State: MAHARASHTRA

Agriculture Contingency Plan for District: SATARA

1.0 District Agricultural Profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Deccan Plateau for semi arid region (6.1)		
	Agro-Climatic Region (Planning Commission)	Western plateau and hills region		
	Agro Climatic Zone (NARP)*	Western Maharashtra Scarcity Zone (MH-6) - ZARS, Solapur Sub Montane Zone – ZARS, Kolhapur Plain Zone – ZARS, Ganeshkhind, Pune		
	List of the districts falling under the NARP zone	**Scarcity Zon**e - Sangli, Nandurbar, Nasik (SN Eastern Part), Dhule, Ahmednagar, Pune, Solapur, Satara(SN Eastern part), Kolhapur (Part), Jalgaon **Western Maharashtra Plain Zone** – Pune (Eastern Part), Kolhapur, Sangli, Central part of Satara, Nashik (Central Part) **Sub Montane Zone** – Western Part of Satara, Nashik (Western Part) , Kolhapur, Pune		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		17^0 41'29.04"- N	74^0 00'03.38" E	760 m MSL
	Name and address of the concerned ZRS /ZARS /RARS /RRS / RRTTS	Central Sugarcane Research Station, Padegaon, Tal-Phaltan, Dist.Satara (M.S.) Pin-415521, Phone No.02169-265333, 35, 37 Fax: No.02169-265333 ZARS, Krishak Bhavan, Near DAV College, Solapur,Pin 413001 Email: csrspadegaon@rediffmail.com		
	Mention the KVK located in the district	KVK, Kalavade, Tal.Karad, Dist.Satara. Pin code 415 110		

1.2	**Rainfall**	Average (mm) Rainy days	Rainy days	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	668	36	2nd week of June	2nd week of Oct
	NE Monsoon (Oct-Dec):	100	5		
	Winter (Jan-Feb.)	--	-		
	Summer (March-May)	--	-		
	Annual	768	41		

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)	1058.2	799.4	13.5	28.0	74.0	22.0	6.6	53.0	53.8	7.6
Source: District compressive plan (SAO, Satara)											

1. 4	**Major Soils**	**Area ('000 ha)**	**Percentage of total area**
	Shallow grey/ black soils	517.2	64.7
	Deep black soils	147.9	18.5
	Medium black soils	134.3	16.8

1.5	**Agricultural land use**	Area (‘000 ha)	Cropping intensity %
	Net sown area	580.4	128.4 %
	Area sown more than once	219.0	
	Gross cropped area	799.4	

1.6	**Irrigation**	**Area (‘000 ha)**		
	Net irrigated area	94.6		
	Gross irrigated area	283.0		
	Rainfed area	421.7		
	Sources of Irrigation	Number	Area (‘000 ha)	% area
	Canals	12	45.8	20.0
	Tanks	-	-	-
	Open wells	63146	149.0	65.0
	Bore wells	-	-	-
	Lift irrigation	3157	11.5	5.0
	Other sources	-	22.8	10.0
	Total	74843	229.3	
	Pump sets	-	-	

	No. of tractors	-	-	
Source: District compressive plan (SAO, Satara)				

	Groundwater availability and use	No. of blocks /Tahsils	% area	Quality of water (Specify the problems such as high levels of arsenic, fluorides,saline etc)
	Over exploited	Data not available		
	Critical			
	Semi-critical			
	Safe			
	Wastewater availability and use			
	Ground water quality			

1.7 Area under major field crops and horticulture etc.

S. No.	**Major field crops cultivated**	**Area('000 ha)**							
		Kharif			***Rabi***			***Summer***	**Total**
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**		
	Pearl millet		86.5	86.5	-	-	-	--	86.5
	Groundnut	-	56.4	56.4		-	--	-	56.4
	Kharif Jowar	-	56.4	56.4	---	-			56.4
	Paddy	-	43.5	43.5					43.5

	Soybean	-	13.3	13.3					13.3
	Rabi Jowar	-	-	-		138.4	138.4		138.4
	Wheat	-	-	-	41.0		41.0		41.0
	Chickpea	-	-	-		28.6	28.6		28.6
	Sugarcane	-	-	-	53.6				53.6
	Total		-	-	-	-	--		--

