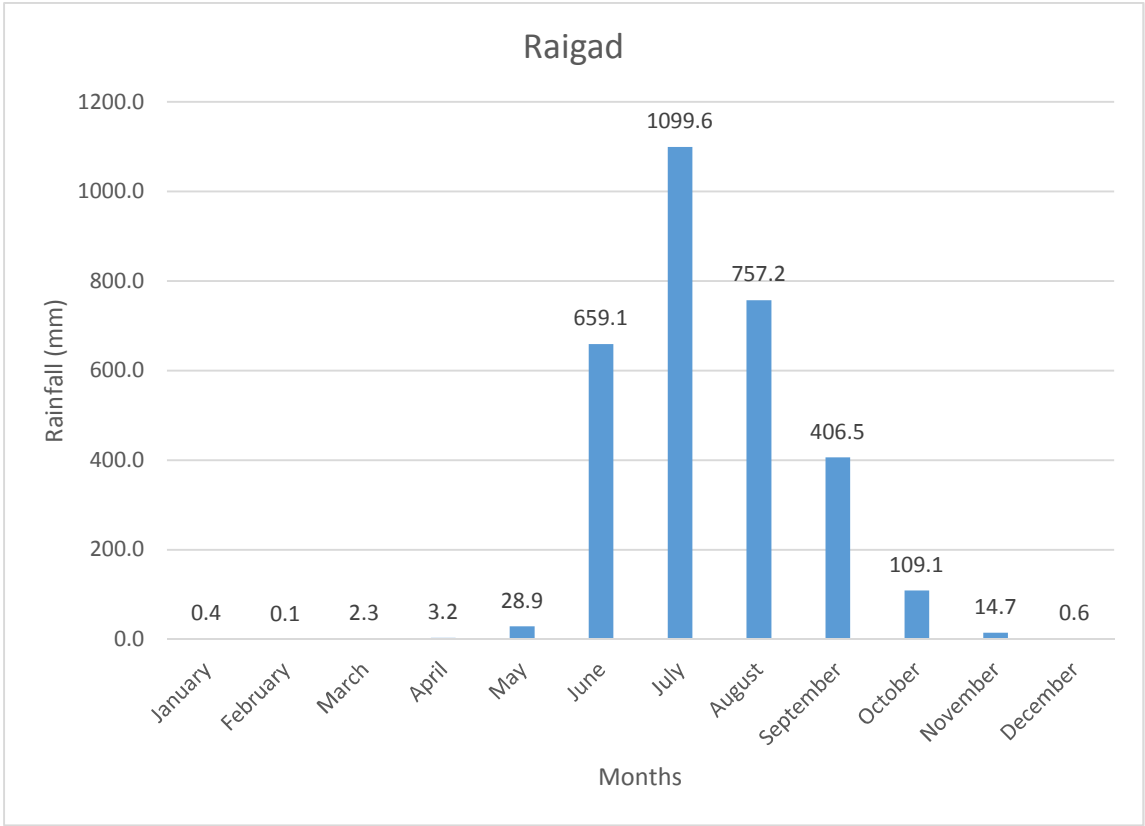
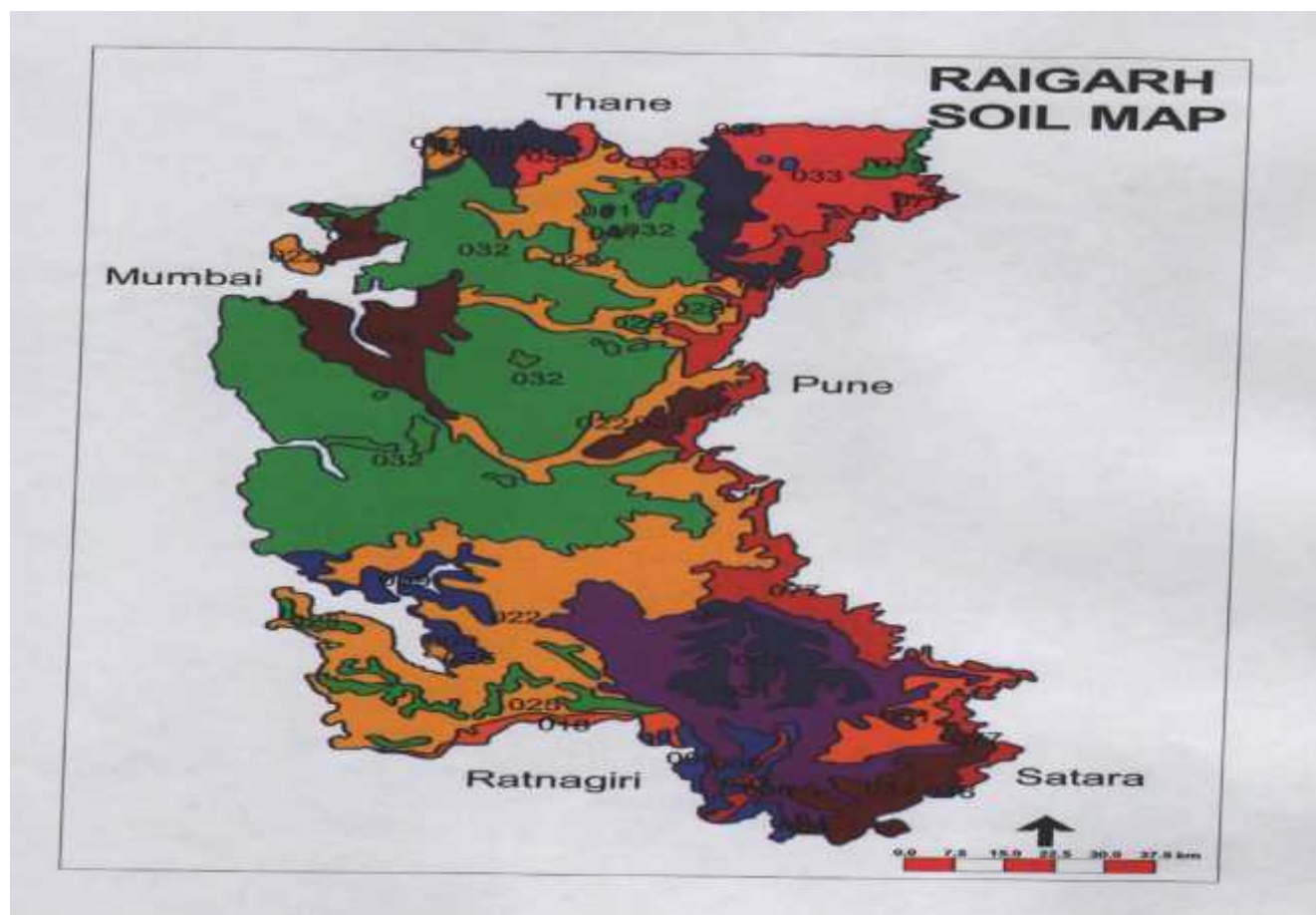


Fig: Mean monthly rainfall (mm) of Raigad District.

Annexure 3



Soil map Raigad district (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 (3 rd week of June)	Upland medium deep to shallow soils	Rice	In case of failure of germination use very early duration variety (Karjat-184, Ratnagiri – 73)	<ul style="list-style-type: none"> • Prepare the seedlings by mat nursery / Dapog method. • If raising of seedling in nursery is not possible, then use direct seeding method (dry or sprouted seeds) 	Procure the seed from Maharashtra State Seed Corporation.
		Finger millet	No change	--	
	Mid-land medium deep soils	Rice	In case of failure of germination use early duration variety (Karjat- 3, Karjat-4, Karjat-7, Ratnagiri-1, Ratnagiri-5, Ratnagiri-24, Ratnagiri-711)	<ul style="list-style-type: none"> • Prepare the seedlings by mat nursery / Dapog method. 	

	Low land deep soils	Rice	In case of failure of germination use mid late duration variety (Karjat-5, Karjat-9, Palghar-1, Palghar-2, Ratnagiri-4)	<ul style="list-style-type: none"> If raising of seedling in nursery is not possible, then use direct seeding method (dry or sprouted seeds) 	
	Hill slope shallow soils	Finger millet	No change	---	
	Khar land	Rice	Use <i>salt tolerant</i> varieties (Panvel -2)	Sowing of sprouted seed	

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 4 weeks (1st week of July)	Upland medium deep to shallow soils	Rice	Use very early duration variety (Karjat-184, Ratnagiri – 73)	Raise the crop by direct seeding method (dry or sprouted seeds)	Source of Seed : Maharashtra State seed corporation and other seed agency
		Finger millet	Cowpea (Var. Konkan Sadabahar), Black gram (TPU- 4) Oil Seed like niger (Var. IGP 76)	--	
	Mid-land medium deep soils	Rice	Use very early duration variety (Karjat-184, Ratnagiri – 73)	Raise the crop by direct seeding method (dry or sprouted seeds)	

	Low land deep soils	Rice	Use early duration variety (Karjat- 3, Karjat-4, Karjat-7, Ratnagiri-1, Ratnagiri-5, Ratnagiri- 24, Ratnagiri-711.)	Raise the crop by direct seeding method (dry or sprouted seeds)	
	Hill slope shallow soils	Finger millet	Grow pulses like cowpea (Var. Konkan Sadabahar), black gram (TPU- 4) Oil Seed like Niger (Var. IGP 76)	-	
		Prosomillet			
	Khar land	Rice	Short duration variety suitable for Kharland (Panvel - 2)	Sowing of sprouted seeds	

Note :- ** Generally such type of situation has not occurred during past years

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 6 weeks (3 rd week of July)	Upland medium deep to shallow soils	Not applicable Note :- ** Generally such type of situation has not occurred during past years			
	Mid-land medium deep soils				
	Low land deep soils				
	Hill slope shallow soils				
	Kharland				

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation

**Delay by 8 weeks (1st Week of August)	Upland medium deep to shallow soils	Not applicable Note :- ** Generally such type of situation has not occurred during past years
	Mid-land medium deep soils	
	Low land deep soils	
	Hill slope shallow soils	
	Kharland	

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Normal onset followed by 15-20 days dry spell at the time of transplanting	Upland medium deep to shallow soils	Rice	<ul style="list-style-type: none"> • Increase number of seedling per hill (5 to 6) or adopt closer spacing (15 x15 cm). • Increase 25% recommended dose of fertilizer. • For shortage of seedling prepare seedling by mat nursery using short duration variety. • Use thomba method. • Dusting with methyl parathion 2% dust @ 25 kg/ha to control armyworm in nursery. 	<ul style="list-style-type: none"> • Protective irrigation for nursery • Protective irrigation after transplanting 	Use water from the outside sources like farm ponds, nalas, streams, rivers for puddling operation
		Finger millet	<ul style="list-style-type: none"> • Increase 25% recommended 	Protective	Use water from the

		Prosomillet	dose of fertilizer <ul style="list-style-type: none"> • Adopt closer spacing (15 x15 cm) 	irrigation after transplanting	outside sources like farm ponds, nalas, streams, rivers, etc.
	Mid-land medium deep soils	Rice	<ul style="list-style-type: none"> • Increase number of seedling per hill (5 to 6) or adopt closer spacing (15 x15 cm) • Increase 25% recommended dose of fertilizer 	<ul style="list-style-type: none"> • Protective irrigation for nursery 	Use water from the outside sources like farm ponds, nalas, streams, rivers for puddling operation
	Low land deep soils	Rice	<ul style="list-style-type: none"> • For shortage of seedling prepare seedling by mat nursery using short duration variety. • Use thomba method • Dusting with methyl parathion 2% dust @ 25 kg/ha to control armyworm in nursery 	<ul style="list-style-type: none"> • Protective irrigation after transplanting 	
	Hill slope shallow soils	Finger millet	<ul style="list-style-type: none"> • Increase 25% recommended dose of fertilizer 	--	
		Prosomillet	<ul style="list-style-type: none"> • Adopt closer spacing (15 x15 cm) 		
	Kharland	Rice	<ul style="list-style-type: none"> • Increase 25% recommended dose of fertilizer • Adopt closer spacing (15 x15 cm) • Dusting with methyl parathion 2% dust @ 25 kg/ha to control armyworm in nursery 	<ul style="list-style-type: none"> • Protective irrigation after transplanting 	Use water from the outside sources like farm ponds, nalas, streams, rivers for protective irrigation

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 & moisture conservation measures	Remarks on Implementation
At vegetative stage	Upland medium deep to shallow soils	Rice	<ul style="list-style-type: none"> Postpone the split dose of Nitrogen application till receipts of rain/protective irrigation Protective irrigation. Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval. Take three sprays of Tricyclazole 1g/lit of water for control of rice blast. 	<ul style="list-style-type: none"> Adopt weed management practices. Apply split dose of Nitrogen after restart of rains Spray % potassium 	Use water from the outside sources like farm ponds, nalas, streams, rivers for protective irrigation
		Finger millet	Protective irrigation	<ul style="list-style-type: none"> Adopt weed management practices. Apply split dose of Nitrogen after restart of rains Spray % potassium 	-
		Prosomillet			-
	Mid-land medium deep soils	Rice	<ul style="list-style-type: none"> Postpone the split dose of Nitrogen application till receipts 	<ul style="list-style-type: none"> Adopt weed management 	Use water from the outside sources like

	Low land deep soils	Rice	<p>of rain/protective irrigation</p> <ul style="list-style-type: none"> • Protective irrigation • Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval. • Take three sprays of Tricyclazole 1g/lit of water for control of rice blast 	<p>practices.</p> <ul style="list-style-type: none"> • Maintain the existing water level in the field. • Apply split dose of Nitrogen after restart of rains <p>Spray % potassium</p>	farm ponds, nalas, streams, rivers for protective irrigation
	Hill slope shallow soils	Finger millet Prosomillet	Give protective irrigation if possible.	<ul style="list-style-type: none"> • Adopt weed management practices. • Apply split dose of Nitrogen after restart of rains 	
	Kharland	Rice	<ul style="list-style-type: none"> • Postpone the split dose of Nitrogen application till receipts of rain/protective irrigation • Protective irrigation • Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval. • Take three sprays of Tricyclazole 1g/lit of water for control of rice blast 	<ul style="list-style-type: none"> • Adopt weed management practices. • Maintain the existing water level in the field. • Apply split dose of Nitrogen after restart of rains • Spray % potassium 	Use water from the outside sources like farm ponds, nalas, streams, rivers for protective irrigation

Condition			Suggested Contingency measures		
Mid season drought	Major Farming	Normal Crop/cropping	Crop management	Soil nutrient &	Remarks on

(long dry spell)	situation	system		moisture conservation measures	Implementation
At flowering/ fruiting stage	Upland medium deep to shallow soils	Rice	<ul style="list-style-type: none">• Protective irrigation• Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval.• Take three sprays of Tricyclazole 1g/lit of water for control of rice blast.	<ul style="list-style-type: none">• Adopt weed management practices.• Maintain the existing water level in the field.• Spray % potassium	Use water from the outside sources like farm ponds, nalas, streams, rivers for protective irrigation
		Finger millet	Protective irrigation.	<ul style="list-style-type: none">• Adopt weed management practices.• Spray % potassium	
		Prosomillet			
	Mid-land medium deep soils	Rice	<ul style="list-style-type: none">• Protective irrigation.• Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval.• Take three sprays of Tricyclazole 1g/lit of water for control of rice blast.	<ul style="list-style-type: none">• Adopt weed management practices.• Maintain the existing water level in the field.• Spray % potassium	
	Low land deep soils	Rice			
	Hill slope shallow soils	Finger millet	Give protective irrigation if possible.	Adopt weed management practices	
		Prosomillet			

	Kharland	Rice	Apply protective irrigation <ul style="list-style-type: none"> Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval. Take three sprays of Tricyclazole 1g/lit of water for control of rice blast. 	<ul style="list-style-type: none"> Adopt weed management practices. Maintain the existing water level in the field. Spray % potassium 	
--	----------	------	---	--	--

Condition			Suggested Contingency measures		
Terminal drought (Early withdrawal of monsoon)	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi crop planning	Remarks on Implementation
	Upland medium deep to shallow soils	Rice	Harvest crop at physiological maturity	• Carry out sowing of Rabi crops as early as possible (Cowpea, groundnut, water melon, leafy vegetables) • Raise the seedlings of chilli, brinjal, cabbage, knol knol)	Source of Seed : Maharashtra State seed corporation and other seed agency
		Finger millet			
		Prosomillet			
	Mid-land medium deep soils	Rice	• Protective irrigation • Harvest crop at physiological maturity	• Carry out sowing of Rabi crops as early as possible (Cowpea, Horse gram, mustard, sweet corn, groundnut, water melon, leafy vegetables) • Raise the seedlings of chilli, brinjal, cabbage, knol knol) • Under flood (field to field) irrigation go for rice cultivation	
	Low land deep soils	Rice			

	Hill slope shallow soils	Finger millet Prosomillet	Harvest crop at physiological maturity	----	
	Kharland	Rice	Harvest crop at physiological maturity	Suitable vegetable crops like sugar beet, radish, spinach, etc.	

Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall	Mid and low land Medium deep to deep soils	Rice (Rabi season)	Use early duration variety (Karjat-3, Karjat-184, Ratnagiri 73, Ratnagiri -1) or Grow short duration pulses viz. cowpea (Var. Konkan Sadabahar), under control irrigation and tail end area	<ul style="list-style-type: none"> Dapog/mat technique of nursery raising. Young seedling transplanting. SRI Technique. 	Source of Seed Maharashtra State Seed corporation and other seed agency
		Groundnut	Prefer short duration variety (Phule pragati) or grow short duration pulses viz. Cowpea (Var. Konkan Sadabahar),	<ul style="list-style-type: none"> If other source of irrigation is available sow the crop as per schedule. 	
		Pulses (Wal, cowpea, green gram)	No change	<ul style="list-style-type: none"> Use micro irrigation (drip or micro sprinkler) 	
		Vegetables (Cucurbitaceous crop, chilli, okra etc.)	Prefer short duration vegetables like Kartoli and leafy vegetables varieties Coriander: Dapoli-1 Radish: Japanies white long, Pusa ketaki Math: Math durangi, Co-1	<ul style="list-style-type: none"> Prepare the seedlings in portrays of vegetables (cucurbitaceous crops, brinjal, chilli) to avoid delay in transplanting. 	
		Water melon	Use short duration varieties		

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	Mid and low land Medium deep to deep soils	Rice (Rabi season)	<ul style="list-style-type: none"> Prefer early duration variety in low land situation (Karjat-3, Karjat-184, Ratnagiri 73, Ratnagiri -1) Grow short duration pulses (cow pea (Var. Konkan Sadabahar), Lab lab bean (Konkan wal no. 1). lab lab bean, horse gram), groundnut (Phule Pragati), vegetables in midland situation 	<ul style="list-style-type: none"> Use SRI Technique for rice cultivation. Adopt Weed management practices Use micro irrigation (drip or micro sprinkler) 	<ul style="list-style-type: none"> Procure the seed from Maharashtra State Seed Corporation
		Groundnut	Prefer short duration variety (Phule Pragati,)	<ul style="list-style-type: none"> Adopt Weed management practices with dry weeder Use micro irrigation (drip or micro sprinkler) Adopt Mulcinhg 	<ul style="list-style-type: none"> Procure the seed from Maharashtra State Seed Corporation
		Pulses (Wal, Cowpea, Green gram)	No change		--
		Vegetables (Cucurbitaceous crop, Chilli, Okra etc.)	Grow Dolichous bean or adopt soil conservation measures for regular vegetables	<ul style="list-style-type: none"> Adopt Weed management practices. Use micro irrigation (drip or micro sprinkler) Adopt mulching 	<ul style="list-style-type: none"> Procure the seed from Maharashtra State Seed Corporation
		Water melon	Either follow the soil conservation measures for water melon or grow short duration pulses		

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

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	Mid and low land Medium deep to deep soils	Rice (Rabi season)	Grow Lab lab bean, horse gram, black gram, bengal gram cowpea, mustard on residual moisture under low land situation.	<ul style="list-style-type: none">• Minimum tillage and sowing of seed by dibbling.• Adopt Weed management practices• Use micro irrigation (drip or micro sprinkler)• Adopt mulching	<ul style="list-style-type: none">• Procure the seed from Maharashtra State Seed Corporation	
		Groundnut	No change			
		Wal (Lablab bean)				
		Pulses (Cowpea, Horsegram, Greengram, Bengalgram, Pea etc.)	No change	<ul style="list-style-type: none">• Adopt Weed management practices• Use micro irrigation (drip or micro sprinkler)• Adopt mulching		
		Vegetables (Cucurbitaceous crop, Chilli, Capsicum, Okra etc.)				
		Water melon				

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	Mid and low land Medium deep to deep soils	Rice (Rabi season)	Wal (lablab bean) - Var. Konkan Wal No. 1, Horse gram - Var. Dapoli – 1, Bengal gram, on residual moisture under low land situation	<ul style="list-style-type: none"> • Minimum tillage and sowing of seed by dibbling, • Relay cropping 	

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
monsoon		Groundnut	Short duration pulses like Bengal Gram, Wal (lablab bean), horse gram, black gram, greengram cowpea (Konkan Sadabahar) on residual moisture. If farm pond water is available grow leafy vegetables.	<ul style="list-style-type: none"> • Minimum tillage and sowing of seed by dibbling, relay cropping • Adopt Weed management practices. • Use micro irrigation (drip or micro sprinkler). • Adopt mulching 	
		Pulses (Cowpea, Horsegram, Green gram, Wal)	No change		
		Vegetables (Cucurbitaceous crop, chilli, okra etc.)	Short duration pulses like Bengal Gram, Wal (lablab bean), horse gram, black gram, greengram cowpea (Konkan Sadabahar) on residual moisture. If farm pond water is available grow leafy vegetables.	<ul style="list-style-type: none"> • Minimum tillage and sowing of seed by dibbling, relay cropping • Adopt Weed management practices. • Use micro irrigation (drip or micro sprinkler). • Adopt mulching 	
		Water melon			

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	Mid and low land Medium deep to deep soils	Rice (Rabi season)	Not applicable		
		Groundnut			
		Wal			

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
		Pulses (Cowpea, Horsegram, Green gram)			
		Vegetables (Cucurbitaceous crop, chilli, okra etc.)			
		Water melon			
Any other condition (specify)		----	----	----	----

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
Rice	<ul style="list-style-type: none"> Spray Cartap Hydrochloride 50SP @ 1.2 g/lit for the management of case worm.. Close water in the field and Drag rope over crop to dislodge the cases after that open the water at one end of the field to collect the cases which can be destroyed afterwards Drain out excess water and spray Propiconazol @ 1ml /lit of water to control sheath blight 	----	Drain out excess water and harvest the crop before lodging	Immediate threshing and drying in shed
Fingermillet	-	-	Harvest the crop before lodging	Immediate threshing and

				drying in shed
Groundnut	Drain out excess water	Drain out excess water 2.Spray mancozeb @ 2.5 g/lit of water to control Tikka and rust disease	Drain out excess water and harvest the crop immediately	Separate the pods immediately and dry in shade.
Blackgram	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water. Harvest the crop at physiological maturity 	Immediate threshing and drying in shed
Horticulture				
Cucurbitaceous crop	Drain out excess water	Drain out excess water	Drain out excess water	-
Solanaceous crop	Drain out excess water	Drain out excess water	Drain out excess water	
Mango	Wait for congenial condition for application of Paclabutrastol @ of 0.75 g/ a.i. per meter average canopy diameter	-	-	-
Banana	<ul style="list-style-type: none"> Drain out excess water Propping with bamboo Spray Hexaconazol @ 1ml/lit of water for control of Sigatoka Leaf spot and blight At pre flowering stage 	<ul style="list-style-type: none"> Drain out excess water. Propping with bamboo 	<ul style="list-style-type: none"> Drain out excess water Propping with bamboo 	--

Heavy rainfall with high speed winds in a short span				
Rice	-	-	Drain out water and harvest the crop at maturity immediately if lodging take place	Immediate threshing and drying in shed
Fingermillet	-	-	Harvest the crop before lodging	Immediate threshing and drying in shed
Groundnut	Drain out excess water	Drain out excess water	Drain out water and harvest at physiological maturity stage	Separate pods immediately and dry in shed
Blackgram	Drain out excess water	Drain out excess water	Drain out water and harvest at	Immediate threshing and

			physiological maturity stage	drying in shed
Horticulture				
Cucurbitaceous crop	Drain out excess water Repair the pendol	Drain out excess water Repair the pendol	Drain out excess water	-
Solanaceous crop	Drain out excess water Do staking	Drain out excess water Do staking	Drain out excess water	-
Mango	<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . • Also apply Bordeaux paste on cut surface and trunk. 	<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . Also apply Bordeaux paste on cut surface and trunk. • Spray Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water for anthracnose. 	<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . Also apply Bordeaux paste on cut surface and trunk. • Collect and utilize fallen fruit immediately for suitable processing. 	<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . • Also apply Bordeaux paste on cut surface and trunk.
Cashew	<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . • Also apply Bordeaux paste on cut surface and trunk. 	<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . • Also apply Bordeaux 	-	

		paste on cut surface and trunk.		
Banana	<ul style="list-style-type: none"> • Drain out excess water • Propping with bamboo 	<ul style="list-style-type: none"> • Drain out excess water • Propping with bamboo • Flowers of broken plant may be used as vegetable 	<ul style="list-style-type: none"> • Drain out excess water • Propping with bamboo • Fruit of broken plants may be used as vegetable. 	-
Outbreak of pests and diseases due to unseasonal rains				
Rice	Spraying of Carbendazim 0.1% or Copper oxy chloride 0.25% or tricyclazole 0.1% to control blast disease	Spraying of Carbendazim 0.1% or Copper oxy chloride 0.25% or tricyclazole 0.1% to control blast disease	-	-
Fingermillet	-	-	-	-
Groundnut	<ul style="list-style-type: none"> • Spraying with carbendazim 0.1% or Propiconazole 0.1% or Tridemorph 0.1% to control early and late leaf spot 	<ul style="list-style-type: none"> • Spraying with carbendazim 0.1% or Propiconazole 0.1% or Tridemorph 0.1% to control early and late leaf spot 	-	-
Horticulture				
Cucurbitaceous crop	----	----	<ul style="list-style-type: none"> • Install Rakshak trap 4 per ha (Cue lure) to control fruit fly • Spray with Copper Oxy Chloride @ 2.5 g/lit of water to control Downey mildew 	----
Solanecious crop	----	----	----	
Mango	<ul style="list-style-type: none"> • Take spray of Lambda Cyhalothrin 5 EC @ 0.6 ml/lit of water and second spray of Imidachloprid 17.8 EC @ 0.3 ml/lit of water for control of mango 	<ul style="list-style-type: none"> • Spraying with 0.2% W.P. sulphur dust or 0.05% hexaconazol to control powdery mildew. 	<ul style="list-style-type: none"> • Install Rakshak trap 4 per ha (Methyl eugenol) to control fruit fly 	<ul style="list-style-type: none"> • Dipping fruits in hot water at 52°C for 10 min. after harvest to control post harvest rot.

	hopper and shoot borer. • Spray Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water for anthracnose			
Cashew	First spray with Profenophos 40EC 1ml/ lit of water, second spray with Lamda cyhalothrin 0.6 ml/ lit of water and third spray with prophenophos 1ml /lit of water @ interval of one month. Sprays starting from leaf flush to control tea mosquito bug.	-	-	-
Arecanut	----	Spraying with 1% Bordeaux mixture or 0.37% copper oxychloride or root feeding four times at monthly intervals (June to sept.) with fosetyl AL 0.3% to control kole rog	----	----
Sapota	Three sprays of Emamectin benzoate 5 SG 0.45 g/lit. or Deltamethrin 2.8 EC @ 1 ml/lit. or Lambda cyhalothrin 5 EC @ 1 ml/lit or profenofos 40 EC @ 1 ml/lit for control of sapota bud borer. The first spray should be given at the fifty per cent flowering i.e. March and subsequent two	For control of Sapota seed borer spraying of Profenophos 40 EC @ 1ml/lit. by the end of monsoon, Therafter Deltamethrin 2.8 EC 1 ml/lit. one month after first spray, Lambda-cyhalothrin 5 EC 1 ml/lit. one month after second	-	Collect and destroy the fallen and infected fruits

	sprays should be given at an interval of one month.	spray and Deltamethrin 2.8 EC/lit one month after third spray Spraying of Metalaxyl + Mancozeb containing complex fungicide @ 0.2% to control fruit drop		
--	---	---	--	--

2.3 Floods

Condition	Suggested contingency measure			
Transient water logging/ partial inundation	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Rice	If washed out resowing of nursery by using mat nursery/sowing of sprouted seed on puddled field	• Drain out excess water	• Drain out excess water	• Drain out excess water. • Immediate harvesting, threshing and drying in shed
Finger millet	Not applicable			
Groundnut				
Blackgram				
Horticulture (Vegetables)				
Cucurbitaceous crop	Resowing	Drain out excess water	Drain out excess water	-
Solanaceous crop	Resowing /Replanting of seedlings	Drain out excess water	Drain out excess water	

Continuous submergence for more than 2 days				
Rice	If washed out resowing of nursery by using mat nursery/ sowing of sprouted seed on puddled field	• Drain out excess water • Apply second dose (40%) of nitrogen after submergence is over	Drain out excess water	• Drain out excess water. • Immediate harvesting, threshing and dry in shed
Finger millet	Not applicable			

Groundnut				
Black gram				
Horticulture (Vegetables)				
Cucurbitaceous crop	Resowing of seeds	Drain out excess water	Drain out excess water	-
Solanaceous crop	Resowing of seeds/ Replanting of seedlings	Drain out excess water	Drain out excess water	

Sea water intrusion				
Rice	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water. Irrigate the affected area with fresh water and drain out, If wash out resowing of nursery with salt tolerant varieties like Panvel -1 and Panvel -2 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water. Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> 1.Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water. Immediate harvesting, threshing and drying in shed.
Fingermilletts	Not applicable			
Groundnut				
Niger				
Black gram				
Horticulture (Vegetables)				
Cucurbitaceous crop	Not applicable	Not applicable	Not applicable	Not applicable
Coconut	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out Mound the crop with soil 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out

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

Extreme event type	Suggested contingency measure ^r			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave				
Mango	<ul style="list-style-type: none"> • Cover with shed net /Protective irrigation • Water spray 	Water spray / 1% Potassium nitrate spray	Collect and destroy dropped fruits	Collect and destroy dropped fruits
Cashew	<ul style="list-style-type: none"> • Cover with shed net /Protective irrigation Water spray 	Protective irrigation	Protective irrigation	----
Coconut	<ul style="list-style-type: none"> • Cover with shed net. • Water spray 	<ul style="list-style-type: none"> • Frequent irrigation 	<ul style="list-style-type: none"> • Frequent irrigation 	<ul style="list-style-type: none"> • Frequent irrigation
Arecanut	<ul style="list-style-type: none"> • Cover with shed net. • Water spray 	<ul style="list-style-type: none"> • Frequent irrigation 	<ul style="list-style-type: none"> • Frequent irrigation 	Frequent irrigation
Cold wave	NA			
Frost	NA			
Hailstorm				
Mango	-	-	Collect and destroy the fallen fruit to avoid the further built-up of pest and disease inoculums	Collect the fallen fruit to avoid the further built-up of pest and disease inoculums
Cyclone				
Mango	<ul style="list-style-type: none"> • Support the young seedlings/grafts 	<ul style="list-style-type: none"> • Proper pruning and disposal of damaged or broken branches 	<ul style="list-style-type: none"> • Proper pruning of damage or broken branches • Collect dropped fruits and use it for suitable processing 	<ul style="list-style-type: none"> • Proper pruning of damage or broken branches • Collect dropped fruits and use it for suitable processing
Cashew	<ul style="list-style-type: none"> • Support the young seedlings/grafts 	<ul style="list-style-type: none"> • Proper pruning and disposal of damaged or broken branches 	<ul style="list-style-type: none"> • Proper pruning of damage or broken branches • Collect fallen nuts market it. 	<ul style="list-style-type: none"> • Proper pruning of damage or broken branches • Collect fallen nuts and store

Coconut	<ul style="list-style-type: none"> • Support the young seedlings 	<ul style="list-style-type: none"> • Immediate disposal of damaged trunk 	<ul style="list-style-type: none"> • Collect fallen tender nuts, market it. 	<ul style="list-style-type: none"> • Collect fallen tender nuts market it.
Arecanut	<ul style="list-style-type: none"> • Support the young seedlings 	<ul style="list-style-type: none"> • Immediate disposal of damaged trunk 	<ul style="list-style-type: none"> • Collect fallen tender nuts market 	<ul style="list-style-type: none"> • Collect fallen tender nuts market it.

2.7 Contingent strategies for Livestock, Poultry & Fisheries

2.7.1 Livestock

	Suggested contingency measures		
Drought	Before the event	During the event	After the event
Feed and fodder availability	<ul style="list-style-type: none"> ➤ Conservation of green fodder as silage dry fodder as hay in flush season for utilization in lean period ➤ Dry fodder available should be processed i.e. Urea treatment of crop residues to enhance their nutritive value. For this inputs such as training of livestock owners, material like urea, polythene sheet etc may be provided free of cost to the livestock owners. ➤ Judicial use of available feed resources by the livestock owners. ➤ Non conventional feed resources such as Neem seed Cake/ Sal seed Meal/ Mango seed Kernels/ Babul pods etc should be collected and stored. ➤ Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains, Govt. Godowns wastes, grains unfit for human consumption etc. should be procured for productive animals. ➤ Urea molasses mineral blocks (UMMB) may be reserved with NDDB, Anand, Gujarat for emergency supply as concentrate. ➤ Sugarcane bagasse, cane tops and molasses form important byproducts. Sugarcane bagasse- is an important feed resource for ruminants. ➤ Tree leaves are easily available. Leaves of neem, mango, banyan, pipal, babul, subabul, mahuva, etc. can be used as green fodder. Tree leaves are good source of protein, calcium, Vitamin A and hence should be reserved for feeding during drought. 	<ul style="list-style-type: none"> ➤ Judicious use of feed resources processed as per type of livestock possessed by the livestock owners. ➤ Distribution of fodder, UMMB blocks, other feed resources stored in the affected area to the livestock owners as per the number and type of livestock possessed. ➤ Mineral supplementation – Mineral mixture be provided for the livestock @50 g/day/Anim. ➤ Disposal/Transfer of the animals in the area having feed resources availability. ➤ Concentrate feeding for productive animals to support minimum production & lifesaving of the important animals. ➤ Other nonproductive animals are to be fed at subsistence level. ➤ Use of food grains for biodiesel and distillaries should be stopped and the grains be spared for productive animals. ➤ Bypass protein concentrate ingredients may be provided in order to harvest maximum nutrients for 	<ul style="list-style-type: none"> ➤ Green fodder production in next Kharip season needs to be undertaken as a source of fodder at earliest. ➤ Mineral Supplementation should be continued. ➤ Concentrate feeding for productive animals so as to compensate the body condition and production. ➤ The animals must be brought into cyclic stage for reproduction. ➤ Young crossbred livestock needs to be attended properly so as to harness the high productivity. ➤ <i>Adlib.</i> feeding may be practiced with balancing the

	<ul style="list-style-type: none"> ➤ Cactus is primarily found in deserts hence it is easily available during scarcity also. As such it is not used for feeding animals but during scarcity it can be used. ➤ Mineral mixture should be procured and stored for supply. ➤ Fodder Banks: Grasses & tree leaves: Grasses from periphery of forest area wastelands & farmlands & Dry fallen forest tree leaves may be harvested & stored as hay in bales. ➤ Fodder Bank: Crop Residues: The major cereals like rice & wheat straws are more important for this purpose. Next are coarse cereals, legumes, haulms left after removing grains from the crops. These may be stored in these banks to be established at each Taluka in the drought area. ➤ Govt. should provide support to farmers for making stacks, bailing & storage. ➤ State Animal feed resources Grid needs to be established so as to provide feed resources during scarcity period. ➤ Cattle camp sites needs to be identified. ➤ NGOs/Gorakshan Sanstha etc. needs to be identified. ➤ Anticipated number of livestock & feed resources to be provided needs to be assessed. ➤ Livestock registration should be compulsory with identification by tagging ➤ Preparedness of veterinary services to drought prone areas. ➤ Encourage farmers to cultivate fodder crops. ➤ Identification of the site for fodder depot. ➤ Facility to store fodder by creating centralized silage making facility with provision for transport. ➤ Forage production and storage of fodder in irrigated areas. ➤ Assessment of risk and vulnerability. ➤ Formation of village Disaster Management Committee. ➤ Establishment of drought monitoring system or early warning system. 	<p>productive animals particularly high productive crossbred cows.</p> <ul style="list-style-type: none"> ➤ Top feeds should be used during scarcity period only. ➤ Oil seed cakes are good source of proteins and hence should be used for productive animals only. ➤ Feed supplements/ Additives needs to be used widely for productive animals. ➤ Establishment of Cattle camps at identified sites. ➤ NGOs/Gorakshan Sanstha etc. identified to be involved for participation/ implementation. ➤ Feed resources @ 7 kg.dry fodder/day/adult animal for maintenance 2.0 kg. concentrate mixture/day/adult animal for supporting minimum milk production. ➤ Adaptation of proper distribution policy as per requirement with transport facility. ➤ Regular rest periods for working animals particularly bulls during hot period of the day. ➤ Capture and care of stray animals. ➤ The unproductive/surplus livestock needs to be culled/disposed. ➤ Sale of feed and fodder from the affected area to non affected area should be banned. ➤ Distribute fodder at reasonable rate. ➤ Monitoring feed and fodder prices. 	<p>nutrients required.</p> <ul style="list-style-type: none"> ➤ The unproductive/surplus livestock needs to be culled/disposed. ➤ Livestock suitable with the farming system practiced only should be maintained. ➤ Mechanization in agriculture needs to be encouraged. ➤ Feed processing needs to be encouraged in order to minimize the wastage of feed resources. ➤ <i>In-situ</i> storage and feeding of processed animal feed resources by the livestock owners needs to be encouraged. ➤ Readiness for feed and fodder bank as and when required for each districts with transport facility. ➤ Review of shortfalls in planning and refining action plan the before and during event.
Suggested contingency measures			
Drought	Before the event	During the event	After the event
Drinking	➤ Water resources as in general are inadequate and	➤ Special distribution and carrying capacity	➤ Permanent water

water	<p>hence the resources should be trapped and increased.</p> <ul style="list-style-type: none"> ➤ Available rain water harvesting technique should be adopted i.e. farm ponds etc. ➤ Water conservations measures be adopted to increase water table like recharging of bore wells. ➤ Available water resources should be tapped and reserved. ➤ Water harvesting measures like farm ponds alternative water sources, Nala bunding/check dams etc. needs to be undertaken. ➤ Judicious use of water in agriculture i.e. through drip/sprinkler irrigation. ➤ Wastage of water needs to be curbed. ➤ Rain water harvesting measures needs to be implemented at village level. ➤ Proper utilization of Water to save water. ➤ Equal water distribution plan may be implemented. ➤ Cloud seeding desalination, recycle sewage water, transvasment river project etc. 	<p>should be implemented from other available resources.</p> <ul style="list-style-type: none"> ➤ Water should be used as per the requirement of animals (@10-15 lit/ 100 kg body weight). ➤ Drinking water should not be used for washing animals. ➤ Clean and chlorinated water be provided to prevent water borne diseases. ➤ Special distribution and carrying capacity should be supplemented from other available resources. ➤ Water for irrigation should be stopped. ➤ Judicious use of water for livestock. ➤ Supply of water through tankers during contingency. ➤ Private water resources such as wells shall be used for drinking water. ➤ Proper utilization of Water to save water. ➤ In vicinity of animal camp or chavani creation of borewell. 	<p>resources should be developed with campaign for public awareness.</p> <ul style="list-style-type: none"> ➤ Steps should be taken to conserve water. ➤ Ensure fresh clean and cold water supply to livestock.
-------	--	---	---

	Suggested contingency measures		
Drought	Before the event	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter with stock of life saving medicine for livestock. ➤ Vaccination of animals for various diseases according to season. ➤ Deworming and spraying be done to get rid of endoparasites and ectoparasites to keep the health of animals in good condition. ➤ Personnels should be trained for health and disease management through training 	<ul style="list-style-type: none"> ➤ Services of trained personnel need to be made available in affected area with sufficient supply of life saving medicine of livestock. ➤ A team of veterinary experts be deployed for health management of drought hit livestock. ➤ During occurrence of disease, affected animals should be kept isolated and treated properly and promptly. ➤ Vaccination against contagious diseases like HS, FMD, Theileriosis be carried out. ➤ Mineral mixture be provided to take care of deficiency disorders. 	<ul style="list-style-type: none"> ➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during drought with stock of life saving medicine for livestock. ➤ There will be stress on animals due to deterioration of health during drought period. ➤ Concentrates and vitamin-mineral supplements be provided to minimize the

	<ul style="list-style-type: none"> ➤ List of trained personnel should be available at each district head quarter. ➤ Feed additives/Tonics/ Vitamin supplements should be stocked. ➤ Vaccines, Insecticides, disinfectants and dewormers needs to be stocked. ➤ Records/PM/ Carcass disposal arrangements needs to be ensured. ➤ Training of farmers for maintaining optimum health of animals, balance ration and recognize early signs of disease and management shortfalls. ➤ Create temporary shade shelters to prevent heat stress on the animals. (animal camps) ➤ Supply of Vitamin and minerals mixture. ➤ Application of preventive and control measures of SP & MD. 	<ul style="list-style-type: none"> ➤ Tick control measures be undertaken to prevent tick borne diseases in animals under stress. ➤ Deworming should be carried out. ➤ Feed additives/Tonics/Vitamin supplements should be provided. ➤ Post Mortem /record keeping/carcass disposal arrangements be effected. ➤ Restriction on movement of the animals to prevent the spread of diseases. ➤ Periodic disinfection and disinfestations of premises where animals are kept. ➤ Permission of only healthy and vaccinated animals in cattle market. ➤ By proper treatment with supervision and exercise over starvation. ➤ Special transport facility of mobile van for veterinary team be deployed. 	<p>stress on animals.</p> <ul style="list-style-type: none"> ➤ The animals should be observed for signs of contagious diseases or deficiency disorders. ➤ Vaccination spraying and deworming programme needs to be undertaken. ➤ Record of affected livestock to be submitted for compensation of the loss. ➤ Farm disinfection and disinfestations. ➤ Assessment of losses due to mortality if any.
--	--	--	---

	Suggested contingency measures		
Floods	Before the event	During the event	After the event
Feed and fodder availability	<ul style="list-style-type: none"> ➤ Identification of flood prone zones and flood forecasting. ➤ Installation of early warning systems. ➤ Steps to prevent spoilage of food and water supply due to flood water. ➤ Dedicated helpline to emergency contact and communication at taluka level. ➤ Avoid construction of farm buildings in flood risk areas. ➤ Local ponds and canals regularly inspected and cleared off from obstruction ➤ Adequate stock of Tetanus toxoid. ➤ Change cropping pattern according to flood risk periods. ➤ Storage of available fodder at safe place before rainy season. ➤ Training of local personnel for disaster management. ➤ Dry fodder available should be processed i.e. Urea treatment of crop residues to enhance their nutritive value. 	<ul style="list-style-type: none"> ➤ Quick evacuation of livestock from flood plane areas before area become flooded ➤ Prevent outflow of manure pit in river ➤ Proper feed, vaccine, drugs, disinfectants and feed supplement distribution policy adopted with transport facility. ➤ Prevent spoilage of food and water supply ➤ Judicious use of feed resources processed as per type of livestock possessed by the livestock owners. ➤ Distribution of fodder, UMMB blocks, other feed resources stored 	<ul style="list-style-type: none"> ➤ Green fodder production in next Kharip season needs to be undertaken as a source of fodder at earliest. Fodder seed of improved fodder crop varieties needs to be distributed. ➤ Mineral Supplementation should be continued. ➤ Concentrate feeding for productive animals so as to compensate the