		Area ('000 ha)	
		Total Area ('000 ha)	**Irrigated**
	Horticulture – Fruit Crops-	--	--
	Mango, Grapes, Banana	10.3	10.3
	Vegetables Crops- Onion etc	17.8	17.6
	Medicinal and Aromatic crops	6.8	6.8
	Plantation Crops/Flowers	1.6	1.6
	Total fodder crop area	--	--
	Grazing land	--	--
	Sericulture etc.	--	--

1.8	**Livestock**		**Male ('000)**	**Female ('000)**	**Total ('000)**	
	Non descriptive Cattle (local low yielding)		47.0	45.0	92.0	
	Crossbred cattle		9.8	149.6	159.4	
	Non descriptive Buffaloes (local low yielding)		23.8	278.6	302.4	
	Graded Buffaloes		3.2	43.7	46.9	
	Goat		71.3	324.8	396.2	
	Sheep		51.4	262.6	314.1	
	Others (Camel, Pig, Yak etc.)					
	Commercial dairy farms (Number)					
1.9	**Poultry**		**No. of farms**	**Total No. of birds**		
	Commercial		0	142.2		
	Backyard			1514.6		
1.10	**Fisheries**					
	A. Capture					
	i) Marine	No. of fisherman	Boats		Nets	
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Sjore deines, stake & trap nets)	Storage facilities(Ice plants etc.)
	ii) Inland	Not applicable				
	B. Culture	Water spead area (ha)		Yield (t/ha)	Production (000tons)	

	Brackish Water	Not applicable
	Fresh Water	
	Others	

1.11 Production & Productivity of major crops

1.11	Major field crops	*Kharif*		*Rabi*		Summer		Total	
		Prod. (‘000 t)	Productivity (kg/ha)	Prod. (‘000 t)	Productivity (kg/ha)	Prod. (‘000 t)	Productivity (kg/ha)	Prod. (‘000 t)	Productivity (kg/ha)
	Pearl millet	106	663	--	--	--	--	106	663
	Groundnut	142	952	--	--	--	--	142	952
	Kharif Jowar	67	1229					67	1229
	Paddy	87	1877	--	--	--	--	87	1877
	Soybean	16	1437	--	--	--	--	16	1437
	Rabi Jowar	--	--	215	956	--	--	215	956
	Wheat	--	--	74	1641	--	--	74	1641
	Chickpea	--	--	5	698	--	--	5	698
	Sugarcane	4590	85518			--	--	4590	85518

Source: Satara District Agricultural Plan

1.12	**Sowing window for 5 major field crops**	Pearl millet	Groun d nut	Kharif Sorghu m	Paddy	Soybean	*Rabi* Sorghum	Wheat	Chickpea	Sugarcane
	Kharif-Rainfed	2nd Fortnigh t of June to 1nd Fortnigh t of July	15th June to 15th July	1st fortnigh t of June	--	15th June to 10th July	-	-	-	-

	Kharif-Irrigated	-	-	-	15th June to 10th July	--	-	--	-	Adsali: 15th July-15th August.
	Rabi-Rainfed	-	-	-	-	--	15th September to 15th October	--	15th September to 15th October	
	Rabi-Irrigated	-	-	-	-	--	--	-1st Fortnight of November	-	Suru: 15th Jan -15th February Preseasonal: 15th October -15th November

1.13	**What is the major contingency the district is prone to?**	Regular	Occasional	None
	Drought	-	√(Long dryspells of 15 to 20 days in kharif)	-
	Flood	-	-	√
	Cyclone	-	-	√
	Hail storm	-	--	√
	Heat wave	-	-	√
	Cold wave	--	-	√
	Frost	-	-	√
	Sea water intrusion	-	-	√
	Pests and disease outbreak (Wooly aphids, stem borer, leaf spot)	-	√	-

1.14	**Include Digital maps of the district for**	Location map of district with in state as Annexure I	Enclosed: Yes
		Mean Annual rainfall as Annexure 2	Enclosed: Yes