	<p>For this inputs such as training of livestock owners, material like urea, polythene sheet etc may be provided free of cost to the livestock owners.</p> <ul style="list-style-type: none"> ➤ Judicial use of available feed resources by the livestock owners. ➤ Non conventional feed resources such as Neem seed Cake/ Sal seed Meal/ Mango seed Kernels/ Babul pods etc should be collected and stored. ➤ Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains, Govt Godowns wastes, grains unfit for human consumption etc. should be procured for productive animals. ➤ Urea molasses mineral blocks (UMMB) may be reserved with NDDB, Anand, Gujarat for emergency supply as concentrate. ➤ Sugarcane bagasse, cane tops and molasses form important byproducts. Sugarcane bagasse- is an important feed resource for ruminants. ➤ Tree leaves are easily available. Leaves of neem, mango, banyan, pipal, babul, subabul, mahuva, etc. can be used as green fodder. Tree leaves are good source of protein, calcium, Vitamin A & hence should be reserved for feeding during drought. ➤ Cactus is primarily found in deserts hence it is easily available during scarcity also. As such it is not used for feeding animals but during scarcity it can be used. ➤ Mineral mixture should be procured and stored for supply. ➤ Fodder Banks: Grasses & tree leaves: Grasses from periphery of forest area wastelands & farmlands & Dry fallen forest tree leaves may be harvested & stored as hay in bales. ➤ Fodder Bank: Crop Residues: The major cereals like rice & wheat straws are more important for this purpose. Next are coarse cereals, legumes, haulms left after removing grains from the crops. These may be stored in these banks to be established at each Taluka in the drought area. ➤ Govt. should provide support to farmers for making stacks, baling & storage. ➤ State Animal feed resources Grid needs to be established so as to provide feed resources during scarcity 	<p>in the affected area to the livestock owners as per the number and type of livestock possessed.</p> <ul style="list-style-type: none"> ➤ Mineral supplementation – Mineral mixture be provided for the livestock @ 50 g/day/Anim. ➤ Disposal/Transfer of the animals in the area having feed resources availability. ➤ Concentrate feeding for productive animals to support minimum production & life saving of the important animals. ➤ Other non productive animals are to be fed at subsistence level. ➤ Use of food grains for biodisel and distillaries should be stopped and the grains be spared for productive animals. ➤ Bypass protein concentrate ingredients may be provided in order to harvest maximum nutrients for productive animals particularly high productive crossbred cows. ➤ Top feeds should be used during scarcity period only. ➤ Oil seed cakes are good source of proteins and hence should be used for productive animals only. ➤ Feed supplements/ Additives needs to be used widely for productive animals. ➤ Establishment of Cattle camps at identified sites. ➤ NGOs/Gorakshan Sanstha etc. identified to be involved for participation/ implementation. ➤ Feed resources @ 7 kg. dry fodder/day/adult animal for maintainance 2.0 kg. concentrate 	<p>body condition and production.</p> <ul style="list-style-type: none"> ➤ The animals must be brought into cyclic stage for reproduction. ➤ Young crossbred livestock needs to be attended properly so as to harness the high productivity. ➤ <i>Adlib.</i> feeding may be practiced with balancing the nutrients required. ➤ The unproductive/surplus livestock needs to be culled/disposed. ➤ Livestock suitable with the farming system practiced only should be maintained. ➤ Mechanization in agriculture needs to be encouraged. ➤ Feed processing needs to be encouraged in order to minimize the wastage of feed resources. ➤ <i>In-situ</i> storage and feeding of processed animal feed resources by the livestock owners needs to be encouraged.
--	--	---	--

	period. ➤ Cattle camp sites needs to be identified. ➤ NGOs/Gorakshan Sanstha etc. needs to be identified. ➤ Anticipated number of livestock & feed resources to be provided needs to be assessed. ➤ Information at every district head quarter regarding availability of fodder resources from other areas for exploitation should be made available. A storehouse can be prepared at a highest point in the city where feeds & fodder (silage) can be stored for emergency use.	mixture/day/adult animal for supporting minimum milk production. ➤ The stored feeds & fodder can be used to feed the animals & if it is short then Fodder resources should be exploited with sufficient transport facilities from other areas of the district.	➤ Fodder resources should be exploited with sufficient transport facilities from other areas of the district even after the event.
--	--	---	--

	Suggested contingency measures		
Floods	Before the event	During the event	After the event
Drinking water	➤ Sufficient storage capacity should be made available particularly during rainy season in view of the forecasting of the flood. Rain water harvesting should be done in all districts. Every district should be made self-sufficient. Every district gas plenty of rain water which should be harvested so that these areas should become self-sufficient & if required they should be able to provide water to other dry areas too. The rain water should not be wasted in sea. ➤ Shelters & temporary camps should be set up at a height in city area as well as in suburbs after choosing the right location for each area. Same provisions should be done in other Konkan districts. ➤ Bore well facilities should be exploited in districts for supply of clean water. Contamination of local water resources due to flood water should be prevented ➤ Potable drinking water source should be there to supply water to animals. ➤ Every society should implement rain harvesting system, so that water can be stored for use whole year long. Water problem likely to be faced in future. Water harvesting measures like farm ponds alternative water sources, Nala bunding/check dams etc. needs to be undertaken. ➤ Judicious use of water in agriculture i.e. through drip/sprinkler irrigation.	➤ Sufficient facility for transportation with advanced proper planning should be made in the areas of each district. ➤ During flood condition there will be polluted water, whatever potable drinking water source is available should be used with almost care. ➤ Disinfection of drinking water <i>i.e.</i> chlorination of water should be carried out Stop use of drinking water for animals from contaminated water resources. ➤ Disinfection of the water for consumption of the animals should be carried out to prevent water-borne diseases. Aerosol spray of the disinfectant for preventing spread of airborne infections should be carried out. Shelters & temporary camps for displaced animals should be set up with proper sanitation facilities. ➤ Judicious use of water for livestock.	➤ Sufficient infrastructure facility for transportation with advanced proper planning should be made in the areas of each district. ➤ Clean disinfected water from bore well or rain harvested water may be supplied to the animals as water-borne infections are common after floods. ➤ Sources of potable drinking water should be tapped for its proper use. ➤ Permanent water resources should be developed with

	<ul style="list-style-type: none"> ➤ Wastage of water needs to be curbed. ➤ Rain water harvesting measures needs to be implemented even at village level with establishment of water Storage and Purification facility 	<ul style="list-style-type: none"> ➤ Water tankers provision ➤ Private water resources such as wells shall be used for drinking water availability only. 	<p>campaign for public awareness.</p> <ul style="list-style-type: none"> ➤ Water storage facility created away from the flooded area.
--	--	--	--

	Suggested contingency measures		
Floods	Before the event	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter for flood affected areas with stock of life saving medicine for livestock. ➤ Vaccination of animals for various diseases according to season. ➤ Deworming and spraying be done to get rid of endoparasites and ectoparasites to keep the health of animals in good condition. ➤ Stock of life saving medicine be made. ➤ Disaster management team of veterinarians be constituted at district/taluka/panchayat level. ➤ Training to veterinarians in health and disease management during flood disaster be given. ➤ Awareness amongst farmers regarding health care practices during flood disaster be undertaken. 	<ul style="list-style-type: none"> ➤ Services of trained personnel need to be made available in affected area with sufficient supply of life saving medicine of livestock. ➤ Shifting of the animals at suitable place for temporary shelter. ➤ Disaster management team of veterinarians be deployed. ➤ Makeshift Veterinary medical facilities should be created at the site nearer to disaster place. ➤ Various referral centres in the disease diagnostics should be roped in for detection of infections which cannot be diagnosed at field level. ➤ Various diagnostic facility with modern techniques should be made available at Tahsil level besides district level so that more number of farmers may approach for diagnosis & treatment. ➤ Adequate nutrition including vitamin-mineral supplements should be given to animals to keep their health in proper condition. ➤ During occurrence of contagious diseases, affected animals should be kept isolated and treated properly. Isolation and treatment of ailing animals viz. hypothermia, wound, diarrhoea and pneumonia be undertaken. ➤ Vaccination against HS, BQ and FMD in bovines and PPR and enterotoxaemia in small ruminants should be undertaken. ➤ Deworming and spraying of apparently healthy animals 	<ul style="list-style-type: none"> ➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during flood with stock of life saving medicine for livestock. ➤ After flood condition there are chances of occurrence of specific diseases. ➤ Preventive measures should be taken to reduce occurrence of diseases. Vaccination and deworming programme needs to be undertaken. ➤ Animals should closely be observed for new/re-emerging diseases. ➤ Proper disposal of carcass is very important in flood affected areas from public health point of view. Methods of disposing of dead animals include burning, burying and

	<ul style="list-style-type: none"> ➤ Feed additives/Tonics/ Vitamin supplements should be stocked. ➤ Vaccines /Dewormers needs to be stocked. ➤ Records/PM/ Carcass disposal arrangements needs to be ensured. ➤ In flood prone area pucca cattle shed should be constructed. ➤ Preparation of walls and hips to keep flood water away from village. ➤ Supply of Vitamin and minerals mixture. ➤ Application of preventive and control measures of SP & MD. 	<ul style="list-style-type: none"> ➤ be carried out. ➤ Use of antivenom in snake bite cases. ➤ Feed additives/Tonics/Vitamin supplements should be provided. Vaccination and deworming programme needs to be undertaken. ➤ Post Mortem /record keeping/carcass disposal arrangements be effected. ➤ Disinfect the premises with bleaching powder and lime. ➤ Turn off electrical power. ➤ Training of farmers for maintaining optimum health of animals, balance ration and recognize early signs of disease and managerial shortfalls during floods. ➤ During severe regular flood, shifting of village away from river or changing the path of river away from village. 	<ul style="list-style-type: none"> ➤ composting ➤ Disinfection of animal sheds with 2% formaldehyde / 4% caustic soda. ➤ Provide proper shelter to protect animals from cold and rain. ➤ Record of affected livestock to be submitted for compensation of the loss. ➤ In regular flood prone areas defenses such as levees, bunds, reservoirs and weirs should be used for future preventions.
--	--	---	---

	Suggested contingency measures		
Cyclone	Before the event^s	During the event	After the event
Feed and fodder availability	<ul style="list-style-type: none"> ➤ There should be availability of fodder depot one each for every district. ➤ Information at every district head quarter regarding availability of fodder resources from other areas for exploitation should be made available. A storehouse can be prepared at a highest point in the district where feeds & fodder (silage) can be stored for emergency use. The store house should have proper walls on all sides with one entrance to avoid effect of cyclone. ➤ Feed & fodder should be stored as emergency stock in Govt. warehouses which can be distributed to areas that need them. 	<ul style="list-style-type: none"> ➤ Adaptation of proper distribution policy as per requirement with transport facility. ➤ The stored feeds & fodder can be used to feed the animals & if it is short then Fodder resources should be exploited with sufficient transport facilities from other areas of the district. 	<ul style="list-style-type: none"> ➤ Readiness for feed and fodder bank as and when required for each districts with transport facility should be created.
	Suggested contingency measures		
Cyclone	Before the event^s	During the event	After the event
Drinking water	<ul style="list-style-type: none"> ➤ Water resources as in general are inadequate and hence the resources should be trapped and increased. ➤ Rain water harvesting should be done in all 	<ul style="list-style-type: none"> ➤ Special distribution and carrying capacity should be implemented from other available resources. ➤ Rain harvested water & bore well water should be disinfected & provided to the animals. 	<ul style="list-style-type: none"> ➤ Permanent water resources should be

	<p>districts. Every district should be made self-sufficient. Each district has plenty of rain water which should be harvested so that these areas are self-sufficient & if required they should be able to provide water to other dry areas too. The rain water should not be wasted in sea.</p> <p>➤ Walls of the well should be constructed much above the ground level to avoid contamination.</p>	<p>➤ Special distribution and carrying capacity should be implemented from other available resources.</p> <p>➤ Disinfection of the water for consumption of the animals should be carried out to prevent water-borne diseases. Aerosol spray of the disinfectant for preventing spread of airborne infections should be carried out. Shelters & temporary camps for displaced animals should be set up with proper sanitation facilities</p>	<p>developed even after the event with campaign for public awareness.</p>
--	---	--	---

	Suggested contingency measures		
Cyclone	Before the event	During the event	After the event
Health and disease management	<p>➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter for cyclone affecting areas with stock of life saving medicine for livestock.</p> <p>➤ Vaccination against common infections like FMD, swine fever, black quarter, anthrax, haemorrhagic septicaemia, etc. should be given to animals.</p> <p>➤ Stock of medicines should be kept available for use during cyclone.</p> <p>➤ The walls and roofs of the cow sheds should be well secured.</p> <p>➤ Loose poles & tree branches should be removed, which may become harmful during extreme wind.</p> <p>➤ Supply of Mineral and Vitamins mixture.</p> <p>➤ Application of preventive and control measures of SP & MD.</p>	<p>➤ Keep watch on weather and listen to radio or TV and make others alert by warning.</p> <p>➤ Shift the animals at safer place or in well secured cattle sheds.</p> <p>➤ The wall and roofs of the cow sheds should be well secured.</p> <p>➤ Loose poles & tree branches should be removed, which may become harmful during extreme wind.</p> <p>➤ Services of trained personnel need to be made available in cyclone affected area with sufficient supply of life saving medicine of livestock.</p> <p>➤ Makeshift Veterinary medical facilities should be created at the site nearer to disaster place.</p> <p>➤ Various referral centers in the disease diagnostics should be roped in for detection of infections which cannot be diagnosed at field level.</p> <p>➤ Various diagnostic facility with modern techniques should be made available at Tahesil level besides district level so that more number of farmers may approach for diagnosis & treatment.</p>	<p>➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during cyclone with stock of life saving medicine for livestock.</p> <p>➤ Do not free the animals unless all clear or officially advised it is safe.</p>

2.7.2 Poultry

Drought	Suggested contingency measures		
	Before the event ^s	During the event	After the event
Shortage of feed ingredients	<ul style="list-style-type: none"> ➤ There should be availability of feed, feed ingredients and mineral mixtures with sufficient storage capacity for every district. ➤ Registration of poultry farms made compulsory to make it easier to be prepared and provide quick help to the farmers ➤ Storage of feed ingredients of previous year in sufficient quantity to use in scarcity period. ➤ Identification and storage of locally available feed ingredients as an substitute for scares ingredients. ➤ A farm disaster kit should be prepared in advance. The kit should be placed in a central location and everyone should know where it is. The contents of the kit must be checked regularly to ensure fresh and complete supplies. The following items should be included in the kit in addition to the items that are used everyday: <ul style="list-style-type: none"> – Updated list of all farms with information about birds, their location and records of feeding, vaccination, tests. – Basic first aid kit. – Handling equipment & cages. – Waterier and feeders. – Sanitation and disinfection equipments & chemicals. – Other safety and emergency items for vehicles and trailers, e.g.,Extra tyres, winches, tools, 	<ul style="list-style-type: none"> ➤ Adaptation of proper distribution policy as per requirement with transport facility. ➤ Supply of feed ingredients through government channel to the end users at reduced price. ➤ Make sure that birds receive adequate quantity and essential nutrients through feed to minimize stress and to prevent occurrence of disease outbreaks. ➤ Crucial use of available feed avoiding excess feeding and wastage of the feed. ➤ Stored feed ingredients will be utilized during contingency. ➤ Birds should be evacuated and taken to shelters as soon as there is news of an imminent disaster. Every flock must have some form of durable and visible identification. ➤ There should be arrangements for appropriate transport, suitable for birds. Stranded birds should be rescued and taken to safer places. ➤ If the stranded place is considered safe for the next week or so, the birds may be left there but should be provided with feed and drinking water. ➤ Arrangements should be made so that veterinary and Para- veterinary personnel can quickly reach all affected farms to provide necessary measures. ➤ Officials and other personnel engaged in relief work should also gather intelligence on the extent and nature of the damage to individual farms and villages so that appropriate relief measures can be 	<ul style="list-style-type: none"> ➤ Readiness for feed, feed ingredients and mineral mixtures as and when required for each districts with transport facility. ➤ Strategies to minimize the effects of stress due to drought by optimum feeding and management of the flock. ➤ Use of mineral and vitamin supplements to reduce stress. ➤ Follow up of affected livestock for adequate feed supply. ➤ Proper utilization of the resources should be carried out. The situation should be assessed properly and decision has to be taken on which birds to be treated first and how. ➤ The birds that are in very poor condition with no chance of recovery should be culled in humane manner. ➤ The dead birds should be disposed off in hygienic manner by burial or incineration. ➤ The situation at the farm also should be assessed and the corrective measures

	<p>etc.</p> <ul style="list-style-type: none"> ➤ Maize grain is limiting source as a feed ingredient in poultry feed. ➤ Store maize for poultry feed. ➤ Substitute feed ingredient should be tapped as replacement for maize grain which can be used for poultry feed. ➤ Concentrate ingredients such as Grains, brans, & oilseed cakes, low grade grains, Govt. Godowns wastes, grains unfit for human consumption etc. should be procured. ➤ Ban on export of oilseed meals needs to be implemented. ➤ Feed required for broilers 3.5 kg./bird for six weeks. For Layers 55 kg /layer bird for a period of 72 weeks. 	<p>implemented.</p> <ul style="list-style-type: none"> ➤ Adequate nutrition should be given to birds to keep their health in proper condition. ➤ The available ingredients as poultry feed should be used with utmost care. ➤ Non-conventional feed ingredients can also be tapped to use as a poultry feed taking into consideration the anti-nutritional factors present in it. ➤ Alternate day feeding for broilers. ➤ Avoid feed wastage. ➤ Restricted feeding for layers. ➤ Poor layer birds to be culled. ➤ Broiler rear up to 4 weeks only. ➤ Use of feed additives be enhanced to maximize the feed efficiency. 	<p>should be taken as soon as possible. All damages should be repaired and shed should be made functional. Disinfection of the premises and shed should be carried to prevent spread of diseases.</p> <ul style="list-style-type: none"> ➤ The stress on poultry due to shortage of feed during drought period can be minimized by proper feeding of the birds after drought period. ➤ Ad lib. feeding to compensate the egg production. ➤ Feed additives may be used to maximize production
--	--	--	---

	Suggested contingency measures		
Drought	Before the event	During the event	After the event
Drinking water	<ul style="list-style-type: none"> ➤ Water resources as in general are inadequate and hence the resources should be tapped and increased. ➤ Conservation of water for drought period. ➤ Water conservations measures adopted to increase water table like recharging of bore wells. ➤ Available water resources should be tapped and reserved. ➤ Leak proof water supply systems. ➤ Available rain water harvesting technique should be adopted i.e. farm ponds etc. ➤ Water conservations measures be adopted to increase water table. ➤ Judicious use of water. ➤ Use of nipples for watering. 	<ul style="list-style-type: none"> ➤ Special distribution and carrying capacity should be implemented from other available resources for poultry. ➤ Optimum use of available water as per the requirement of birds. ➤ Supply of adequate water to farms with transportation facility. ➤ Supply of water through tankers during contingency. ➤ Judicious use of water. ➤ Use of nipples for watering. 	<ul style="list-style-type: none"> ➤ Permanent water resources should be developed even after the event with campaign for public awareness. ➤ Evaluation and fine tuning of the contingency majors. ➤ Ensure clean, cold water supply to birds. ➤ Steps should be taken to conserve water and to develop permanent water resources. ➤ Fresh and ad lib. water should be provided.

	Suggested contingency measures		
Drought	Before the event	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management of poultry through trainings and list of trained personnel should be available at each district head quarter with stock of medicine, mineral mixture and vaccine for poultry. ➤ Regular and strict vaccination of birds. ➤ Vaccination of wild birds through water whenever possible. ➤ Deworming of birds before and after drought period. ➤ Appointment of veterinarian on farms made compulsory. 	<ul style="list-style-type: none"> ➤ Services of trained personnel need to be made available in affected area with sufficient supply of medicine, mineral mixture and vaccine for poultry. ➤ Immediate attention to diseased birds by veterinarians. ➤ Regular visits of veterinarians to detect diseased birds and veterinary care ➤ Vaccination of birds if necessary. ➤ If there is occurrence of disease, affected birds should be kept isolated and treated properly and promptly. ➤ Periodic disinfection and disinfestations of farm and premises. ➤ Measures to minimize risk of spreading contagious diseases. ➤ Birds should be checked for injury/ signs of disease. ➤ Antibiotic through water ➤ Anti-stress supplements ➤ Multivitamin supplements ➤ Bio-security measures to be implemented. ➤ Proper disposal of poultry carcass. 	<ul style="list-style-type: none"> ➤ Routine training programmed as a refresher course need to be implemented in relation to health and disease management during drought with stock of life saving medicine and vaccine for poultry to prevent outbreak. Proper disposal system of poultry carcasses. ➤ Efforts to minimize effects of stress through optimum feeding, management and veterinary care. ➤ Assessment of losses due to mortality if any. ➤ Proper disposal of carcass. ➤ There will be stress on birds due to deterioration of health during drought period. Hence proper feeding should be done to minimize the stress on birds by supplying vitamin supplements. ➤ Birds should be tested at regular interval to confirm that they are free of contagious diseases. ➤ Proper disposal of birds died of various diseases. ➤ Vaccination. ➤ Replacement of stock.

	Suggested contingency measures		
Floods	Before the event	During the event	After the event
Shortage of feed ingredients	<ul style="list-style-type: none"> ➤ Poultry owners needs to be advised to be in readiness for- ➤ Alternate poultry sheds with feed stock at safe places. ➤ Displacement of stock- transport arrangements. 	<ul style="list-style-type: none"> ➤ Poultry owners needs to be advised to be in readiness for- ➤ Alternate poultry sheds with feed stock at safe places. ➤ Displacement of stock- transport arrangements. 	<ul style="list-style-type: none"> ➤ Shifting at original site after repair of the shades and restoration of the necessary facilities. ➤ Proper feeding should be done to minimize the

	<ul style="list-style-type: none"> ➤ Registration of poultry farms made compulsory to make it easier to be prepared and provide quick help to the farmers ➤ Measures to avoid spoilage of feed stores due to water. ➤ Construction of feed stores to stores feed sufficient for at least one month. ➤ Farmers will be encouraged to purchase and store the feed ingredient when it is cheaply available in the market. ➤ Information at every district head quarter regarding availability of feed and feed ingredients and mineral mixture resources from other areas. 	<ul style="list-style-type: none"> ➤ Registration of poultry farms made compulsory to make it easier to be prepared and provide quick help to the farmers ➤ Measures to avoid spoilage of feed stores due to water. ➤ Construction of feed stores to stores feed sufficient for at least one month. ➤ Farmers will be encouraged to purchase and store the feed ingredient when it is cheaply available in the market. ➤ Information at every district head quarter regarding availability of feed and feed ingredients and mineral mixture resources from other areas. 	<p>stress on birds</p> <ul style="list-style-type: none"> ➤ Ensure good quality feed and fodder supply to birds ➤ Feed and feed ingredients resources should be exploited with sufficient transport facilities from other areas of the district even after the event.
--	--	--	---

	Suggested contingency measures		
Floods	Before the event	During the event	After the event
Drinking water	<ul style="list-style-type: none"> ➤ Arrangement of clean and hygienic water. ➤ Leak and contamination proof water supply system. ➤ Installations of the watering systems targeted to optimum use of available water avoiding water wastage. ➤ Source of water should be away from flood affected areas. ➤ Sufficient storage capacity should be made available particularly during rainy season in view of the forecasting of flood. ➤ Encourage the farmers for rain water harvesting. ➤ Proper utilization of Water to save water. 	<ul style="list-style-type: none"> ➤ Sufficient facility for transportation with advanced proper planning should be made in the areas of each district. ➤ Water treatment to avoid entry of pathogens through drinking water. ➤ Judicious use of potable chlorinated water. ➤ Avoid contamination of wells and tube wells by flood water. ➤ Proper utilization of Water to save water. ➤ Supply of water through tankers during contingency. ➤ Water purification measures for ensuring hygienic water supply. 	<ul style="list-style-type: none"> ➤ Actions to rectify the water related issues observed during flood period. ➤ Ensure potable water supply to birds. ➤ Sufficient infrastructure facility for transportation with advanced proper planning should be made in the areas of each district. ➤ Sources of potable drinking water should be tapped for its proper use. ➤ Use of disinfected water. ➤ Arrangements of hygienic water supply.
	Suggested contingency measures		
Floods	Before the event	During the event	After the event
Health and disease	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management 	<ul style="list-style-type: none"> ➤ Services of trained personnel need to be made 	<ul style="list-style-type: none"> ➤ Routine training programmed as a refresher course need to be implemented in relation to

management	<p>through trainings and list of trained personnel should be available at each district head quarter for flood affecting areas with stock of medicine, mineral mixture and vaccine for poultry.</p> <ul style="list-style-type: none"> ➤ Vaccination and deworming schedule should be observed strictly. ➤ Additional deworming can be carried out before and after floods. ➤ Medicine store facility with availability of adequate drugs at each farm and veterinary dispensaries. ➤ Training of farmers to identify signs of common contagious diseases particularly to avoid outbreaks. ➤ Do not built poultry house on nalla or stream or otherwise remove the birds before monsoon from such poultry house. 	<p>available in affected area with sufficient supply of medicine, mineral mixture and vaccine.</p> <ul style="list-style-type: none"> ➤ During flood if it is difficult to shift and manage large number of birds, they should be slaughter and sent to cold storage. ➤ Vaccination against contagious diseases. ➤ Proper disposal of birds died of diseases particularly contagious diseases. ➤ Disinfection of sheds be undertaken. ➤ Immediate veterinary help to the farms. ➤ Adequate proper feeding and management. 	<p>health and disease management during flood with stock of medicine and vaccine for poultry to prevent outbreak. Proper disposal system of poultry carcasses.</p> <ul style="list-style-type: none"> ➤ Cleaning and disinfection of poultry farms. ➤ Monitoring for disease outbreaks in birds through regular farm visits by veterinarian. ➤ Proper disposal of carcass is very important in flood affected areas from public health point of view. ➤ Vaccination for RD and IBD to avoid outbreaks. ➤ Anti-stress treatment of birds is important to prevent mortality. ➤ Preventive measures should be taken to reduce occurrence of diseases, particularly use of antibiotics in drinking water. ➤ Hygienic measures should be followed. ➤ Birds should be served for emerging infectious diseases. ➤ Restriction on movement of the birds. ➤ Compensation of the loss.
-------------------	---	---	--

	Suggested contingency measures		
Cyclone	Before the event	During the event	After the event
Shortage of feed ingredients	<ul style="list-style-type: none"> ➤ Information at every district head quarter regarding availability of feed and feed ingredients and mineral mixture resources from other areas with storage facility. 	<ul style="list-style-type: none"> ➤ Feed and feed ingredients resources should be exploited with sufficient transport and storage facilities from other areas of the district. 	<ul style="list-style-type: none"> ➤ Feed and feed ingredients resources should be exploited with sufficient transport and storage facilities from other areas of the district even after the event.

	Suggested contingency measures
--	---------------------------------------

Cyclone	Before the event	During the event	After the event
Drinking water	<ul style="list-style-type: none"> ➤ Sufficient storage capacity should be made available particularly during rainy season in view of the forecasting of the cyclone. 	<ul style="list-style-type: none"> ➤ Sufficient facility for transportation with advanced proper planning should be made in the areas of each district. 	<ul style="list-style-type: none"> ➤ Sufficient infrastructure facility for transportation with advanced proper planning should be made in the areas of each district.
Suggested contingency measures			
Cyclone	Before the event	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter during heat and cold waves with stock of life saving medicine, vaccine, feed and mineral mixture for poultry. 	<ul style="list-style-type: none"> ➤ Services of trained personnel need to be made available in affected area with facilities to overcome heat waves through water availability and cold through proper closed shelter with sufficient supply of medicine and vaccine for poultry. During heat fogging system should be ready and during cold artificial heat through electricity need to be provided. ➤ Detection & treatment of ailing birds. ➤ Vaccination against contagious diseases. ➤ Antistressor preparations or multivitamins preparations through drinking water during stress. ➤ <i>Ad. lib.</i> Cold water availability ➤ Supply of medicine and vaccine for poultry. ➤ Feed in cool hrs and increase the frequency of feeding with high density feeds. ➤ Mineral & Vitamin supplementation 	<ul style="list-style-type: none"> ➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during heat and cold waves with stock of medicine and vaccine for poultry and sufficient arrangement. ➤ Anti- stress to relieve stress. ➤ Birds should be monitored for occurrence of diseases. ➤ Vaccination to avoid outbreaks. ➤ Proper disposal of poultry carcasses.

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture			
Marine	Information not available	Information not available	Information not available
Inland			
(i) Shallow water depth due to insufficient rains/inflow	Need to implement cost-effective water efficiency and conservation measures in very early stage to handle the drought. Strategic plan should be made to construct bunds & conserve water in drought prone areas.	In severe drought condition Most of the stock can be harvested immediately while Some portion of the local aquatic species should be transfer to the less affected areas so as to conserve them and reintroduce in its regional habitat.	Water policies should be determined If we want to restore our inland fishery resources. Need to set up hatcheries for drought affected fish species to avoid their extinction, and the conserved species once again need to be reintroduced in their original habitats after achieving desired aquatic environment.
(ii) Changes in water quality	Regular monitoring of water quality	Need to harvest the stock to minimize economic losses before mass mortality due to undesired water quality.	After achieving desired water quality, conserved species once again need to be reintroduced in their original habitats.
(iii) Any other	Gene bank should be made for all indigenous local commercially & ecologically important species.	To conserve the endangered species breeding and rearing indoor facility may be created for future restoration.	The conserved species once again need to be reintroduced in their original habitats after achieving desired aquatic environment.

B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Water temperature may get raised and also Dissolved Oxygen level may get declined, hence efforts should made to increase the depth of pond & avoid	Water recycling with the aid of potential filtration systems can be applied if available. Provide artificial oxygenation. If water level	Construction of small reservoirs or dams should be newly developed in drought prone area. Identifying culturable air breathing

	water seepage by using bentonite clay, plastic liners etc. also artificial oxygenation systems as aerators etc. should be incorporated in aquaculture system.	is too much low, can lead to mass mortality due to environmental stress hence it will be better to harvest the stock immediately.	species / hardy species (e.g. <i>Notopterus</i> , <i>Clarius</i> , <i>Puntius</i> etc.) suitable to the regional aquatic environment.
(ii) Impact of salt load build up in ponds / change in water quality	Throughout the culture period salinity & other parameters should be checked for regular intervals. Fresh water storage ponds should be developed at aquaculture site.	Fresh water from the storage ponds can be utilized for maintaining salinity.	Identifying best suitable euryhaline spp. (Pearl spot, Sea bass, Rabbit fish , mullets etc.) for the culture which can tolerate wide range of salinity.
(iii) Any other	--	--	--

2) Floods			
A. Capture			
Marine	<p>Disaster preparedness mission through Sea walls, Embankment. In future early warning systems and evacuation strategy planning for flood prone areas.</p> <p>Plan of Preventive measures against the epidemiological diseases, like malaria, cholera, <i>dengue</i> etc. among coastal communities .</p> <p>Educating coastal population about Disaster mitigation and provision of good transport means in coastal areas prior to the Flooding event which will be helpful for rescue operations.</p>	<p>Aid to populations at the affected zones and shelters.</p> <p>Affected population should be provided with adequate food & medicines in time.</p>	<p>National & international financial support for research on the various aspects of the flood will be needed for future strategies.</p> <p>Microfinance to the affected population by Governmental & Non Governmental Organization to reconstruct their socio-economic status.</p> <p>Control of vector-borne endemic and epidemic diseases.</p> <p>Mangrove plantation & conservation strategies should be adopted in estuarine region for minimizing future risk.</p>
Inland	<p>In future early warning systems and evacuation strategy planning for flood prone areas.</p> <p>Awareness of People living in rural zones, or urban margins with regards to the geography of their area as they do not take into account whether they are on a river's flood plain, an</p>	<p>Aid to populations at the affected zones and shelters.</p> <p>Timely help to populations at the affected zones and shelters.</p> <p>Affected population should</p>	<p>Diversifying course of flooding river to minimize socio-economic losses.</p> <p>Microfinance to the affected population by Governmental & Non Governmental Organization to reconstruct their socio-economic status.</p>

	<p>unstable hillside, a dry river bed in a flooding area, etc., when they (fisheries community) build their houses.</p> <p>More emphasis should be given on the maintenance of public infrastructure, such as highways, secondary roads and bridges prior to the flooding event which will be helpful for rescue operations.</p> <p>Awareness should be created for using good materials for their construction of houses.</p> <p>Strategic planning to build up local rescue teams in flood prone areas.</p>	be provided with adequate food & medicines in time.	
--	---	---	--

(i) Average compensation paid due to loss of human life	<i>Not applicable</i>		
(ii) No. of boats / nets/damaged	<i>Not applicable</i>		
(iii) No. of houses damaged	<i>Not applicable</i>		
(iv) Loss of stock	<i>Not applicable</i>		
(v) Changes in water quality	<i>Not applicable</i>		
(vi) Health and diseases	Preventive measures of Plan of the Health Ministry for the prevention of epidemiological diseases, like malaria, cholera, <i>dengue</i> etc. & vaccination in flood prone area.	Affected population should be provided with adequate food & medicines in time.	Control of vector-borne endemic and epidemic diseases.

B. Aquaculture				
(iii)	Inundation with flood water	Early warning systems should be developed to minimize future risk. Elevating the height of peripheral dykes of the aquaculture ponds. Providing	Need to harvest the stock as early as possible to minimize economic losses	Drain out excess water, disinfecting and refilling the ponds with water and restocking by adopting standard aquaculture protocols.

	elevated net fencing on the bunds to avoid loss of fish during flooding.		
(ii) Water contamination and changes in water quality	Elevating the peripheral dykes of the aquaculture ponds.	Need to harvest the stock as early as possible to minimize economic losses	Drain out all the water from the pond and refill it with good quality water for future crop.
(iii) Health and diseases	Adequate vaccination of fish stocks prior to flooding event is recommended to minimize the risk.	In situ observations & analysis of health status of cultivable species and stress inducing factors and recommendation of treatments to specific diseases.	Quarantining of culture pond before next stocking.
(iv) Loss of stock and inputs (feed, chemicals etc)	Elevating the peripheral dykes of the aquaculture ponds and good indoor storage facility for inputs.	Early harvest of the stock and transport of inputs to the safer places.	Use new stock.
(v) Infrastructure damage (pumps, aerators, huts etc)	Elevating the peripheral dykes of the aquaculture ponds and good indoor storage facility for the pumps & aerators in flood condition.	Transport of the pumps, aerators etc. to the safer places.	Insurance and micro-finance for repair and maintenance of the infrastructure.
(vi) Any other	-	-	-

3. Cyclone / Tsunami			
A.Capture			
Marine	<p>Timely Communication of weather forecasting to fishermen</p> <p>Implementation of Tsunami detection & warning system in Indian ocean and evacuation strategy planning for Cyclone / Tsunami prone area.</p> <p>Disaster preparedness mission through Sea walls, Embankment</p> <p>Provision of Wave breakers & dry</p>	<p>Timely aid to coastal populations at the affected zones and provision of shelters.</p> <p>Affected population should be provided with adequate food & medicines in time.</p>	<p>Microfinance to the affected population by Governmental & Non Governmental Organization to rebuild their socio-economic status.</p> <p>Control of vector-borne endemic and epidemic diseases;</p> <p>National & international financial support for research on the various aspects of the Cyclone / Tsunami will be needed for the planning of future</p>

	<p>docks for fishing vessel security.</p> <p>Encouragement and financial incentives should be given to fishermen to carry Safety Devices on their fishing crafts.</p> <p>Educating coastal population about Disaster mitigation and provision of good transport means in coastal areas prior to the Cyclone / Tsunami event which will be helpful for rescue operations.</p> <p>Preventive measures for the prevention of epidemiological diseases, like malaria, cholera, dengue etc</p>		<p>strategies.</p> <p>Mangrove conservation, plantation strategies should be adopted in estuarine / coastal region for minimizing future risk</p>
(i) Average compensation paid due to loss of fishermen lives	---	---	---
(ii) Avg. no. of boats / nets/damaged	---	---	---
(iii) Avg. no. of houses damaged	---	---	---
Inland	<p>Timely Communication of weather forecasting to fishermen</p> <p>Encouragement and financial incentives should be given to fishermen to carry safety devices on their fishing crafts.</p>	<p>Timely aid to coastal populations at the affected zones and provision of shelters.</p> <p>Affected population should be provided with adequate food & medicines in time.</p>	<p>Microfinance to the affected population by Governmental & Non Governmental Organization to rebuild their socio-economic status.</p> <p>Rehabilitation of fishermen communities.</p>
B. Aquaculture			
(i) Overflow / flooding of ponds	<p>Elevating the peripheral dykes of the aquaculture ponds</p> <p>Early warning systems should be developed to minimize future risk.</p>	<p>In very initial stage prior to flooding, need to harvest the stock as early as possible to minimize economic losses . In severe condition nothing can be controlled.</p>	<p>Drain out excess water, disinfecting and refilling the ponds with water and restocking by adopting standard aquaculture protocols.</p>
(ii) Changes in water quality (fresh water / brackish water ratio)	<p>Elevating the peripheral dykes of the aquaculture ponds. Regular monitoring</p>	<p>Fresh water from the storage ponds can be utilized for maintaining</p>	<p>Drain out excess water, After achieving desired water quality , restocking by</p>

	of water quality.	salinity.	adopting standard aquaculture protocols.
(iii) Health and diseases	Adequate vaccination of the stocks prior to this is recommended to minimize the risk	In situ observations & analysis of health status of cultivable species and stress inducing factors and recommendation of treatments to specific diseases.	Disinfecting / Quarantining of culture pond before the next stocking.
(iv) Loss of stock and inputs (feed, chemicals etc)	Elevating the peripheral dykes of the aquaculture ponds and good indoor storage facility for inputs.	Early harvest of the stock and transport of inputs to the safer places.	Use new stock.
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	Elevating the peripheral dykes of the aquaculture ponds and Initial provision of good indoor storage facility for pumps & aerators.	Transport of the pumps, aerators etc. to the safer places.	Insurance and microfinance with low interest from Govt. for the repair and maintenance of the infrastructure.
(vi) Any other	---	---	---
4. Heat wave and cold wave			
A. Capture			
Marine	Information not available	Information not available	Information not available
Inland	<i>Not applicable</i>	<i>Not applicable</i>	<i>Not applicable</i>
B. Aquaculture			
(i) Changes in pond environment (water quality)	Depth of the aquaculture ponds should be increased to minimize thermal stress. Plantation at the peripheral dykes of aquaculture ponds can be recommended.	Aerators should properly utilized for the good circulation of water maintaining good pond environment.	Identification of best suitable eurythermic spp. for aquaculture to tolerate wide temperature range.
(ii) Health and Disease management	Maintaining water parameters at desired levels can reduce the stressful condition & can avoid disease.	Aerators should properly utilized for the good circulation of water maintaining optimum water quality.	Early warning systems should be developed to minimize future risk. Identification of hardy species for aquaculture practices.
(iii) Any other	---	---	---

THANE
And
PALGHAR

State: MAHARASHTRA
Agriculture Contingency Plan for District: THANE and PALGHAR

1.0 District Agriculture profile					
1.1	Agro-Climatic/Ecological Zone				
	Agro Ecological Sub Region (ICAR)	Western Ghats And Coastal Plain, Hot Humid-Perhumid Eco-Region (19.1) Western Ghats And Coastal Plain, Hot Humid-Perhumid Eco-Region (19.3)			
	Agro-Climatic Zone (Planning Commission)	West Coast Plains And Ghat Region (XII)			
	Agro Climatic Zone (NARP)	North Konkan Coastal Zone (MH-2)			
	List all the districts or part thereof falling under the NARP Zone	Thane, Palghar and Raigad			
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude	
		19°10'54.21" N 18°42'20.20" N	72°57'38.59 "E 72 °57'73.48" E	20 M	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Dr. L. S. Chavan, Associate Director of Research, Regional Agricultural Research Station, Karjat- 410 201 , Dist. Raigad			
	Mention the KVK located in the district	Krishi Vigyan Kendra, Kosbad hills, Tal- Dhanu, Dist. Thane (M.S.)- 401 703			
	Name and address of the nearest Agromet Field Unit for agro- advisories in the zone	Technical Officer, Integrated Agro Advisory Services, Department of Agronomy, Dr. B.S. Konkan Krishi Vidyapeeth, Dapoli - 415 712, Dist. Ratnagiri (M.S.)			
1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	2502.1	76	1 st week of June	2 nd week of October
	NE Monsoon(Oct-Dec):	-	-	-	-
	Post rainy showers (Oct-Dec):	88.1	5	-	-
	Winter (Jan- March)	1.5	0	-	-
	Summer (Apr-May)	10.9	0	-	-
	Annual	2602.5	81		

1.3	Land use pattern of the district (latest statistics)	Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000' ha)	908	454	351.21	58.59	16.46	18	36	59	18	18

Source – District Socio-economic Review -2014-15 (Directorate of Economic & Statistics, Govt. of Maharashtra)

1.4	Major Soils (Medium black soils)	Area ('000'ha)	Percent (%) of total
	Shallow Red soils	708.4	75.8
	Medium Red deep soils	221.9	23.7
	Deep soils	3.6	0.3

Source :- NBSS & LUP, Nagpur

1.5	Agricultural land use	Area ('000'ha)	Cropping intensity %
	Net sown area	356	110.1
	Area sown more than once	36	
	Gross cropped area	392	

Source :District Socio-economic Review -2014-15 (Directorate of Economic & Statistics, Govt. of Maharashtra)

1.6	Irrigation	Area ('000' ha)		
	Net irrigated area	10.28		
	Gross irrigated area	21.3		
	Rainfed area	336.8		
	Sources of Irrigation	Number	Area ('000' ha)	Percentage of total irrigated area
	Canals		15.0	78.1
	Tanks	-	-	-
	Open wells	2887	2.0	10.4
	Bore wells	287	2.2	11.5
	Lift irrigation schemes	87		
	Micro-irrigation			
	Other sources (please specify)			
	Total Irrigated Area		19.2	100.0
	Pump sets	8203		
No. of Tractors	2465			

Source :District Socio-economic Review -2014-15 (Directorate of Economic & Statistics, Govt. of Maharashtra)

Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tahsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
Over exploited	-	-	-
Critical	-	-	-
Semi- critical	-	-	-
Safe	-	-	-
Wastewater availability and use	-	-	-
Ground water quality			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%			

1.7 Area under major field crops & horticulture etc.

1.7	Major Field crops cultivated	Area ('000' ha)				
		<i>Kharif</i>		<i>Rabi</i>		Summer
		Irrigated	Rainfed	Irrigated	Rainfed	Total
	Rice	5.1	145.5	3	-	139
	Finger millets	-	15.96	-	-	16
	Prosomillet	-	11.3	-	-	11.0
	Pulses (Cowpea, blackgram, pigeon pea, chick pea, etc.)	-	11.85	9.7	-	21.7
	Groundnut	-	1.9	0.1	-	3.7
	Other oilseeds	-		0.6	-	
	Horticultural crops – Fruits	Total Area ('000'ha)				
	Mango	15.81				
	Cashew	4.3				
	Sapota	10.8				
	Other fruit crops	2.6				
	Flowers	0.4*				

	Horticulture crops – Vegetables	
	Okra, Brinja, Chilli and Leafy vegetables etc.	7.2*

	Plantation crops	
	Coconut	2.5
	Fodder crops	-

Source :- Krishi Utpadan Karyakramachi Rupresha, Kharif and Rabi Hangam - 2010-11, Vibhagiy Sabha, Konkan Mahsul Vibhag.