		Soil map as Annexure 3	Enclosed: Yes

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 June 4th week	Shallow Grey/black soils	Pearl millet	No Change Prefer Varieties like Shraddha,Saburi, Shanti	Hoeing at 25 DAS and weeding	**Seed source :** • Central campus MPKV, Rahuri, College of Agril., Pune and Dhule • NSC, MSSC
	Medium black soils	Groundnut	No Change Prefer Varieties like JL-24,JL-501,JL-286	As above	
		Kharif Jowar	No Change Prefer Varieties like CSH 14,16,17	Thinning, Hoeing at 25 DAS and weeding	
		Upland Paddy	No Change Prefer Varieties like Indrayani, Pavana	Hoeing and weeding	
		Soybean	No Change Prefer Varieties like JS-335, DS-228, JS 9305	Sowing at wider spacing at 45 cm row spacing	
	Deep black soils	Kharif Jowar	No Change Prefer Varieties like CSH 14,16,17	Frequent intercultivation	
		Upland Paddy	No Change Prefer Varieties like Indrayani, Pavana	Protective irrigation	
		Soybean	No Change Prefer Varieties like JS-335, MACS-450	Sowing at 45 cm row spacing	

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 (July 2nd week)	Shallow Grey/black soils	Pearl millet	No Change Prefer Varieties like Shraddha,Saburi, Shanti	Hoeing and application of 25 kg K_2O/ha	**Seed source :** • Central campus MPKV, Rahuri, College of Agril., Pune and Dhule • NSC, MSSC
	Medium black soils	Groundnut	No Change Prefer Varieties like JL-24,JL-501,JL-286	Hoeing	
		Kharif Jowar	Sunflower (Bhanu, Phule Raviraj)	Thinning and Hoeing	
		Upland Paddy	No Change Prefer Varieties like Indrayani, Pavana	Hoeing	
		Soybean	No Change Prefer Varieties like JS-335, DS-228, JS 9305	Sowing at 45 cm row spacing	
	Deep black soils	Kharif Jowar	No Change Prefer Varieties like CSH 14,16,17	Hoeing and weeding	
		Paddy	No Change Prefer Varieties like Indrayani, Pavana,Koyna	Hoeing and weeding	
		Soybean	No Change Prefer Varieties like JS-335, DS-228, JS 9305	Sowing at 45 cm row spacing	

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 (July 4th week)	Shallow Grey/black soils	Pearl millet	No Change Prefer Varieties like Shraddha,Saburi, Shanti	Application of 25 kg K_2O/ha	**Seed source :** • Central campus

	Medium black soils	Groundnut	No Change Prefer Varieties like JL-24,JL-501,JL-286	Hoeing	MPKV, Rahuri, College of Agril., Pune and Dhule • NSC, MSSC
		Kharif Jowar	Sunflower (Bhanu, Raviraj)	Opening of conservation furrow after 3rd row	
		Upland Paddy	No Change Prefer Varieties like Indrayani, Pavana	Hoeing	
		Soybean	Sunflower (Bhanu, Phule Raviraj)	Hoeing	
	Deep black soils	Kharif Jowar	Sunflower (Bhanu, , Phule Raviraj)	Opening of conservation furrow after 3rd row	
		Paddy	No Change Prefer Varieties like Indrayani, Pavana,Koyna	Hoeing and Protective irrigation	
		Soybean	Sunflower (Bhanu, Phule Raviraj)	Hoeing and sprinkler irrigation	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks 2nd week of August.	Not applicable				

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	Shallow Grey/black soils	Pearl millet	No Change Prefer Varieties like Shraddha, Saburi, Shanti	• Hoeing	**Seed source :** Central campus MPKV, Rahuri, ARS, Mohol ZARS, Solapur

etc.	Medium black soils	Groundnut	No Change Prefer Varieties like JL-24,JL-501,JL-286, TAG-24	• Hoeing 20 DAS	NSC MSSC NRCS, Solapur MAU, Parbhani
		Kharif Jowar	No Change	• Kaolin spray @ 8 % • Hoeing • Resowing if population is less than 30 %	
		Upland Paddy	No Change Prefer Varieties like Indrayani, Pavana	• Protective irrigation	
		Soybean	No Change Prefer Varieties like JS-335, DS-228, JS 9305	• Hoeing • Resowing If population is less than 30 %	
	Deep black soils	Kharif Jowar	No Change Prefer Varieties like CSH 14,16,17	• Kaolin spray @ 8 % • Hoeing • Resowing If population is less than 30 %	
		Upland Paddy	Indrayani, Pavana	• Protective irrigation	
		Soybean	No Change Prefer Varieties like JS-335, MACS-450	• Hoeing • Resowing If population is less than 30 %	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless	**Major Farming situation**	**Normal Crop /cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Shallow Grey/black soils	Pearl millet	No Change Prefer Varieties like Shraddha,Saburi, Shanti	Protective irrigation from available sources	Seed source with MSSC, NSC and ARS, K. Digraj

	Medium black soils	Groundnut	No Change Prefer Varieties like JL-24, JL-501, JL-286	Protective irrigation from available sources	ARS, Karad MPKV, Rahuri
		Kharif Jowar	No Change Prefer Varieties like CSH 14,16,17	Kaoline spray @ 8%	
		Upland Paddy	No Change Prefer Varieties like Indrayani, Pavana	Protective irrigation from available sources	
		Soybean	No Change Prefer Varieties like JS-335, DS-228, JS 9305	Protective irrigation from available sources	
	Deep black soils	Kharif Sorghum	No Change Prefer Varieties like CSH 14,16,17	Kaoline spray @ 8 %	
		Upland Paddy	No Change Prefer Varieties like Indrayani, Pavana	Protective irrigation from available sources	
		Soybean	No Change Prefer Varieties like JS-335, DS-228, JS 9305	Protective irrigation from available sources	

Condition			**Suggested Contingency measures**		
Terminal drought	**Major Farming situation**	**Normal Crop /cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
(Early withdrawal of monsoon)	Shallow Grey/black soils	Pearlmillet	Harvest at physiological maturity stage	--	Seed source with MSSC, NSC and ARS, K. Digraj ARS, Karad MPKV, Rahuri
	Medium black soils	Groundnut	Protective irrigation	--	

		Kharif Sorghum	Harvest at physiological maturity stage	--	
		Paddy	Protective irrigation	-	
		Soybean	Harvest at physiological maturity stage	-	
	Deep black soils	Kharif Sorghum	As above	--	
		Paddy	Protective irrigation	--	
		Soybean	As above	-	

2.1.2 Irrigated situation

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delayed release of water in canals due to low rainfall OR Limited release of water in canals due to low rainfall	Shallow Grey/black soils	Pearl millet	Pearl millet	Hoeing and weeding	Seed source with MSSC, NSC and ARS, K. Digraj ARS, Karad MPKV, Rahuri
	Medium black soils	Groundnut	Groundnut	Hoeing at 30 DAS and protective irrigation	
		Kharif Sorghum	Kharif Sorghum	Hoeing	
		Paddy	Paddy	Protective irrigation	
		Soybean	Soybean	As above	
	Deep black soils	Kharif Sorghum	Kharif Sorghum	Hoeing	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
		Paddy	Paddy	Protective irrigation	
		Soybean	Soybean	As above	

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	Not applicable				

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	Not applicable				

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop / Cropping system**	**Change in crop / cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater	Shallow soils	Pearl millet	Pearl millet	Hoeing and weeding	Seed source with MSSC, NSC and

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop / Cropping system**	**Change in crop / cropping system**	**Agronomic measures**	**Remarks on Implementation**
recharge due to low rainfall	Medium soils	Groundnut	Groundnut	Sprinkler irrigation, Hoeing	ARS, K. Digraj ARS, Karad MPKV, Rahuri
		Kharif Sorghum	Sunflower (Bhanu, Phule Raviraj)	Hoeing	
		Paddy	Paddy	Sprinkler irrigation	
		Soybean	Sunflower (Bhanu, Phule Raviraj)	Sprinkler irrigation	
	Deep soil	Kharif Sorghum	Sunflower (Bhanu, Phule Raviraj)	As above	
		Paddy	Paddy	Sprinkler irrigation	
		Soybean	Sunflower (Bhanu, Phule Raviraj)	Hoeing and weeding	

2.2 Unusual rains:

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Paddy	Drain out excess water	Drain out excess water	Harvest at physiological maturity stage	Harvest & dry in drying shade
Pearl millet	As above	As above	As above	As above
Kharif Sorghum	As above	As above	As above	As above
Soybean	As above	As above	As above	As above

Groundnut	As above	As above	As above	As above
Horticulture				
Mango	Drain out excess water	Drain out excess water	Immediate harvesting & marketing	
Grapes	As above	As above	As above	
Banana	As above	As above	As above	
Heavy rainfall with high speed winds in a short span[2]				
Paddy	Drain out excess water	Drain out excess water	Harvest at physiological maturity stage	Harvest & dry in drying shade
Pearl millet	As above	As above	As above	As above
Kharif Sorghum	As above	As above	As above	As above
Soybean	As above	As above	As above	As above
Sugarcane	As above	As above	Drain out excess water	-
Horticulture				
Mango	Drain out excess water and staking	Drain out excess water and staking	Early harvest & marketing	
Grapes	As above	As above	--	--