Dept. of Agriculture, Govt. of Maharashtra

*District Krishi Utpadan Aarahda, Joint Director of Agriculture, Konkan Division, Thane

1.8	Livestock	Male	Female	Total
	Non descriptive Cattle (local low yielding)	288721	192005	725395
	Crossbred cattle	4093	8887	11247
	Non descriptive Buffaloes (local low yielding)	2164	7059	162764
	Graded Buffaloes	0	0	11155
	Goat	57853	173380	192760
	Sheep	78	58	2127
	Others (Camel, Pig, Yak etc.)			1001
	Commercial dairy farms (Number)			
1.9	Poultry	No. of farms	Total No. of birds	
	Commercial	<i>Dara are not available</i>	1325134	
	Backyard	-		

Source : Maharashtra Animal and Fisheries Science University, Nagpur

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.) Number of processing unit
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
		101042	2155	1185	113160	16325	142
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
63		35		237			

	B. Culture			
		Water Spread Area ('000'ha)	Yield (t/ha)	Production (MT)

i) Brackish water (Data Source: MPEDA/ Fisheries Department)	1.1	1.0	1147.0
ii) Fresh water (Data Source: Fisheries Department)	5.6	0.5	3197.7

1.11 Production and Productivity of major crops (Average of last 5 years)

1.11	Name of crop	Kharif		Rabi-Summer		Summer		Total		Crop residue as fodder ('000 tons)
		Produc tion ('000'T)	Produc tivity (kg/ha)	Produc tion (000'T)	Produc tivity (kg/ha)	Produc tion (000'T)	Produc tivity (kg/ha)	Produc tion (000'T)	Produc tivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Rice	352.1	2612	6.0	2400	-	-	303.3	2160	-
	Finger millets	9.3	812	0.4	1000	-	-	20.2	726.6	-
	Other cereals and millets	5.7	650			-	-			-
	Pulses	8.0	3420	5.3	570	-	-	12.3	630.8	-
	Groundnut	0.2	850	0.4	2000	-	-	1.6	444	-
	Other oil seed	1.0	357	0.2	333					-

Source :- Krishi Utpadan Karyakramachi Rupresha, Kharif and Rabi Hangam - 2010-11, Vibhagiy Sabha, Konkan Mahsul Vibhag.
Dept. of Agriculture, Govt. of Maharashtra

Major Horticultural crops (Crops to be identified based on total acreage)			
	Mango	94.0	1.60 MT/ha
	Cashew	4.0	0.50 MT/ha
	Coconuts	178 Lakh nuts	8000 nuts/ha
	Sapota	830.0	10.00 MT/ha
	Vegetables	846.0	12.00 MT/ha

Source :- District Krishi Utpadan Aarakhdha, Joint Director of Agriculture, Konkan Division, Thane

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Rice	Finger millets	Proso millet	Groundnut	Sesame
	Kharif- Rainfed	10 th June to 10 th July	2 nd fortnight of June	2 nd fortnight of June	-	2 nd fortnight of July
	Kharif-Irrigated					
	Rabi- Rainfed					
	Rabi-Irrigated	2 nd fortnight of December	-		2 nd fortnight of December	2 nd fortnight of November

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) 1. Rice :- : Stem borer, Bacterial blight, Blast 2. Finger millet :- Bacterial blight, Blast 3. Groundnut :- Early and late leaf spot 4. Mango :- Mealy bug, thrips, fruit fly, Anthracnose, Powdery mildew. 5 Cashew :- Tea mosquito bug, thrips, aphids 6 Areca nut :- Koleroga and Ganoderma rot. 7 Sapota : Seed borer, Bud borer, Fruit drop 8 Coconut :- Rhinoceros beetle, eriophyid mite, black headed caterpillar 9 Okra : Fruit & shoot borer, white fly, Yellow vein mosaic 10 Cucurbits :- Red pumpkin beetle, fruit fly, thrips , Powdery & Downy mildew. 11 Brinjal :- Fruit & shoot borer, Bacterial wilt	✓		

	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 (Give legend)	

Annexure 1 : Location Map of Thane and Palghar



Annexure - 2

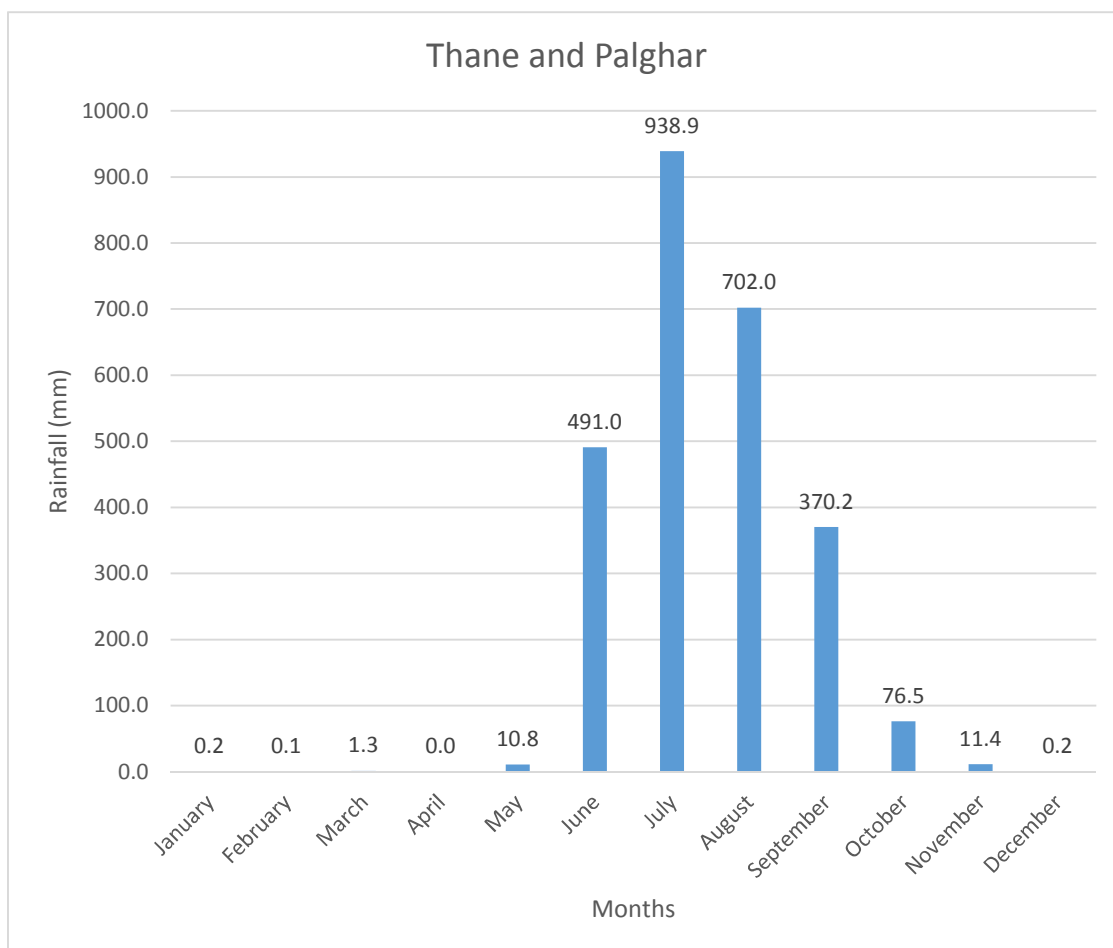
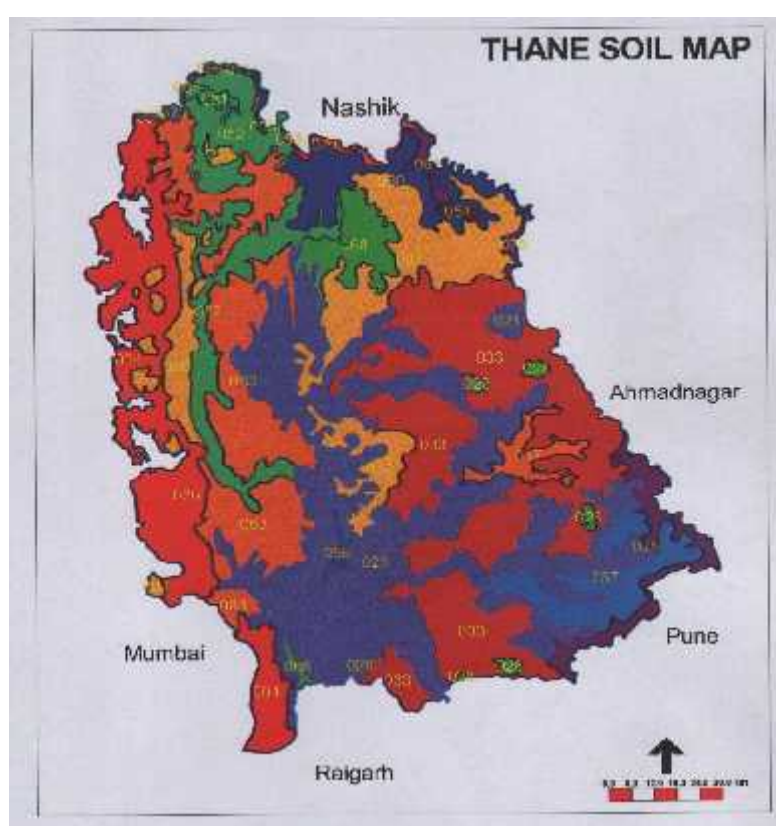


Fig: Mean monthly rainfall (mm) of Thane and Palghar District.

Annexure -3



Soil map Thane and Palghar District (Source :- NBSS & LUP, Nagpur)

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 2 weeks (3 rd week of June)	Upland medium deep to shallow soils	Rice	In case of failure of germination use very early duration variety (Karjat-184, Ratnagiri – 73)	<ul style="list-style-type: none"> • Prepare the seedlings by mat nursery / Dapog method. • If raising of seedling in nursery is not possible, then use direct seeding method (dry or sprouted seeds) 	Procure the seed from Maharashtra State Seed Corporation.
		Finger millet	No change		
		Vegetable crops (Chilli, okra, bitter gourd, snake gourd)		--	
		Sesamum		-	
	Mid-land medium deep soils	Rice	In case of failure of germination use early duration variety (Karjat- 3, Karjat-4, Karjat-7, Ratnagiri-1, Ratnagiri-5, Ratnagiri-24, Ratnagiri-711)	<ul style="list-style-type: none"> • Prepare the seedlings by mat nursery / Dapog method. • If raising of seedling in nursery is not possible, 	Procure the seed from Maharashtra State Seed Corporation.

	Low land deep soils	Rice	In case of failure of germination use mid late duration variety (Karjat-5, Karjat-9, Palghar-1, Palghar-2, Ratnagiri-4)	then use direct seeding method (dry or sprouted seeds)	
	Hill slopes shallow soils	Finger millet	No change	-	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping systemIncluding variety	Agronomic measures	Remarks on Implementation
**Delay by 4 weeks (1 st week of July)	Upland farming medium deep to shallow soils	Rice	Use very early duration variety (Karjat-184, Ratnagiri – 73)	Raise the crop by direct seeding method (dry or sprouted seeds)	Source of Seed : Maharashtra State Seed corporation
		Finger millet	Short duration variety (H.R. 374)	--	
		Sesamum	No Change	-	
		Vegetable crops (Chilli, okra, bitter gourd, snake gourd)	-	--	
	Mid-land farming medium deep soils	Rice	Use early duration variety (Karjat-184, Karjat-3, Karjat-4, Karjat-7, Ratnagiri – 73)	Raise the crop by direct seeding method (dry or sprouted seeds)	
	Low land farming deep soils	Rice	Mid-late duration variety (Palghar- 1, Palghar- 2, Karjat- 5 etc)		
	Soils on hill slope shallow soils	Finger millet	Cowpea (Variety- Konkan Sadabahar)., Black gram (Variety- TPU –4)	--	

** Generally such type of situation has not occurred during past years

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 6 weeks (3 rd Week of July)	Upland medium deep to shallow soils	Not applicable Note :- ** Generally such type of situation has not occurred during past years			
	Mid-land medium deep soils				
	Low land deep soils				
	Hill slope shallow soils				

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
**Delay by 8 weeks (1 st Week of August)	Upland medium deep to shallow soils	Not applicable Note :- ** Generally such type of situation has not occurred during past years			
	Mid-land medium deep soils				
	Low land deep soils				
	Hill slope shallow soils				

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Early season drought (Normal onset)	Upland medium deep to shallow soils	Rice	<ul style="list-style-type: none"> • Increase number of seedling per hill (5 to 6) or adopt closer spacing (15 x15 cm). • Increase 25% recommended dose of fertilizer. • For shortage of seedling prepare seedling by mat nursery using short duration variety. • Use thomba method. • Dusting with methyl parathion 2% dust @ 25 kg/ha to control armyworm in nursery. 	<ul style="list-style-type: none"> • Protective irrigation for nursery • Protective irrigation after transplanting 	Use water from the outside sources like farm ponds, nalas, streams, rivers for puddling operation
		Finger millet	<ul style="list-style-type: none"> • Increase 25% recommended dose of fertilizer • Adopt closer spacing (15 x15 cm) 	Protective irrigation after transplanting	
		Vegetables	-	Protective irrigation/ mulching with Glyricidia green leaves/ weed management	
	Mid-land medium deep soils	Rice	<ul style="list-style-type: none"> • Increase number of seedling per hill (5 to 6) or adopt closer spacing (15 x15 cm). • Increase 25% recommended dose of fertilizer. • For shortage of seedling prepare seedling by mat nursery using short duration variety. • Use thomba method. • Dusting with methyl parathion 2% dust @ 25 kg/ha to control armyworm in nursery. 	<ul style="list-style-type: none"> • Protective irrigation for nursery • Protective irrigation after transplanting 	Use water from the outside sources like farm ponds, nalas, streams, rivers for puddling operation
	Low land deep soils	Rice	<ul style="list-style-type: none"> • Increase number of seedling per hill (5 to 6) or adopt closer spacing (15 x15 cm). • Increase 25% recommended dose of fertilizer. • For shortage of seedling prepare seedling by mat nursery using short duration variety. • Use thomba method. • Dusting with methyl parathion 2% dust @ 25 kg/ha to control armyworm in nursery. 	<ul style="list-style-type: none"> • Protective irrigation for nursery • Protective irrigation after transplanting 	

	Hill slope shallow soils	Finger millet	<ul style="list-style-type: none"> • Increase 25% recommended dose of fertilizer • Adopt closer spacing (15 x15 cm) 	Protective irrigation after transplanting	Use water from the outside sources like farm ponds, nalas, streams, rivers, etc.
--	-----------------------------	---------------	---	---	--

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
At vegetative stage	Upland medium deep to shallow soils	Rice	<ul style="list-style-type: none"> • Postpone the split dose of Nitrogen application till receipts of rain/protective irrigation • Protective irrigation. • Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval. • Take three sprays of Tricyclazole 1g/lit of water for control of rice blast. 	<ul style="list-style-type: none"> • Adopt weed management practices. • Apply split dose of Nitrogen after restart of rains • Spray % potassium 	Use water from the outside sources like farm ponds, nalas, streams, rivers for protective irrigation

		Finger millet	Protective irrigation	<ul style="list-style-type: none"> • Adopt weed management practices. • Apply split dose of Nitrogen after restart of rains • Spray % potassium 	
		Vegetable	<ul style="list-style-type: none"> • Apply split dose of Nitrogen after restart of rains 	<ul style="list-style-type: none"> • Protective irrigation • Mulching with leaf lopping 	
	Mid-land medium deep soils	Rice	<ul style="list-style-type: none"> • Postpone the split dose of Nitrogen application till receipts of rain/protective irrigation • Protective irrigation • Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval. • Take three sprays of Tricyclazole 1g/lit of water for control of rice blast 	<ul style="list-style-type: none"> • Adopt weed management practices. • Maintain the existing water level in the field. • Apply split dose of Nitrogen after restart of rains Spray % potassium 	Use water from the outside sources like farm ponds, nalas, streams, rivers for protective irrigation
	Low land deep soils	Rice			
	Hill slope shallow soils	Finger millet	Give protective irrigation if possible.	<ul style="list-style-type: none"> • Adopt weed management practices. • Apply split dose of Nitrogen after restart of rains 	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
At flowering/ fruiting stage	Upland medium deep to shallow soils	Rice	<ul style="list-style-type: none"> • Protective irrigation • Take three spray Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval. • Take three sprays of Tricyclazole 1g/lit of water for control of rice blast. 	<ul style="list-style-type: none"> • Adopt weed management practices. • Maintain the existing water level in the field. • Spray % potassium 	Use water from the outside sources like farm ponds, nalas, streams, rivers for protective irrigation
		Finger millet	Protective irrigation.	<ul style="list-style-type: none"> • Adopt weed management practices. • Spray % potassium 	
		Vegetables	Protective irrigation	<ul style="list-style-type: none"> • Adopt weed management practices. • Spray % potassium • Mulching with leaf lopping 	
	Mid-land medium deep soils	Rice	<ul style="list-style-type: none"> • Protective irrigation. • Take three spray 	<ul style="list-style-type: none"> • Adopt weed management 	

	Low land deep soils	Rice	Copper oxy chloride 2.5 g/lit water + Streptocycline sulphate 0.5 g/lit of water to control Bacterial leaf blight at 15 days interval. • Take three sprays of Tricyclazole 1g/lit of water for control of rice blast.	practices. • Maintain the existing water level in the field. • Spray % potassium	
	Hill slope shallow soils	Finger millet	Give protective irrigation if possible.	Adopt weed management practices	

Condition			Suggested Contingency measures		
Terminal drought	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi crop planning	Remarks on Implementation
(Early withdrawal of monsoon)	Upland farming medium deep to shallow soils	Rice	• Harvest crops at physiological maturity	Wal (Lablab bean), Blackgram, , Cowpea, Mustard Sunflower, Groundnut, Sesamum Vegetables like Okra, Brinjal, Knol khol, Chilli, Capsicum, Tomato, Leafy vegetables, Melons and Cucurbitaceous crops, Seasonal flowers in irrigated area	Source of Seed : Maharashtra State seed corporation and other seed agency
		Finger millet			
		Vegetables	Protective irrigation		
	Mid-land farming medium deep soils	Rice	• Protective irrigation	Wal (Lablab bean), Blackgram, ,	Source of Seed : Maharashtra State

	Low land farming deep soils	Rice	<ul style="list-style-type: none"> Harvest crop at physiological maturity 	Bengalgram, Cowpea, Mustard Sunflower, Groundnut, Sesamum Vegetables like Okra, Brinjal, Knol khol, Chilli, Capsicum, Tomato, Leafy vegetables, Melons and Cucurbitaceous crops, Seasonal flowers in irrigated area	seed corporation and other seed agency
	Soils on hill slope shallow soils	Finger millet	Harvest crop at physiological maturity	-	

2.1.2 Irrigated situation

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall	Mid and low land Medium deep to deep soils	Rice (Rabi – hot weather season)	<ul style="list-style-type: none"> Use early duration variety (Karjat-3, Karjat 7, Karjat-184, Ratnagiri 73, Ratnagiri -1) or Grow short duration pulses viz. cowpea (Var. Konkan Sadabahar), under control irrigation and tail end area. Grow oil seed like groundnut (Konkan Gaurav, SB XI, Phule pragati). 	<ul style="list-style-type: none"> Dapog/mat technique of nursery raising. Young seedling transplanting. SRI Technique. 	Source of Seed Maharashtra State Seed corporation and other seed agency

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
		Groundnut	Prefer short duration variety (Phule pragati) or grow short duration pulses viz. Cowpea (Var. Konkan Sadabahar),	<ul style="list-style-type: none"> If other source of irrigation is available sow the crop as per schedule. Use micro irrigation (drip or micro sprinkler) Prepare the seedlings in portrays of vegetables (cucurbitaceous crops, brinjal, chilli, water melon) to avoid delay in transplanting. 	
		Pulses (Wal, Cowpea, Greengram)	No change		
		Vegetables (Cucurbitaceous and Solanaceous crops, Okra etc.)	No change		
		Water melon	Use short duration varieties		
Condition	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	Mid and low land Medium deep to deep soils	Rice (Rabi season)	<ul style="list-style-type: none"> Prefer early duration variety in low land situation (Karjat-3, Karjat-184, Ratnagiri 73, Ratnagiri -1) Grow short duration pulses (cow pea (Var. Konkan Sadabahar), Lab lab bean (Konkan wal no. 1). lab lab bean, horse gram), groundnut (Phule Pragati), vegetables in midland situation 	<ul style="list-style-type: none"> Use SRI Technique for rice cultivation. Adopt Weed management practices Use micro irrigation (drip or micro sprinkler) 	<ul style="list-style-type: none"> Procure the seed from Maharashtra State Seed Corporation