Outbreak of pests and diseases due to unseasonal rains	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Sugarcane	**Insect pests** **Stem Borer and white grubs**: Soil application of 10 G Phorate 20 kg/ha or dust Endosulphan 4% 50 kg/ha or 20% Chloropyriphos 5 lit in 1000 lit of water through water channal.	**Insect pests** **Top shoot borer**: Soil application of 10 G Phorate 20 kg/ha or dust Endosulphan 4% 50 kg/ha or 20% Chloropyriphos 5 lit in 1000 lit of water through water channal.	--	--

		White Wooly aphid: Phorate 10G 15 kg/ha or spray Methyl dematon 25 EC 1.5 ml/L or Diamethoate 30% 1.5ml/L		
Groundnut	**Diseases** **Leaf spot & Rust** – Spray Mancozeb 75 WP 0.25 % or Carbendenzim 50WP 0.1 %	**Diseases** **Leaf spot & Rust** – Spray Mancozeb 75 WP 0.25 % or Carbendenzim 50WP 0.1 %	--	Proper drying for control of Aspergillus
	Insect pests **Thrips & Jassids**: Spraying of Dimethoate 1 ml/L or Methyl dematon1 ml/L	**Leaf Roller**: Spraying of Quinolphos 25 EC 2 ml/L	--	--
Sorghum	**Insect pests** **Shootfly**: Installation of fishmeal traps, Spraying of endosulphan 1.5 ml /L **Stem Borer**: Spraying of endosulphan 1.5 ml /L	**Stem Borer:** Spraying of chloropyriphos 2ml /L or enosulphon 2 ml/l		-
Chickpea	**Insects pests:** **Aphids/Jassids:** Spraying of dimethoade 1 ml/L **Diseases:** **Wilt/ Root rot** - Treat seed with carbendazim + mancozeb (2 g each/kg) or Phule Trichoderma 5 g/kg.			

	Insect pests	**Insect pests**		
	Heliothis : Spray 5 % NSE	**Heliothis** : Installation of Pheromone traps Spray 5 % NSE followed by Endosulphan 2 ml/L		
	Insect pests-	**Insect pests-**		
	Spodoptera/Hairy caterpillar/semi looper: • Installation ofpheromane traps • DustMethyl parathion 2% or Quinolphos	**Spodoptera/Hairy caterpillar/semi looper:** • Installation ofpheromane traps	--	--

	1.5 % or Endosulphon 4% dust @ 20kg /ha. • Spraying of Chloropyriphos 2 ml/L or spraying of Endosulphan 35 EC 2 ml/L	• DustMethyl parathion 2% or Quinolphos 1.5 % or Endosulphon 4% dust @ 20kg /ha. • Spraying of Chloropyriphos 2 ml/or L or spraying of Endosulphan 35 EC 2 ml/L		
Soybean	**Diseases**	**Diseases**	**Diseases**	
	Root rot/collar rot- Treat seed with carbendazim + mancozeb (2 g each/kg) or Phule Trichoderma 5 g/kg.	Rust – • Early sowing in last week of may • Use of disease resistant variety • Spraying the crop with Propiconazole @ 0.1%	Charcoal rot- Provide protective irrigation	
	Insect pests-	**Insect pests-**		
	Spodoptera/Hairy caterpillar: • DustMethyl parathion 2% or Quinolphos 1.5 % or Endosulphon 4% dust @ 20kg /ha. • Spraying of Chloropyriphos 2 ml/or L or spraying of Endosulphan 35 EC 2 ml/L	Spodoptera/Hairy caterpillar: • DustMethyl parathion 2% or Quinolphos 1.5 % or Endosulphon 4% dust @ 20kg /ha. • Spraying of Chloropyriphos 2 ml/or L or spraying of Endosulphan 35 EC 2 ml/L		

2.3 Floods: Not applicable

2.4 Extreme events: Heat wave/Cold wave/Frost/Hailstorm/Cyclone : Not applicable

2.5 Contingent strategies for Livestock and Poultry in Satara District

2.5.1 Livestock

	Suggested contingency measures		
	Before the event[s]	**During the event**	**After the event**
Drought			
Feed and fodder	Motivating the sugarcane farmers to convert green sugarcane tops in to silage by the end of February	Harvest and use biomass of dried up crops (paddy/wheat/Sorghum/Bajra,/chickpea/ groundnut/	Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize(UP

availability	Collection of soya meal waste and groundnut cake for use as feed supplement during drought Sowing of cereals (Sorghum/Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during North-East monsoon under dry land system for fodder production. Establishment of fodder bank at village level with available dry fodder (paddy /wheat straw, Sorghum/Bajra stover, groundnut haulms, sugarcane tops) Development of silvopastoral models with Leucaena, Glyricidia, Prosopis as fodder trees and Marvel, Madras Anjan, Stylo, Desmanthus, etc., as under storey grass Encourage fodder production with Sorghum – stylo-Sorghum on rotation basis and also to cultivate short-term fodder crops like sunhemp Promote Azola cultivation at backyard Formation of village Disaster Management Committee Capacity building and preparedness of the stakeholders and official staff for the drought/floods	soya) material as fodder Use of unconventional and locally available cheap feed ingredients especially soya meal waste and groundnut cake and also sunflower heads for feeding of livestock during drought Harvest all the top fodder available (Subabul, Glyricidia, Pipol, Prosopis etc) and feed the LS during drought Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured from Govt. Godowns for feeding as supplement for high productive animals during drought Promotion of Horse gram as contingent crop and harvesting it at vegetative stage as fodder All the hay should be enriched with 2% Urea molasses solution or 1% common salt solution and fed to LS. Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals	chari, MP chari, HC-136, HD-2, GAINT BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 on their own lands with input subsidy Supply of quality seeds of COFS 29, Stylo and fodder slips of Marvel, Yaswant, Jaywant, Napier, guinea grass well before monsoon Flushing the stock to recoup Replenish the feed and fodder banks
Drinking water	Adopt various water conservation methods at village level to improve the ground water level for adequate water supply. Identification of water resources Desilting of ponds Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) Construction of drinking water tanks in herding places/village junctions/relief camp locations Community drinking water trough can be arranged in shandies /community grazing areas	Adequate supply of drinking water. Restrict wallowing of animals in water bodies/resources Add alum in stagnated water bodies	Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources Provide clean drinking water
Health and	Procure and stock emergency medicines and vaccines for	Carryout deworming to all animals entering into	Keep close surveillance on

disease management	important endemic diseases of the area All the stock must be immunized for endemic diseases of the area Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures Procure and stock multivitamins & area specific mineral mixture	relief camps Identification and quarantine of sick animals Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of any outbreak Restricting movement of livestock in case of any epidemic Tick control measures be undertaken to prevent tick borne diseases in animals Rescue of sick and injured animals and their treatment Organize with community, daily lifting of dung from relief camps	disease outbreak. Undertake the vaccination depending on need Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer
Floods	**NA**		
Cyclone	**NA**		
Heat wave	**NA**		
Cold wave	**NA**		
Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	Submission for insurance claim and availing insurance benefit Purchase of new productive animals

Vaccination schedule in small ruminants (Sheep & Goat)

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

Vaccination programme for cattle and buffalo:

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

2.5.2 Poultry

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Supplementation to all survived birds
Drinking water		Use water sanitizers or offer cool hygienic drinking water	
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and IBD	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water)	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
Floods	**NA**		
Cyclone	**NA**		
Heat wave	**NA**		

Cold wave	**NA**

[a] based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

Measures suggested for Drought			
A. Capture Inland			
i) Shallow water depth due to insufficient rains/inflows	1. Proper planning of water storage 2. Conservation & development of water resources by construction of reservoirs & dams. 3. Avoid seepage losses by lining the canals. 4. Adopt rain water harvest techniques. 5. Farmer's organizations, water users & private sectors should be involved in construction, operation & maintenance of irrigation system. 6. To make people aware about conservation of water. 7. Critical analysis of long range a Forecast data. 8. Storage of water. 9. A forestation program. 10. Conservation of rivers/reservoir/ponds. Re-excavation of local canals and reservoirs.	1.Maintenance of dams & reservoirs to avoid leakage & to control theft of water. 2. Proper use of water resources on priority base. 3.Add water in shallow water pond. 4.Use stored water. 5.Use surface water flow. 6.Divert water from unutilized areas. 7.Utilize canal water. 8. Aeration of water in ponds/reservoirs.	1. Regular desiltation of reservoirs & dams. 2. Govt. should make laws on water conservation. 3. To develop demand oriented system. 4. Govt. should make laws to stop deforestation. 5. Need based monitoring through research plan. 6. Intensive forestation program. 7. Augmentation of surface water flow. 8. Strengthening of water reservoirs. 9. Rain water harvesting . 10. Compensation claims. 11. Prepare vulnerability map and place it to management committee
ii) Changes in Water Quality	1. Storage of water disinfectant such as chlorine, alum etc. at district level. 2. Prohibit dumping of solid, liquid and waste in water sources. 3. Preparedness with stocks of chemicals,	1. Provision of water filtration system for the ponds to overcome the water contamination- 2. Use disinfectants and	1. Removal of runoff from land by proper means before decomposition. 2. Supply of water filtration system even after the event & creating awareness in farmers.