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
		Groundnut	Prefer short duration variety (Phule Pragati.)	<ul style="list-style-type: none"> • Adopt Weed management practices with dry weeder • Use micro irrigation (drip or micro sprinkler) • Adopt Mulcinhg 	<ul style="list-style-type: none"> • Procure the seed from Maharashtra State Seed Corporation
		Sesame	No change	<ul style="list-style-type: none"> • Adopt Weed management practices with dry weeder. • Adopt Mulcinhg 	
		Pulses (Wal, cowpea, horsegram, greengram, Bengal gram)	No change	<ul style="list-style-type: none"> • Adopt Weed management practices with dry weeder 	
		Vegetables (Capsicum, cucurbitaceous and solanaceous crops, okra etc.)	No change	<ul style="list-style-type: none"> • Use micro irrigation (drip or micro sprinkler) 	
		Water melon	No change	<ul style="list-style-type: none"> • Adopt Mulcinhg 	

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	Mid and low land Medium deep to deep soils	Rice (Rabi season)	Grow Lab lab bean, horse gram, black gram, bengal gram cowpea, mustard on residual moisture under low land situation.	<ul style="list-style-type: none"> • Minimum tillage and sowing of seed by dibbling. • Adopt Weed management practices 	<ul style="list-style-type: none"> • Procure the seed from Maharashtra State Seed Corporation
		Groundnut	No change	<ul style="list-style-type: none"> • Use micro 	
		Sesame			

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
		Pulses (Cowpea, Horsegram, Greengram, Bengalgram, Pea etc.)		irrigation (drip or micro sprinkler) • Adopt mulching	
		Vegetables (Cucurbitaceous and Solanaceous crop, Okra etc.)	No change	• Adopt Weed management practices • Use micro irrigation (drip or micro sprinkler) • Adopt mulching	
		Water melon			

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	Mid and low land Medium deep to deep soils	Rice (Rabi season)	Wal (lablab bean) - Var. Konkan Wal No. 1, Horse gram - Var. Dapoli – 1, Bengal gram, on residual moisture under low land situation	• Minimum tillage and sowing of seed by dibbling, • Relay cropping	Procure the seed from Maharashtra State Seed Corporation
		Groundnut	Short duration pulses like Bengal Gram, Wal (lablab bean), horse gram, black gram, greengram cowpea (Konkan Sadabahar) on residual moisture. If farm pond water is available grow leafy vegetables.	• Minimum tillage and sowing of seed by dibbling, relay cropping • Adopt Weed management practices. • Use micro irrigation (drip or micro sprinkler). • Adopt mulching	
		Pulses (Cowpea, Horsegram, Greengram)	No change		

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
		Vegetables (Cucurbitaceous and Solanaceous crop, Okra etc.) Water melon	Short duration pulses like Bengal Gram, Wal (lablab bean), horse gram, black gram, greengram cowpea (Konkan Sadabahar) on residual moisture. If farm pond water is available grow leafy vegetables.	<ul style="list-style-type: none"> • Minimum tillage and sowing of seed by dibbling, relay cropping • Adopt Weed management practices. • Use micro irrigation (drip or micro sprinkler). • Adopt mulching 	

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	Mid and low land Medium deep to deep soils	Rice (Rabi season)	Not applicable		
		Groundnut			
		Sesame			
		Pulses (Cowpea, Horsegram, Greengram)			
		Vegetables (Cucurbitaceous and Solanaceous crop, Okra etc.)			
		Watermelon			
Any other condition (specify)		----	----	----	

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
Rice	<ul style="list-style-type: none"> Spray Cartap Hydrochloride 50SP @ 1.2 g/lit for the management of case worm.. Close water in the field and Drag rope over crop to dislodge the cases after that open the water at one end of the field to collect the cases which can be destroyed afterwards Drain out excess water and spray Propiconazol @ 1ml /lit of water to control sheath blight 	----	Drain out excess water and harvest the crop before lodging	Immediate threshing and drying in shed
Fingermillet	--	--	Harvest the crop before lodging	Immediate threshing and drying in shed
Groundnut	Drain out excess water	Drain out excess water 2.Spray mancozeb @ 2.5 g/lit of water to control Tikka and rust disease	Drain out excess water and harvest the crop immediately	Separate the pods immediately and dry in shade.

Horticulture				
Cucurbitaceous crop	Drain out excess water	Drain out excess water	Drain out excess water	-
Solanaceous crop	Drain out excess water	Drain out excess water	Drain out excess water	
Mango	Wait for congenial condition for application of Paclabutrastol @ of 0.75 g/ a.i. per meter average canopy	-	-	-

	diameter			
Banana	<ul style="list-style-type: none"> • Drain out excess water • Propping with bamboo • Spray Hexaconazol @ 1ml/lit of water for control of Sigatoka Leaf spot and blight At pre flowering stage 	<ul style="list-style-type: none"> • Drain out excess water. • Propping with bamboo 	<ul style="list-style-type: none"> • Drain out excess water • Propping with bamboo 	--
Sapota	Drain out excess water	Drain out excess water	Drain out excess water	Drain out excess water
Seasonal flower	Drain out excess water	Drain out excess water	Drain out excess water and harvest at proper stage	
Heavy rainfall with high speed winds in a short span				
Rice			Drain out water and harvest the crop at maturity immediately if lodging take place	Immediate threshing and drying in shed
Fingermillet			Harvest the crop at maturity before its lodging.	Harvest the crop before lodging
Groundnut	Drain out excess water	Drain out excess water	Harvest the crop immediately	Separate the pod immediately and dry in shade
Horticulture				
Cucurbitaceous crop	Drain out excess water Repair the pendol	Drain out excess water Repair the pendol	Drain out excess water	Harvest at proper stage
Solanaceous crop	Drain out excess water Do staking	Drain out excess water Do staking	Drain out excess water	Harvest at proper stage
Mango	<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . • Also apply Bordeaux paste on cut surface and trunk. 	<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . Also apply Bordeaux paste 	<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . Also apply Bordeaux paste on cut surface and trunk. • Collect and utilize fallen 	<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water. • Also apply Bordeaux

		on cut surface and trunk. • Spray Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water for anthracnose.	fruit immediately for suitable processing.	paste on cut surface and trunk.
Cashew	<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . • Also apply Bordeaux paste on cut surface and trunk. 	<ul style="list-style-type: none"> • Prune the broken branches and swabbing with Chloropyriphos @ 5ml/lit water to avoid stem borer infestation and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water. • Also apply Bordeaux paste on cut surface and trunk. 	-	-
Banana	<ul style="list-style-type: none"> • Drain out excess water • Propping with bamboo 	<ul style="list-style-type: none"> • Drain out excess water • Propping with bamboo • Flowers of broken plant may be used as vegetable 	<ul style="list-style-type: none"> • Drain out excess water • Propping with bamboo • Fruit of broken plants may be used as vegetable. 	-
Sapota	<ul style="list-style-type: none"> • Prune the broken branches and Apply Chloropyriphos @ 5ml/lit water and Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water . • Also apply Bordeaux paste on cut surface and trunk. 	-	-	-
Seasonal flowers	Drain out excess water Do staking to prevent lodging	Drain out excess water Do staking	Drain out excess water Do staking	-
Outbreak of pests and diseases due to unseasonal rains				
Rice	Spraying of Carbendazim	Spraying of Carbendazim	-	-

	0.1% or Copper oxy chloride 0.25% or tricyclazole 0.1% to control blast disease	0.1% or Copper oxy chloride 0.25% or tricyclazole 0.1% to control blast disease		
Fingermillet	-	-	-	-
Groundnut	<ul style="list-style-type: none"> Spraying with carbendazim 0.1% or Propiconazole 0.1% or Tridemorph 0.1% to control early and late leaf spot 	<ul style="list-style-type: none"> Spraying with carbendazim 0.1% or Propiconazole 0.1% or Tridemorph 0.1% to control early and late leaf spot 	-	-
Horticulture				
Cucurbitaceous crop	-	--	<ul style="list-style-type: none"> Install Rakshak trap 4 per ha (Cue lure) to control fruit fly Spray with Copper Oxy Chloride @ 2.5 g/lit of water to control Downey mildew 	-
Solanaceous crop		-	-	
Mango	<ul style="list-style-type: none"> Take spray of Lambda Cyhalothrin 5 EC @ 0.6 ml/lit of water and second spray of Imidachloprid 17.8 EC @ 0.3 ml/lit of water for control of mango hopper, shoot borer . Spray Carbendazim + Mancozeb based composite fungicide @ 2 g/lit of water for anthracnose 	<ul style="list-style-type: none"> Spraying with 0.2% W.P. sulphur dust or 0.05% hexaconazol to control powdery mildew. 	<ul style="list-style-type: none"> Install Rakshak trap 4 per ha (Methyl eugenol) to control fruit fly 	<ul style="list-style-type: none"> Dipping fruits in hot water at 52°C for 10 min. after harvest to control post harvest rot.
Cashew	First spray with Profenophos 40EC 1ml/ lit of water, second spray with Lamda cyhalothrin	-	-	-

	0.6 ml/ lit of water and third spray with prophenophos 1ml /lit of water @ interval of one month. Sprays starting from leaf flush to control tea mosquito bug.			
Sapota	Three sprays of Emamectin benzoate 5 SG 0.45 g/lit. or Deltamethrin 2.8 EC @ 1 ml/lit. or Lambda cyhalothrin 5 EC @ 1 ml/lit or profenofos 40 EC @ 1 ml/lit for control of sapota bud borer. The first spray should be given at the fifty per cent flowering i.e. March and subsequent two sprays should be given at an interval of one month. For control of sapota seed borer.	For control of Sapota seed borer spraying of Profenophos 40 EC @ 1ml/lit. by the end of monsoon, Therafter Deltamethrin 2.8 EC 1 ml/lit. one month after first spray, Lambda-cyhalothrin 5 EC 1 ml/lit. one month after second spray and Deltamethrin 2.8 EC/lit one month after third spray Spraying of Metalaxyl + Mancozeb containing complex fungicide @ 0.2% to control fruit drop	-	Collect and destroy the fallen and infected fruits

2.3 Floods

Condition	Suggested contingency measure			
Transient water logging/ partial inundation	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Rice	If washed out resowing of nursery by using mat nursery/sowing of sprouted seed on puddled field	• Drain out excess water	• Drain out excess water	<ul style="list-style-type: none"> • Drain out excess water. • Immediate harvesting, threshing and drying in shed
Fingermilletts	Not applicable since these crops are grown on well drained soils.			
Groundnut				

Sesame				
Horticulture (Vegetables)				
Cucurbitaceous crop	Resowing /Replanting of seedlings	Drain out excess water	Drain out excess water	--
Solanaceous crop				
Flower crops				

Continuous submergence for more than 2 days				
Rice	If washed out resowing of nursery by using mat nursery/ sowing of sprouted seed on puddled field	<ul style="list-style-type: none"> • Drain out excess water • Apply second dose (40%) of nitrogen after submergence is over 	Drain out excess water	<ul style="list-style-type: none"> • Drain out excess water. • Immediate harvesting, threshing and dry in shed
Fingermillet	Nor applicable since these crops are grown on well drained soils.			
Groundnut				
Sesame				
Horticulture (Vegetables)				
Cucurbitaceous crop				
Solanaceous crop				
Flower crops				

Sea water intrusion				
Rice	<ul style="list-style-type: none"> • Strengthening of creek bund and sea wall to prevent sea water intrusion • Drain out sea water. • Irrigate the affected area with fresh water and drain out, If wash out resowing of nursery with salt tolerant varieties like Panvel -1 and 	<ul style="list-style-type: none"> • Strengthening of creek bund and sea wall to prevent sea water intrusion • Drain out sea water, • Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> • Strengthening of creek bund and sea wall to prevent sea water intrusion • Drain out sea water. • Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> • 1.Strengthening of creek bund and sea wall to prevent sea water intrusion • Drain out sea water. • Immediate harvesting, threshing and drying in shed.

	Panvel -2			
Fingermillets	Nor applicable since these crops are grown on well drained soils.			
Groundnut				
Black gram				
Horticulture (Vegetables)				
Cucurbitaceous crop				
Solanecious crop				
Flower crops				
Coconut	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out Mound the crop with soil 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out 	<ul style="list-style-type: none"> Strengthening of creek bund and sea wall to prevent sea water intrusion Drain out sea water, Irrigate the affected area with fresh water and drain out

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				
Mango	<ul style="list-style-type: none"> Cover with shed net /Protective irrigation Water spray 	Water spray / 1% Potassium nitrate spray	Collect and destroy dropped fruits	Collect dropped fruits
Cashew	<ul style="list-style-type: none"> Cover with shed net /Protective irrigation Water spray 	Protective irrigation	Protective irrigation	----
Coconut	<ul style="list-style-type: none"> Cover with shed net. Water spray 	<ul style="list-style-type: none"> Frequent irrigation 	<ul style="list-style-type: none"> Frequent irrigation 	<ul style="list-style-type: none"> Frequent irrigation
Arecanut	<ul style="list-style-type: none"> Cover with shed net. 	<ul style="list-style-type: none"> Frequent irrigation 	<ul style="list-style-type: none"> Frequent irrigation 	Frequent irrigation

	• Water spray			
Cucurbitaceous crop	Water spray	Water spray	Water spray	-
Solanaceous crop				-
Flower crops				-

Hailstorm				
Mango	-	-	Collect and destroy the fallen fruit to avoid the further built-up of pest and disease inoculums	Collect the fallen fruit to avoid the further built-up of pest and disease inoculums
Cyclone				
Mango	• Support the young seedlings/grafts	• Proper pruning and disposal of damaged or broken branches	<ul style="list-style-type: none"> • Proper pruning of damage or broken branches • Collect dropped fruits and use it for suitable processing 	<ul style="list-style-type: none"> • Proper pruning of damage or broken branches • Collect dropped fruits and use it for suitable processing
Cashew	• Support the young seedlings/grafts	• Proper pruning and disposal of damaged or broken branches	<ul style="list-style-type: none"> • Proper pruning of damage or broken branches • Collect fallen nuts market it. 	<ul style="list-style-type: none"> • Proper pruning of damage or broken branches • Collect fallen nuts and store
Coconut	• Support the young seedlings	• Immediate disposal of damaged trunk	• Collect fallen tender nuts, market it.	• Collect fallen tender nuts market it.
Sapota	• Support the young seedlings	• Proper pruning and disposal of damaged or broken branches	<ul style="list-style-type: none"> • Proper pruning of damage or broken branches • Collect fallen fruits, market it 	<ul style="list-style-type: none"> • Proper pruning of damage or broken branches • Collect fallen fruits, market it.
Arecanut	• Support the young seedlings	• Immediate disposal of damaged trunk	• Collect fallen tender nuts and market it	• Collect fallen tender nuts market it.
Frost	Not applicable			
Cold wave				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.7.3 Livestock

Drought	Suggested contingency measures		
	Before the event	During the event	After the event
Feed and fodder availability	<ul style="list-style-type: none"> ➤ Conservation of green fodder as silage dry fodder as hay in flush season for utilization in lean period ➤ Dry fodder available should be processed i.e. Urea treatment of crop residues to enhance their nutritive value. For this inputs such as training of livestock owners, material like urea, polythene sheet etc may be provided free of cost to the livestock owners. ➤ Judicial use of available feed resources by the livestock owners. ➤ Non conventional feed resources such as Neem seed Cake/ Sal seed Meal/ Mango seed Kernels/ Babul pods etc should be collected and stored. ➤ Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains, Govt. Godowns wastes, grains unfit for human consumption etc. should be procured for productive animals. ➤ Urea molasses mineral blocks (UMMB) may be reserved with NDDDB, Anand, Gujarat for emergency supply as concentrate. ➤ Sugarcane bagasse, cane tops and molasses form important byproducts. Sugarcane bagasse- is an important feed resource for ruminants. ➤ Tree leaves are easily available. Leaves of 	<ul style="list-style-type: none"> ➤ Judicious use of feed resources processed as per type of livestock possessed by the livestock owners. ➤ Distribution of fodder, UMMB blocks, other feed resources stored in the affected area to the livestock owners as per the number and type of livestock possessed. ➤ Mineral supplementation – Mineral mixture be provided for the livestock@50 g/day/Anim. ➤ Disposal/Transfer of the animals in the area having feed resources availability. ➤ Concentrate feeding for productive animals to support minimum production & life saving of the important animals. ➤ Other non productive animals are to be fed at subsistence level. ➤ Use of food grains for biodisel and distillaries should be stopped and the grains be spared for productive animals. ➤ Bypass protein concentrate ingredients may be provided in order to harvest maximum nutrients for productive animals particularly high productive crossbred cows. ➤ Top feeds should be used during scarcity period only. 	<ul style="list-style-type: none"> ➤ Green fodder production in next Kharip season needs to be undertaken as a source of fodder at earliest. ➤ Mineral Supplementation should be continued. ➤ Concentrate feeding for productive animals so as to compensate the body condition and production. ➤ The animals must be brought into cyclic stage for reproduction. ➤ Young crossbred livestock needs to be attended properly so as to harness the high productivity. ➤ <i>Adlib.</i> feeding may be practiced with balancing the nutrients required. ➤ The unproductive/surplus livestock needs to be culled/disposed. ➤ Livestock suitable with the farming system practiced only should be maintained. ➤ Mechanization in agriculture needs to be encouraged. ➤ Feed processing needs to be encouraged in order to

	<p>neem, mango, banyan, pipal, babul, subabul, mahuva, etc. can be used as green fodder. Tree leaves are good source of protein, calcium, Vitamin A and hence should be reserved for feeding during drought.</p> <ul style="list-style-type: none"> ➤ Cactus is primarily found in deserts hence it is easily available during scarcity also. As such it is not used for feeding animals but during scarcity it can be used. ➤ Mineral mixture should be procured and stored for supply. ➤ Fodder Banks: Grasses & tree leaves: Grasses from periphery of forest area wastelands & farmlands & Dry fallen forest tree leaves may be harvested & stored as hay in bales. ➤ Fodder Bank: Crop Residues: The major cereals like rice & wheat straws are more important for this purpose. Next are coarse cereals, legumes, haulms left after removing grains from the crops. These may be stored in these banks to be established at each Taluka in the drought area. ➤ Govt. should provide support to farmers for making stacks, bailing & storage. ➤ State Animal feed resources Grid needs to be established so as to provide feed resources during scarcity period. ➤ Cattle camp sites needs to be identified. ➤ NGOs/Gorakshan Sanstha etc. needs to be identified. ➤ Anticipated number of livestock & feed resources to be provided needs to be assessed. ➤ Livestock registration should be compulsory with identification by tagging ➤ Preparedness of veterinary services to drought prone areas. 	<ul style="list-style-type: none"> ➤ Oil seed cakes are good source of proteins and hence should be used for productive animals only. ➤ Feed supplements/ Additives needs to be used widely for productive animals. ➤ Establishment of Cattle camps at identified sites. ➤ NGOs/Gorakshan Sanstha etc. identified to be involved for participation/ implementation. ➤ Feed resources @ 7 kg.dry fodder/ day/adult animal for maintenance 2.0 kg. concentrate mixture/day/adult animal for supporting minimum milk production. ➤ Adaptation of proper distribution policy as per requirement with transport facility. ➤ Regular rest periods for working animals particularly bulls during hot period of the day. ➤ Capture and care of stray animals. ➤ The unproductive/surplus livestock needs to be culled/disposed. ➤ Sale of feed and fodder from the affected area to non affected area should be banned. ➤ Distribute fodder at reasonable rate. ➤ Monitoring feed and fodder prices. 	<p>minimize the wastage of feed resources.</p> <ul style="list-style-type: none"> ➤ <i>In-situ</i> storage and feeding of processed animal feed resources by the livestock owners needs to be encouraged. ➤ Readiness for feed and fodder bank as and when required for each districts with transport facility. ➤ Review of shortfalls in planning and refining action plan the before and during event.
--	---	--	---

	<ul style="list-style-type: none"> ➤ Encourage farmers to cultivate fodder crops. ➤ Identification of the site for fodder depot. ➤ Facility to store fodder by creating centralized silage making facility with provision for transport. ➤ Forage production and storage of fodder in irrigated areas. ➤ Assessment of risk and vulnerability. ➤ Formation of village Disaster Management Committee. ➤ Establishment of drought monitoring system or early warning system. 		
	Suggested contingency measures		
Drought	Before the event^s	During the event	After the event
Drinking water	<ul style="list-style-type: none"> ➤ Water resources as in general are inadequate and hence the resources should be trapped and increased. ➤ Available rain water harvesting technique should be adopted i.e. farm ponds etc. ➤ Water conservations measures be adopted to increase water table like recharging of bore wells. ➤ Available water resources should be tapped and reserved. ➤ Water harvesting measures like farm ponds alternative water sources, Nala bunding/check dams etc. needs to be undertaken. ➤ Judicious use of water in agriculture i.e. through drip/sprinkler irrigation. ➤ Wastage of water needs to be curbed. ➤ Rain water harvesting measures needs to be implemented at village level. ➤ Proper utilization of Water to save water. ➤ Equal water distribution plan may be implemented. ➤ Cloud seeding desalination, recycle sewage water, transvasment river project etc. 	<ul style="list-style-type: none"> ➤ Special distribution and carrying capacity should be implemented from other available resources. ➤ Water should be used as per the requirement of animals (@10-15 lit/ 100 kg body weight). ➤ Drinking water should not be used for washing animals. ➤ Clean and chlorinated water be provided to prevent water borne diseases. ➤ Special distribution and carrying capacity should be supplemented from other available resources. ➤ Water for irrigation should be stopped. ➤ Judicious use of water for livestock. ➤ Supply of water through tankers during contingency. ➤ Private water resources such as wells shall be used for drinking water. ➤ Proper utilization of Water to save water. ➤ In vicinity of animal camp or chavani creation of borewell. 	<ul style="list-style-type: none"> ➤ Permanent water resources should be developed with campaign for public awareness. ➤ Steps should be taken to conserve water. ➤ Ensure fresh clean and cold water supply to livestock.

	Suggested contingency measures		
Drought	Before the event	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter with stock of life saving medicine for livestock. ➤ Vaccination of animals for various diseases according to season. ➤ Deworming and spraying be done to get rid of endoparasites and ectoparasites to keep the health of animals in good condition. ➤ Personnels should be trained for health and disease management through training ➤ List of trained personnel should be available at each district head quarter. ➤ Feedadditives/Tonics/ Vitamin supplements should be stocked. ➤ Vaccines, Insecticides, disinfectants and dewormers needs to be stocked. ➤ Records/PM/ Carcass disposal arrangements needs to be ensured. ➤ Training of farmers for maintaining optimum health of animals, balance ration and recognize early signs of disease and managerial shortfalls. ➤ Create temporary shade shelters to prevent heat stress on the animals. (animal camps) ➤ Supply of Mineral and Vitamins mixture. ➤ Application of preventive and control measures of SP & MD. 	<ul style="list-style-type: none"> ➤ Services of trained personnel need to be made available in affected area with sufficient supply of life saving medicine of livestock. ➤ A team of veterinary experts be deployed for health management of drought hit livestock. ➤ During occurrence of disease, affected animals should be kept isolated and treated properly and promptly. ➤ Vaccination against contagious diseases like HS, FMD, Theileriosis be carried out. ➤ Mineral mixture be provided to take care of deficiency disorders. ➤ Tick control measures be undertaken to prevent tick borne diseases in animals under stress. ➤ Deworming should be carried out. ➤ Feed additives/Tonics/Vitamin supplements should be provided. ➤ Post Mortem /record keeping/carcass disposal arrangements be effected. ➤ Restriction on movement of the animals to prevent the spread of diseases. ➤ Periodic disinfection and disinfestations of premises where animals are kept. ➤ Permission of only healthy and vaccinated animals in cattle market. ➤ By proper treatment with supervision and exercise over starvation. ➤ Special transport facility of mobile van for veterinary team be deployed. 	<ul style="list-style-type: none"> ➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during drought with stock of life saving medicine for livestock. ➤ There will be stress on animals due to deterioration of health during drought period. ➤ Concentrates and vitamin-mineral supplements be provided to minimize the stress on animals. ➤ The animals should be observed for signs of contagious diseases or deficiency disorders. ➤ Vaccination spraying and deworming programme needs to be undertaken. ➤ Record of affected livestock to be submitted for compensation of the loss. ➤ Farm disinfection and disinfestations. ➤ Assessment of losses due to mortality if any.
	Suggested contingency measures		

Flood	Before the event	During the event	After the event
Feed and fodder availability	<ul style="list-style-type: none"> ➤ Identification of flood prone zones and flood forecasting. ➤ Installation of early warning systems. ➤ Steps to prevent spoilage of food and water supply due to flood water. ➤ Dedicated helpline to emergency contact and communication at taluka level. ➤ Avoid construction of farm buildings in flood risk areas. ➤ Local ponds and canals regularly inspected and cleared off from obstruction ➤ Adequate stock of Tetanus toxoid. ➤ Change cropping pattern according to flood risk periods. ➤ Storage of available fodder at safe place before rainy season. ➤ Training of local personnel for disaster management. ➤ Dry fodder available should be processed i.e. Urea treatment of crop residues to enhance their nutritive value. For this inputs such as training of livestock owners, material like urea, polythene sheet etc may be provided free of cost to the livestock owners. ➤ Judicial use of available feed resources by the livestock owners. ➤ Non conventional feed resources such as Neem seed Cake/ Sal seed Meal/ Mango seed Kernels/ Babul pods etc should be collected and stored. ➤ Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains, Govt Godowns wastes, grains unfit for human consumption etc. should be procured for productive animals. ➤ Urea molasses mineral blocks (UMMB) 	<ul style="list-style-type: none"> ➤ Quick evacuation of livestock from flood plane areas before area become flooded ➤ Prevent outflow of manure pit in river ➤ Proper feed, vaccine, drugs, disinfectants and feed supplement distribution policy adopted with transport facility. ➤ Prevent spoilage of food and water supply ➤ Judicious use of feed resources processed as per type of livestock possessed by the livestock owners. ➤ Distribution of fodder, UMMB blocks, other feed resources stored in the affected area to the livestock owners as per the number and type of livestock possessed. ➤ Mineral supplementation – Mineral mixture be provided for the livestock @50 g/day/Anim. ➤ Disposal/Transfer of the animals in the area having feed resources availability. ➤ Concentrate feeding for productive animals to support minimum production & life saving of the important animals. ➤ Other non productive animals are to be fed at subsistence level. ➤ Use of food grains for biodisel and distillaries should be stopped and the grains be spared for productive animals. ➤ Bypass protein concentrate ingredients may be provided in order to harvest maximum nutrients for productive animals particularly high productive 	<ul style="list-style-type: none"> ➤ Green fodder production in next Kharip season needs to be undertaken as a source of fodder at earliest. Fodder seed of improved fodder crop varieties needs to be distributed. ➤ Mineral Supplementation should be continued. ➤ Concentrate feeding for productive animals so as to compensate the body condition and production. ➤ The animals must be brought into cyclic stage for reproduction. ➤ Young crossbred livestock needs to be attended properly so as to harness the high productivity. ➤ <i>Adlib.</i> feeding may be practiced with balancing the nutrients required. ➤ The unproductive/surplus livestock needs to be culled/disposed. ➤ Livestock suitable with the farming system practiced only should be maintained. ➤ Mechanization in agriculture needs to be

	<p>may be reserved with NDDB, Anand, Gujarat for emergency supply as concentrate.</p> <ul style="list-style-type: none"> ➤ Sugarcane bagasse, cane tops and molasses form important byproducts. Sugarcane bagasse- is an important feed resource for ruminants. ➤ Tree leaves are easily available. Leaves of neem, mango, banyan, pipal, babul, subabul, mahuva, etc. can be used as green fodder. Tree leaves are good source of protein, calcium, Vitamin A & hence should be reserved for feeding during drought. ➤ Cactus is primarily found in deserts hence it is easily available during scarcity also. As such it is not used for feeding animals but during scarcity it can be used. ➤ Mineral mixture should be procured and stored for supply. ➤ Fodder Banks: Grasses & tree leaves: Grasses from periphery of forest area wastelands & farmlands & Dry fallen forest tree leaves may be harvested & stored as hay in bales. ➤ Fodder Bank: Crop Residues: The major cereals like rice & wheat straws are more important for this purpose. Next are coarse cereals, legumes, haulms left after removing grains from the crops. These may be stored in these banks to be established at each Taluka in the drought area. ➤ Govt. should provide support to farmers for making stacks, bailing & storage. ➤ State Animal feed resources Grid needs to be established so as to provide feed resources during scarcity period. ➤ Cattle camp sites needs to be identified. ➤ NGOs/Gorakshan Sanstha etc. needs to 	<p>crossbred cows.</p> <ul style="list-style-type: none"> ➤ Top feeds should be used during scarcity period only. ➤ Oil seed cakes are good source of proteins and hence should be used for productive animals only. ➤ Feed supplements/ Additives needs to be used widely for productive animals. ➤ Establishment of Cattle camps at identified sites. ➤ NGOs/Gorakshan Sanstha etc. identified to be involved for participation/ implementation. ➤ Feed resources @ 7 kg. dry fodder/day/adult animal for maintenance 2.0 kg. concentrate mixture/day/adult animal for supporting minimum milk production. ➤ The stored feeds & fodder can be used to feed the animals & if it is short then Fodder resources should be exploited with sufficient transport facilities from other areas of the district. 	<p>encouraged.</p> <ul style="list-style-type: none"> ➤ Feed processing needs to be encouraged in order to minimize the wastage of feed resources. ➤ <i>In-situ</i> storage and feeding of processed animal feed resources by the livestock owners needs to be encouraged. ➤ Fodder resources should be exploited with sufficient transport facilities from other areas of the district even after the event.
--	---	---	--

	<p>be identified.</p> <ul style="list-style-type: none"> ➤ Anticipated number of livestock & feed resources to be provided needs to be assessed. ➤ Information at every district head quarter regarding availability of fodder resources from other areas for exploitation should be made available. A storehouse can be prepared at a highest point in the city where feeds & fodder (silage) can be stored for emergency use. 		
	Suggested contingency measures		
Flood	Before the event	During the event	After the event
Drinking water	<ul style="list-style-type: none"> ➤ Sufficient storage capacity should be made available particularly during rainy season in view of the forecasting of the flood. Rain water harvesting should be done in all districts. Every district should be made self-sufficient. Every district has plenty of rain water which should be harvested so that these areas should become self-sufficient & if required they should be able to provide water to other dry areas too. The rain water should not be wasted in sea. ➤ Shelters & temporary camps should be set up at a height in city area as well as in suburbs after choosing the right location for each area. Same provisions should be done in other Konkan districts. ➤ Bore well facilities should be exploited in districts for supply of clean water. Contamination of local water resources due to flood water should be prevented ➤ Potable drinking water source should 	<ul style="list-style-type: none"> ➤ Sufficient facility for transportation with advanced proper planning should be made in the areas of each district. ➤ During flood condition there will be polluted water, whatever potable drinking water source is available should be used with almost care. ➤ Disinfection of drinking water <i>i.e.</i> chlorination of water should be carried out Stop use of drinking water for animals from contaminated water resources. ➤ Disinfection of the water for consumption of the animals should be carried out to prevent water-borne diseases. Aerosol spray of the disinfectant for preventing spread of airborne infections should be carried out. Shelters & temporary camps for displaced animals should be set up with proper sanitation facilities. ➤ Judicious use of water for livestock. ➤ Water tankers provision ➤ Private water resources such as wells shall be used for drinking water 	<ul style="list-style-type: none"> ➤ Sufficient infrastructure facility for transportation with advanced proper planning should be made in the areas of each district. ➤ Clean disinfected water from bore well or rain harvested water may be supplied to the animals as water-borne infections are common after floods. ➤ Sources of potable drinking water should be tapped for its proper use. ➤ Permanent water resources should be developed with campaign for public awareness. ➤ Water storage facility created away from the flooded area.

	<p>be there to supply water to animals.</p> <ul style="list-style-type: none"> ➤ Every society should implement rain harvesting system, so that water can be stored for use whole year long. Water problem likely to be faced in future. Water harvesting measures like farm ponds alternative water sources, Nala bunding/check dams etc. needs to be undertaken. ➤ Judicious use of water in agriculture i.e. through drip/sprinkler irrigation. ➤ Wastage of water needs to be curbed. ➤ Rain water harvesting measures needs to be implemented even at village level with establishment of water Storage and Purification facility 	availability only.	
	Suggested contingency measures		
Flood	Before the event	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter for flood affected areas with stock of life saving medicine for livestock. ➤ Vaccination of animals for various diseases according to season. ➤ Deworming and spraying be done to get rid of endoparasites and ectoparasites to keep the health of animals in good condition. ➤ Stock of life saving medicine be made. ➤ Disaster management team of veterinarians be constituted at district/taluka/panchayat level. ➤ Training to veterinarians in health and disease management during flood disaster be given. ➤ Awareness amongst farmers regarding 	<ul style="list-style-type: none"> ➤ Services of trained personnel need to be made available in affected area with sufficient supply of life saving medicine of livestock. ➤ Shifting of the animals at suitable place for temporary shelter. ➤ Disaster management team of veterinarians be deployed. ➤ Makeshift Veterinary medical facilities should be created at the site nearer to disaster place. ➤ Various referral centres in the disease diagnostics should be roped in for detection of infections which cannot be diagnosed at field level. ➤ Various diagnostic facility with modern techniques should be made available at Tahsil level besides district level so that more number of farmers may approach for diagnosis 	<ul style="list-style-type: none"> ➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during flood with stock of life saving medicine for livestock. ➤ After flood condition there are chances of occurrence of specific diseases. ➤ Preventive measures should be taken to reduce occurrence of diseases. Vaccination and deworming programme needs to be undertaken. ➤ Animals should closely be observed for new/re-emerging diseases. ➤ Proper disposal of carcass is

	<p>health care practices during flood disaster be undertaken.</p> <ul style="list-style-type: none"> ➤ Feed additives/Tonics/ Vitamin supplements should be stocked. ➤ Vaccines /Dewormers needs to be stocked. ➤ Records/PM/ Carcass disposal arrangements needs to be ensured. ➤ In flood prone area pucca cattle shed should be constructed. ➤ Preparation of walls and hips to keep flood water away from village. ➤ Supply of Mineral and Vitamins mixture. ➤ Application of preventive and control measures of SP & MD. 	<p>& treatment.</p> <ul style="list-style-type: none"> ➤ Adequate nutrition including vitamin-mineral supplements should be given to animals to keep their health in proper condition. ➤ During occurrence of contagious diseases, affected animals should be kept isolated and treated properly. Isolation and treatment of ailing animals viz. hypothermia, wound, diarrhoea and pneumonia be undertaken. ➤ Vaccination against HS, BQ and FMD in bovines and PPR and enterotoxaemia in small ruminants should be undertaken. ➤ Deworming and spraying of apparently healthy animals be carried out. ➤ Use of antivenum in snake bite cases. ➤ Feed additives/Tonics/Vitamin supplements should be provided. Vaccination and deworming programme needs to be undertaken. ➤ Post Mortem /record keeping/carcass disposal arrangements be effected. ➤ Disinfect the premises with bleaching powder and lime. ➤ Turn off electrical power. ➤ Training of farmers for maintaining optimum health of animals, balance ration and recognize early signs of disease and managerial shortfalls during floods. ➤ During severe regular flood, shifting of village away from river or changing the path of river away from village. 	<p>very important in flood affected areas from public health point of view. Methods of disposing of dead animals include burning, burying and composting.</p> <ul style="list-style-type: none"> ➤ Disinfection of animal sheds with 2% formaldehyde / 4% caustic soda. ➤ Provide proper shelter to protect animals from cold and rain. ➤ Record of affected livestock to be submitted for compensation of the loss. ➤ In regular flood prone areas defenses such as levees, bunds, reservoirs and weirs should be used for future preventions.
--	--	--	---

	Suggested contingency measures		
Cyclone	Before the event^s	During the event	After the event
Feed and fodder availability	<ul style="list-style-type: none"> ➤ There should be availability of fodder depot one each for every district. ➤ Information at every district head quarter regarding availability of fodder resources from other areas for exploitation should be made available. A storehouse can be prepared at a highest point in the district where feeds & fodder (silage) can be stored for emergency use. The store house should have proper walls on all sides with one entrance to avoid effect of cyclone. ➤ Feed & fodder should be stored as emergency stock in Govt. warehouses which can be distributed to areas that need them. 	<ul style="list-style-type: none"> ➤ Adaptation of proper distribution policy as per requirement with transport facility. ➤ The stored feeds & fodder can be used to feed the animals & if it is short then Fodder resources should be exploited with sufficient transport facilities from other areas of the district. 	<ul style="list-style-type: none"> ➤ Readiness for feed and fodder bank as and when required for each districts with transport facility should be created.
	Suggested contingency measures		
Cyclone	Before the event	During the event	After the event
Drinking water	<ul style="list-style-type: none"> ➤ Water resources as in general are inadequate and hence the resources should be trapped and increased. ➤ Rain water harvesting should be done in all districts. Every district should be made self-sufficient. Each district has plenty of rain water which should be harvested so that these areas are self-sufficient & if required they should be able to provide water to other dry areas too. The rain water should not be wasted in sea. ➤ Walls of the well should be constructed much above the ground level to avoid contamination. 	<ul style="list-style-type: none"> ➤ Special distribution and carrying capacity should be implemented from other available resources. ➤ Rain harvested water & bore well water should be disinfected & provided to the animals. ➤ Special distribution and carrying capacity should be implemented from other available resources. ➤ Disinfection of the water for consumption of the animals should be carried out to prevent water-borne diseases. Aerosol spray of the disinfectant for preventing spread of airborne infections should be carried out. Shelters & temporary camps for displaced animals should be set up with proper sanitation facilities 	<ul style="list-style-type: none"> ➤ Permanent water resources should be developed even after the event with campaign for public awareness.

Cyclone	Suggested contingency measures		
	Before the event^s	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter for cyclone affecting areas with stock of life saving medicine for livestock. ➤ Vaccination against common infections like FMD, swine fever, black quarter, anthrax, haemorrhagic septicaemia, etc. should be given to animals. ➤ Stock of medicines should be kept available for use during cyclone. ➤ The walls and roofs of the cow sheds should be well secured. ➤ Loose poles & tree branches should be removed, which may become harmful during extreme wind. ➤ Supply of Mineral and Vitamins mixture. ➤ Application of preventive and control measures of SP & MD. 	<ul style="list-style-type: none"> ➤ Keep watch on weather and listen to radio or TV and make others alert by warning. ➤ Shift the animals at safer place or in well secured cattle sheds. ➤ The wall and roofs of the cow sheds should be well secured. ➤ Loose poles & tree branches should be removed, which may become harmful during extreme wind. ➤ Services of trained personnel need to be made available in cyclone affected area with sufficient supply of life saving medicine of livestock. ➤ Makeshift Veterinary medical facilities should be created at the site nearer to disaster place. ➤ Various referral centers in the disease diagnostics should be roped in for detection of infections which cannot be diagnosed at field level. ➤ Various diagnostic facility with modern techniques should be made available at Tahasil level besides district level so that more number of farmers may approach for diagnosis & treatment. 	<ul style="list-style-type: none"> ➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during cyclone with stock of life saving medicine for livestock. ➤ Do not free the animals unless all clear or officially advised it is safe.

2.5.2 Poultry

Drought	Suggested contingency measures		
	Before the event	During the event	After the event

Shortage of feed ingredients	<ul style="list-style-type: none"> ➤ There should be availability of feed, feed ingredients and mineral mixtures with sufficient storage capacity for every district. ➤ Registration of poultry farms made compulsory to make it easier to be prepared and provide quick help to the farmers ➤ Storage of feed ingredients of previous year in sufficient quantity to use in scarcity period. ➤ Identification and storage of locally available feed ingredients as an substitute for scares ingredients. ➤ A farm disaster kit should be prepared in advance. The kit should be placed in a central location and everyone should know where it is. The contents of the kit must be checked regularly to ensure fresh and complete supplies. The following items should be included in the kit in addition to the items that are used everyday: <ul style="list-style-type: none"> – Updated list of all farms with information about birds, their location and records of feeding, vaccination, tests. – Basic first aid kit. – Handling equipment & cages. – Waterier and feeders. – Sanitation and disinfection equipments & chemicals. – Other safety and emergency items for vehicles and trailers, e.g.,Extra tyres, winches, tools, etc. ➤ Maize grain is limiting source as a 	<ul style="list-style-type: none"> ➤ Adaptation of proper distribution policy as per requirement with transport facility. ➤ Supply of feed ingredients through government channel to the end users at reduced price. ➤ Make sure that birds receive adequate quantity and essential nutrients through feed to minimize stress and to prevent occurrence of disease outbreaks. ➤ Crucial use of available feed avoiding excess feeding and wastage of the feed. ➤ Stored feed ingredients will be utilized during contingency. ➤ Birds should be evacuated and taken to shelters as soon as there is news of an imminent disaster. Every flock must have some form of durable and visible identification. ➤ There should be arrangements for appropriate transport, suitable for birds. Stranded birds should be rescued and taken to safer places. ➤ If the stranded place is considered safe for the next week or so, the birds may be left there but should be provided with feed and drinking water. ➤ Arrangements should be made so that veterinary and Para- veterinary personnel can quickly reach all affected farms to provide necessary measures. ➤ Officials and other personnel engaged in relief work should also gather intelligence on the extent and nature of the damage to individual farms and villages so that appropriate relief measures can be implemented. ➤ Adequate nutrition should be given to birds to keep their health in proper condition. ➤ The available ingredients as poultry feed should be used with utmost care. 	<ul style="list-style-type: none"> ➤ Readiness for feed, feed ingredients and mineral mixtures as and when required for each districts with transport facility. ➤ Strategies to minimize the effects of stress due to drought by optimum feeding and management of the flock. ➤ Use of mineral and vitamin supplements to reduce stress. ➤ Follow up of affected livestock for adequate feed supply. ➤ Proper utilization of the resources should be carried out. The situation should be assessed properly and decision has to be taken on which birds to be treated first and how. ➤ The birds that are in very poor condition with no chance of recovery should be culled in humane manner. ➤ The dead birds should be disposed off in hygienic manner by burial or incineration. ➤ The situation at the farm also should be assessed and the corrective measures should be taken as soon as possible. All damages should be repaired and shed should be made functional. Disinfection of the premises and shed should be carried to prevent spread of diseases. ➤ The stress on poultry due to shortage of feed during drought period can be minimized by
-------------------------------------	--	---	--

	<p>feed ingredient in poultry feed.</p> <ul style="list-style-type: none"> ➤ Store maize for poultry feed. ➤ Substitute feed ingredient should be tapped as replacement for maize grain which can be used for poultry feed. ➤ Concentrate ingredients such as Grains, brans, & oilseed cakes, low grade grains, Govt. Godowns wastes, grains unfit for human consumption etc. should be procured. ➤ Ban on export of oilseed meals needs to be implemented. ➤ Feed required for broilers 3.5 kg./bird for six weeks. For Layers 55 kg /layer bird for a period of 72 weeks. 	<ul style="list-style-type: none"> ➤ Non-conventional feed ingredients can also be tapped to use as a poultry feed taking into consideration the anti-nutritional factors present in it. ➤ Alternate day feeding for broilers. ➤ Avoid feed wastage. ➤ Restricted feeding for layers. ➤ Poor layer birds to be culled. ➤ Broiler rear up to 4 weeks only. ➤ Use of feed additives be enhanced to maximize the feed efficiency. 	<p>proper feeding of the birds after drought period.</p> <ul style="list-style-type: none"> ➤ Ad lib. feeding to compensate the egg production. ➤ Feed additives may be used to maximize production
--	--	---	---

	Suggested contingency measures		
Drought	Before the event	During the event	After the event
Drinking water	<ul style="list-style-type: none"> ➤ Water resources as in general are inadequate and hence the resources should be tapped and increased. ➤ Conservation of water for drought period. ➤ Water conservations measures adopted to increase water table like recharging of bore wells. ➤ Available water resources should be tapped and reserved. ➤ Leak proof water supply systems. ➤ Available rain water harvesting technique should be adopted i.e. farm ponds etc. ➤ Water conservations measures be adopted to increase water table. ➤ Judicious use of water. ➤ Use of nipples as waterers. 	<ul style="list-style-type: none"> ➤ Special distribution and carrying capacity should be implemented from other available resources for poultry. ➤ Optimum use of available water as per the requirement of birds. ➤ Supply of adequate water to farms with transportation facility. ➤ Supply of water through tankers during contingency. ➤ Judicious use of water. ➤ Use of nipples as waterers. 	<ul style="list-style-type: none"> ➤ Permanent water resources should be developed even after the event with campaign for public awareness. ➤ Evaluation and fine tuning of the contingency majors. ➤ Ensure clean, cold water supply to birds. ➤ Steps should be taken to conserve water and to develop permanent water resources. ➤ Fresh and ad lib. water should be provided.