	disinfectants and therapeutic drugs.	therapeutic drugs. 3. Adoption of bio-remedial measures	3. Need based research data should be generated on water quality. Dumping of solid, liquid and waste in water bodies should be stopped through enactment of legislation.
B. Aquaculture			
i) Shallow water in ponds due to insufficient rains/inflows.	1. Available resources will be identified and need to be kept ready for each district on the basis of forecasting of insufficient rain. 2. To avoid loss due to seepage, infiltration & leakage by using bentonite, ash, polythene liners etc. 3. Maintain the level of water by pumping water into pond. 4. Critical analysis of long range Forecast data. 5. Storage of water. 6. A forestation program. 7. Conservation of rivers/reservoir/ponds. Re-excavation of local canals and reservoirs	1. Water resources of the areas will be exploited with planning of proper transport facilities in affected areas. 2. Maintain the level of water to the required depth. 3. Add stored water in shallow water depth. 4. Harvesting of fishes as early as possible to avoid mortality. 5. Use stored water. 6. Use surface water flow. 7. Divert water from unutilized areas. 8. Utilize canal water. Aeration of ponds.	1. Available resources need to be listed with adequate transport arrangement. 2. Desiltation of pond bottom. 3. Maintenance of tanks & ponds 4. Need based monitoring through research plan. 5. Intensive a forestation program. 6. Augmentation of surface water flow. 7. Construction of water reservoirs. 8. Adoption of rain harvesting methods. 9. Compensation claims . Prepare vulnerability map and place it to management committee
ii) Impact of salt load build up in ponds / change in water quality	1. Minimize evaporation losses. 2. Dilution of water if salt load is high. 3. Available resources will be identified & need to be kept ready for each district on the basis of forecasting of insufficient rain to reduce the salinity by trapping available water resources. 4. On the basis of forecasting advising fish farmers for harvesting of marketable fish. 5. Prohibit dumping of solid, liquid and waste in water sources. Preparedness with stocks of chemicals, disinfectants and therapeutic drugs.	1. Dilution of water or exchange water to avoid salt builds up. 2. Harvesting the marketable fish to reduce the density. 3. Use disinfectants and therapeutic drugs. 4. Adoption of bio-remedial measures	1. Trapping the water resources from other places for dilution to reduce salt load. 2. Need based research data should be generated on water quality. 3. Dumping of solid, liquid and waste should be stopped through enactment of legislation.

2.5.3 Fisheries

Measures suggested for Flood			
A. Capture Inland			
i) Average compensation paid due to loss of human life	1. Fishermen will be given forewarning regarding heavy rains and advised not to go for fishing in rivers/reservoirs. 2. Areas need to be identified in each district prone for flood. 3. Maintenance of water drainages in proper way to avoid blockage. 4. Proper forecasting information should be available. 5. Be prepared to evacuate at a short notice. 6. Preparation of flood control action plan. 7. Warning dissemination and precautionary response. 8. Formation of flood management committee. 9. Enhancement in coping capabilities of common people. Insurance for the life of people/fishermen.	1. Fishermen will be advised on use of Life saving jackets and life boats. The life saving appliances/machinery shall be kept ready for rescue operation. 2. Sufficient stock of food, medicine etc. should be available. 3. Govt. should take necessary action & provide trained people for rescue operation during flood. 4. Human evacuation from the area. 5. Coordination of assistance. 6. Damage and need assessment. 7. Immediate management of relief supplies. Immediate help delivery	1. The victim's family shall be provided with compensation up to Rs. 1, 00,000/- for the deaths occurring during the fishing. 2. Rehabilitation of people. 3. Identify the causes of flood affected area & take necessary preventive measures. 4. Arrangement for rescue and casualty care. 5. Arrangement for burial control room. 6. Restoration of essential services, security and protection of property. 7. Support to rehabilitation, logistics, training and awareness build up & testing and updating the plan. Insurance and compensation claim.
ii) No. of boats / nets damaged	1. The prior information on safe keeping of boats and nets will be provided to the fishermen. 2. If prior information is given bring boats & nets towards the safer side. 3. Annual repair of boats/nets and gears.	1. Fishermen will be advised to stop fishing during the floods and heavy rainfall. 2. Continuous monitoring on water level is required. 3. Coordination of assistance	1. The affected fishermen will provided with compensation up to Rs. 50,000/- for damaged boats or nets. 2. Education and training for the repair of boats/nets and gears. Loss assessment & insurance claim.