Drought	Suggested contingency measures		
	Before the event^s	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management of poultry through trainings and list of trained personnel should be available at each district head quarter with stock of medicine, mineral mixture and vaccine for poultry. ➤ Regular and strict vaccination of birds. ➤ Vaccination of wild birds through water whenever possible. ➤ Deworming of birds before and after drought period. ➤ Appointment of veterinarian on farms made compulsory. 	<ul style="list-style-type: none"> ➤ Services of trained personnel need to be made available in affected area with sufficient supply of medicine, mineral mixture and vaccine for poultry. ➤ Immediate attention to diseased birds by veterinarians. ➤ Regular visits of veterinarians to detect diseased birds and veterinary care ➤ Vaccination of birds if necessary. ➤ If there is occurrence of disease, affected birds should be kept isolated and treated properly and promptly. ➤ Periodic disinfection and disinfestations of farm and premises. ➤ Measures to minimize risk of spreading contagious diseases. ➤ Birds should be checked for injury/ signs of disease. ➤ Antibiotic through water ➤ Anti-stress supplements ➤ Multivitamin supplements ➤ Bio-security measures to be implemented. ➤ Proper disposal of poultry carcass. 	<ul style="list-style-type: none"> ➤ Routine training programmed as a refresher course need to be implemented in relation to health and disease management during drought with stock of life saving medicine and vaccine for poultry to prevent outbreak. Proper disposal system of poultry carcasses. ➤ Efforts to minimize effects of stress through optimum feeding, management and veterinary care. ➤ Assessment of losses due to mortality if any. ➤ Proper disposal of carcass. ➤ There will be stress on birds due to deterioration of health during drought period. Hence proper feeding should be done to minimize the stress on birds by supplying vitamin supplements. ➤ Birds should be tested at regular interval to confirm that they are free of contagious diseases. ➤ Proper disposal of birds died of various diseases. ➤ Vaccination. ➤ Replacement of stock.

Floods	Suggested contingency measures		
	Before the event	During the event	After the event

Shortage of feed ingredients	<ul style="list-style-type: none"> ➤ Poultry owners needs to be advised to be in readiness for- ➤ Alternate poultry sheds with feed stock at safe places. ➤ Displacement of stock- transport arrangements. ➤ Registration of poultry farms made compulsory to make it easier to be prepared and provide quick help to the farmers ➤ Measures to avoid spoilage of feed stores due to water. ➤ Construction of feed stores to stores feed sufficient for at least one month. ➤ Farmers will be encouraged to purchase and store the feed ingredient when it is cheaply available in the market. ➤ Information at every district head quarter regarding availability of feed and feed ingredients and mineral mixture resources from other areas. 	<ul style="list-style-type: none"> ➤ Shifting of birds at Alternate poultry sheds with feed stock at safe places. ➤ Stress reducing measures to be adopted. ➤ Feed and feed ingredients resources should be exploited with sufficient transport facilities from other areas of the district. ➤ Adequate nutrition should be given to birds to keep their health in proper condition. ➤ Judicious use of available feed. 	<ul style="list-style-type: none"> ➤ Shifting at original site after repair of the shades and restoration of the necessary facilities. ➤ Proper feeding should be done to minimize the stress on birds ➤ Ensure good quality feed and fodder supply to birds ➤ Feed and feed ingredients resources should be exploited with sufficient transport facilities from other areas of the district even after the event.
	Suggested contingency measures		
Floods	Before the event^s	During the event	After the event
Drinking water	<ul style="list-style-type: none"> ➤ Arrangement of clean and hygienic water. ➤ Leak and contamination proof water supply system. ➤ Installations of the watering systems targeted to optimum use of available water avoiding water wastage. ➤ Source of water should be away from flood affected areas. ➤ Sufficient storage capacity should be made available particularly during rainy season in view of the forecasting of flood. ➤ Encourage the farmers for rain water harvesting. ➤ Proper utilization of Water to save 	<ul style="list-style-type: none"> ➤ Sufficient facility for transportation with advanced proper planning should be made in the areas of each district. ➤ Water treatment to avoid entry of pathogens through drinking water. ➤ Judicious use of potable chlorinated water. ➤ Avoid contamination of wells and tube wells by flood water. ➤ Proper utilization of Water to save water. ➤ Supply of water through tankers during contingency. ➤ Water purification measures for ensuring hygienic water supply. 	<ul style="list-style-type: none"> ➤ Actions to rectify the water related issues observed during flood period. ➤ Ensure potable water supply to birds. ➤ Sufficient infrastructure facility for transportation with advanced proper planning should be made in the areas of each district. ➤ Sources of potable drinking water should be tapped for its proper use. ➤ Use of disinfected water. ➤ Arrangements of hygienic water supply.

	water.		
--	--------	--	--

Floods	Suggested contingency measures		
	Before the event	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter for flood affecting areas with stock of medicine, mineral mixture and vaccine for poultry. ➤ Vaccination and deworming schedule should be observed strictly. ➤ Additional deworming can be carried out before and after floods. ➤ Medicine store facility with availability of adequate drugs at each farm and veterinary dispensaries. ➤ Training of farmers to identify signs of common contagious diseases particularly to avoid outbreaks. ➤ Do not built poultry house on nalla or stream or otherwise remove the birds before monsoon from such poultry house. 	<ul style="list-style-type: none"> ➤ Services of trained personnel need to be made available in affected area with sufficient supply of medicine, mineral mixture and vaccine. ➤ During flood if it is difficult to shift and manage large number of birds, they should be slaughter and sent to cold storage. ➤ Vaccination against contagious diseases. ➤ Proper disposal of birds died of diseases particularly contagious diseases. ➤ Disinfection of sheds be undertaken. ➤ Immediate veterinary help to the farms. ➤ Adequate proper feeding and management. 	<ul style="list-style-type: none"> ➤ Routine training programmed as a refresher course need to be implemented in relation to health and disease management during flood with stock of medicine and vaccine for poultry to prevent outbreak. Proper disposal system of poultry carcasses. ➤ Cleaning and disinfection of poultry farms. ➤ Monitoring for disease outbreaks in birds through regular farm visits by veterinarian. ➤ Proper disposal of carcass is very important in flood affected areas from public health point of view. ➤ Vaccination for RD and IBD to avoid outbreaks. ➤ Anti-stress treatment of birds is important to prevent mortality. ➤ Preventive measures should be taken to reduce occurrence of diseases, particularly use of antibiotics in drinking water. ➤ Hygienic measures should be followed. ➤ Birds should be served for emerging infectious diseases. ➤ Restriction on movement of the birds. ➤ Compensation of the loss.

	Suggested contingency measures		
Cyclone	Before the event	During the event	After the event
Shortage of feed ingredients	<ul style="list-style-type: none"> ➤ Information at every district head quarter regarding availability of feed and feed ingredients and mineral mixture resources from other areas with storage facility. 	<ul style="list-style-type: none"> ➤ Feed and feed ingredients resources should be exploited with sufficient transport and storage facilities from other areas of the district. 	<ul style="list-style-type: none"> ➤ Feed and feed ingredients resources should be exploited with sufficient transport and storage facilities from other areas of the district even after the event.

	Suggested contingency measures		
Cyclone	Before the event	During the event	After the event
Drinking water	<ul style="list-style-type: none"> ➤ Sufficient storage capacity should be made available particularly during rainy season in view of the forecasting of the cyclone. 	<ul style="list-style-type: none"> ➤ Sufficient facility for transportation with advanced proper planning should be made in the areas of each district. 	<ul style="list-style-type: none"> ➤ Sufficient infrastructure facility for transportation with advanced proper planning should be made in the areas of each district.

	Suggested contingency measures		
Cyclone	Before the event	During the event	After the event
Health and disease management	<ul style="list-style-type: none"> ➤ Personnel should be trained for health and disease management through trainings and list of trained personnel should be available at each district head quarter during heat and cold waves with stock of life saving medicine, vaccine, feed and mineral mixture for poultry. 	<ul style="list-style-type: none"> ➤ Services of trained personnel need to be made available in affected area with facilities to overcome heat waves through water availability and cold through proper closed shelter with sufficient supply of medicine and vaccine for poultry. During heat fogging system should be ready and during cold artificial heat through electricity need to be provided. ➤ Detection & treatment of ailing birds. ➤ Vaccination against contagious diseases. ➤ Antistressor preparations or multivitamins preparations through drinking water during stress. ➤ <i>Ad. lib.</i> Cold water availability ➤ Supply of medicine and vaccine for poultry. 	<ul style="list-style-type: none"> ➤ Routine training programme as a refresher course need to be implemented in relation to health and disease management during heat and cold waves with stock of medicine and vaccine for poultry and sufficient arrangement. ➤ Anti- stress to relieve stress. ➤ Birds should be monitored for occurrence of diseases. ➤ Vaccination to avoid outbreaks. ➤ Proper disposal of poultry carcasses.

		<ul style="list-style-type: none"> ➤ Feed in cool hrs and increase the frequency of feeding with high density feeds. ➤ Mineral & Vitamin supplementation 	
--	--	--	--

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture			
Marine	Not applicable	Not applicable	Not applicable
Inland			
(i) Shallow water depth due to insufficient rains/inflow	Need to implement cost-effective water efficiency and conservation measures in very early stage to handle the drought. Strategic plan should be made to construct bunds & conserve water in drought prone areas.	In severe drought condition Most of the stock can be harvested immediately while Some portion of the local aquatic species should be transfer to the less affected areas so as to conserve them and reintroduce in its regional habitat.	Water policies should be determined If we want to restore our inland fishery resources. Need to set up hatcheries for drought affected fish species to avoid their extinction, and the conserved species once again need to be reintroduced in their original habitats after achieving desired aquatic environment.
(ii) Changes in water quality	Regular monitoring of water quality	Need to harvest the stock to minimize economic losses before mass mortality due to undesired water quality.	After achieving desired water quality, conserved species once again need to be reintroduced in their original habitats.
(iii) Any other	Gene bank should be made for all indigenous local commercially & ecologically important species.	To conserve the endangered species breeding and rearing indoor facility may be created for future restoration	The conserved species once again need to be reintroduced in their original habitats after achieving desired aquatic environment.
B. Aquaculture			

(i) Shallow water in ponds due to insufficient rains/inflow	<p>Water temperature may get raised and also Dissolved Oxygen level may get declined, hence efforts should be made to increase the depth of pond & avoid water seepage by using bentonite clay, plastic liners etc.</p> <p>Also artificial oxygenation systems as aerators etc. should be incorporated in aquaculture system.</p>	<p>Water recycling with the aid of potential filtration systems can be applied if available. Provide artificial oxygenation. If water level is too much low, can lead to mass mortality due to environmental stress hence it will be better to harvest the stock immediately.</p>	<p>Construction of small reservoirs or dams should be newly developed in drought prone area.</p> <p>Identifying culturable air breathing species / hardy species (e.g. <i>Notopterus</i>, <i>Clarius</i>, <i>Puntius</i> etc.) suitable to the regional aquatic environment.</p>
(ii) Impact of salt load build up in ponds / change in water quality	<p>Throughout the culture period salinity & other parameters should be checked for regular intervals. Fresh water storage ponds should be developed at aquaculture site.</p>	<p>Fresh water from the storage ponds can be utilized for maintaining salinity.</p>	<p>Identifying best suitable euryhaline spp. (Pearl spot, Sea bass, Rabbit fish, mullets etc.) for the culture which can tolerate wide range of salinity.</p>

2) Floods			
A. Capture			

Marine	<p>Disaster preparedness mission through Sea walls, Embankment. In future early warning systems and evacuation strategy planning for flood prone areas.</p> <p>Plan of Preventive measures against the epidemiological diseases, like malaria, cholera, <i>dengue</i> etc. Among coastal communities.</p> <p>Educating coastal population about Disaster mitigation and provision of good transport means in coastal areas prior to the Flooding event which will be helpful for rescue operations.</p>	<p>Aid to populations at the affected zones and shelters.</p> <p>Affected population should be provided with adequate food & medicines in time.</p>	<p>National & international financial support for research on the various aspects of the flood will be needed for future strategies.</p> <p>Microfinance to the affected population by Governmental & Non Governmental Organization to reconstruct their socio-economic status.</p> <p>Control of vector-borne endemic and epidemic diseases.</p> <p>Mangrove plantation & conservation strategies should be adopted in estuarine region for minimizing future risk.</p>
Inland	<p>In future early warning systems and evacuation strategy planning for flood prone areas.</p> <p>Awareness of People living in rural zones, or urban margins with regards to the geography of their area as they do not take into account whether they are on a river's flood plain, an unstable hillside, a dry river bed in a flooding area, etc., when they (fisheries community) build their houses.</p> <p>More emphasis should be given on the maintenance of public infrastructure, such as highways, secondary roads and bridges prior to the flooding event which will be helpful for rescue operations.</p> <p>Awareness should be created for using good materials for their construction of houses.</p> <p>Strategic planning to build up local</p>	<p>Aid to populations at the affected zones and shelters.</p> <p>Timely help to populations at the affected zones and shelters.</p> <p>Affected population should be provided with adequate food & medicines in time.</p>	<p>Diversifying course of flooding river to minimize socio-economic losses.</p> <p>Microfinance to the affected population by Governmental & Non Governmental Organization to reconstruct their socio-economic status.</p>

	rescue teams in flood prone areas.		
(i) Average compensation paid due to loss of human life	<i>Not applicable</i>		
(ii) No. of boats / nets/damaged	<i>Not applicable</i>		
(iii) No. of houses damaged	<i>Not applicable</i>		
(iv) Loss of stock	<i>Not applicable</i>		
(v) Changes in water quality	<i>Not applicable</i>		
(vi) Health and diseases	Preventive measures of Plan of the Health Ministry for the prevention of epidemiological diseases, like malaria, cholera, <i>dengue</i> etc. & vaccination in flood prone area.	Affected population should be provided with adequate food & medicines in time.	Control of vector-borne endemic and epidemic diseases.

B. Aquaculture			
(iv) Inundation with flood water	Early warning systems should be developed to minimize future risk. Elevating the height of peripheral dykes of the aquaculture ponds. Providing elevated net fencing on the bunds to the avoid loss of fish during flooding.	Need to harvest the stock as early as possible to minimize economic losses	Drain out excess water, disinfecting and refilling the ponds with water and restocking by adopting standard aquaculture protocols.
(ii) Water contamination and changes in water quality	Elevating the peripheral dykes of the aquaculture ponds.	Need to harvest the stock as early as possible to minimize economic losses	Drain out all the water from the pond and refill it with good quality water for future crop.

(iii) Health and diseases	Adequate vaccination of fish stocks prior to flooding event is recommended to minimize the risk.	In situ observations & analysis of health status of cultivable species and stress inducing factors and recommendation of treatments to specific diseases.	Quarantining of culture pond before next stocking.
(iv) Loss of stock and inputs (feed, chemicals etc)	Elevating the peripheral dykes of the aquaculture ponds and good indoor storage facility for inputs.	Early harvest of the stock and transport of inputs to the safer places.	Use new stock.
(v) Infrastructure damage (pumps, aerators, huts etc)	Elevating the peripheral dykes of the aquaculture ponds and good indoor storage facility for the pumps & aerators in flood condition.	Transport of the pumps, aerators etc. to the safer places.	Insurance and micro-finance for repair and maintenance of the infrastructure.

3. Cyclone / Tsunami			
A. Capture			
Marine	<p>Timely Communication of weather forecasting to fishermen</p> <p>Implementation of Tsunami detection & warning system in Indian ocean and evacuation strategy planning for Cyclone / Tsunami prone area.</p> <p>Disaster preparedness mission through Sea walls, Embankment</p> <p>Provision of Wave breakers & dry docks for fishing vessel security.</p> <p>Encouragement and financial incentives should be given to fishermen to carry Safety Devices on their fishing crafts.</p> <p>Educating coastal population about Disaster mitigation and provision of good transport means in coastal areas</p>	<p>Timely aid to coastal populations at the affected zones and provision of shelters.</p> <p>Affected population should be provided with adequate food & medicines in time.</p>	<p>Microfinance to the affected population by Governmental & Non Governmental Organization to rebuild their socio-economic status.</p> <p>Control of vector-borne endemic and epidemic diseases;</p> <p>National & international financial support for research on the various aspects of the Cyclone / Tsunami will be needed for the planning of future strategies.</p> <p>Mangrove conservation, plantation strategies should be adopted in estuarine / coastal region for minimizing future risk</p>

	<p>prior to the Cyclone / Tsunami event which will be helpful for rescue operations.</p> <p>Preventive measures for the prevention of epidemiological diseases, like malaria, cholera, dengue etc</p>		
(i) Average compensation paid due to loss of fishermen lives	---	---	---
(ii) Avg. no. of boats / nets/damaged	---	---	---
(iii) Avg. no. of houses damaged	---	---	---
Inland	<p>Timely Communication of weather forecasting to fishermen</p> <p>Encouragement and financial incentives should be given to fishermen to carry safety devices on their fishing crafts.</p>	<p>Timely aid to coastal populations at the affected zones and provision of shelters.</p> <p>Affected population should be provided with adequate food & medicines in time.</p>	<p>Microfinance to the affected population by Governmental & Non Governmental Organization to rebuild their socio-economic status.</p> <p>Rehabilitation of fishermen communities.</p>
B. Aquaculture			
(i) Overflow / flooding of ponds	<p>Elevating the peripheral dykes of the aquaculture ponds</p> <p>Early warning systems should be developed to minimize future risk.</p>	<p>In very initial stage prior to flooding, need to harvest the stock as early as possible to minimize economic losses. In severe condition nothing can be controlled.</p>	<p>Drain out excess water, disinfecting and refilling the ponds with water and restocking by adopting standard aquaculture protocols.</p>
(ii) Changes in water quality (fresh water / brackish water ratio)	<p>Elevating the peripheral dykes of the aquaculture ponds. Regular monitoring of water quality.</p>	<p>Fresh water from the storage ponds can be utilized for maintaining salinity.</p>	<p>Drain out excess water, After achieving desired water quality, restocking by adopting standard aquaculture protocols.</p>
(iii) Health and diseases	<p>Adequate vaccination of the stocks prior to this is recommended to minimize the risk</p>	<p>In situ observations & analysis of health status of cultivable species and stress inducing factors and recommendation of treatments to specific diseases.</p>	<p>Disinfecting / Quarantining of culture pond before the next stocking.</p>
(iv) Loss of stock and inputs (feed,	Elevating the peripheral dykes of the	Early harvest of the stock and	Use new stock.

chemicals etc)	aquaculture ponds and good indoor storage facility for inputs.	transport of inputs to the safer places.	
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	Elevating the peripheral dykes of the aquaculture ponds and Initial provision of good indoor storage facility for pumps & aerators.	Transport of the pumps, aerators etc. to the safer places.	Insurance and microfinance with low interest from Govt. for the repair and maintainance of the infrastucture.
(vi) Any other	---	---	---
4. Heat wave and cold wave			
A. Capture			
Marine	<i>Not applicable</i>		
Inland	<i>Not applicable</i>		
B. Aquaculture			
(i) Changes in pond environment (water quality)	Depth of the aquaculture ponds should be increased to minimize thermal stress. Plantation at the peripheral dykes of aquaculture ponds can be recommended.	Aerators should properly utilized for the good circulation of water maintaining good pond environment.	Identification of best suitable eurythermic spp. for aquaculture to tolerate wide temperature range.
(ii) Health and Disease management	Maintaining water parameters at desired levels can reduce the stressful condition & can avoid disease.	Aerators should properly utilized for the good circulation of water maintaining optimum water quality.	Early warning systems should be developed to minimize future risk. Identification of hardy species for aquaculture practices.
(iii) Any other	---	---	---