	Insurance of boats/nets/gears.	4. Immediate management of relief supplies. Govt. support and compensation.	
iii) No. of houses damaged	1. Forewarning regarding heavy rainfall, sudden downpour and floods will be spread in the fishermen villages on the banks of rivers. 2. Shift the people to safer places. 3. Proper maintenance of *Kaccha* houses. 4. Education and training for the repair of houses 5. Store raw material for emergency repair of houses. 6. House insurance.	1. Temporary shelter to the affected families will be provided. 2. Arrangement of temporary shelters for homeless people. 3. Damaged house enumeration and need assessment. 4. Coordination of assistance. Immediate management of relief supplies.	1. The housing facilities on higher elevation shall be provided to affected families by the Government agencies. 2. Provide compensation from Govt. to build/repair houses. 3. Loss assessment & insurance claim. 4. Govt. assistance claim.
iv) Loss of stock	1. Harvesting the existing fish stock 2. Keep boats, nets/gears ready for emergency use. 3. Store fuels, food/other item 4. Develop flood control management plans. .Stock material insurance	1. Search/locate the stock/input. 2. Mobilize local people for protection. 3. Hire stock/inputs from distant areas/company/ farmers who are not affected by flood.	Provided subsidy on seeds by Govt. 2. Implementation of Insurance policy. 3. Locate backup stocks and verify its usability time. 4. Follow flood control management plan. 5. Notify utilities of the critical demand about loss of stock and inputs. Loss assessment & insurance claim.
v) Changes in water quality	1.Storage of water disinfectant such as chlorine, alum etc. at district level. 2. Provision to stop/close the effluent/sewerage discharge point in water bodies 3. Store chemicals, disinfectants and therapeutic drugs. 4. Develop flood control management plan.	.Provision of water filtration system for the ponds to overcome the water contamination- 2. Do not use contaminated water 3. Proper preparation and management through emergency aeration. 4. Use appropriate amount of disinfectants, chemicals and therapeutic drugs.	1.Removal of runoff from land by proper means before decomposition. 2.Supply of water filtration system even after the event & creating awareness in farmers. 3. Need based research data should be generated to maintain water quality, 4. Dumping of solid, liquid and waste should be stopped through enactment of legislation. 5. Contact Govt. and industrial organization for immediate remedy and cleaning of the water bodies.

		5. Immediate support of Govt./industrial organizations for maintaining the purity and quality of water bodies. 6. Need based bioremediation	6. Regular water monitoring and bio-monitoring of water bodies for formulation of management plan
vi) Health and diseases	1.Water filtration system & control measures for diseases should be available. 2. Advance planning and preparedness. 3. Store chemicals, disinfectants and therapeutic drugs. 4. Stock sufficient stores of medicines.	1. 1.Periodical checking particularly with respective fish mortality should be done during flood & dead fishes disposed properly. 2. Prompt action or immediate removal of disease causing agents/ dead fish, followed by sterile or landfill disposal. 3. Use appropriate amount of disinfectants, chemicals and therapeutic drugs. 4. 4. Emergency aeration or splashing in water bodies.	1.Setting health & disease management training centre at district level for fisherman community by Govt. or with the help of NGO. 2. Laboratory diagnosis of diseased fish, generation of data about type or kind of disease spread. 3. Eradicating the disease where possible. 4. Follow up surveillance and monitoring after disease outbreak. 5. Need based research data should be generated. 6. Loss assessment & insurance claim.
B. Aquaculture			
i) Inundation with flood water	1) In the flood prone areas proper draining system from ponds need to be developed and planned in flood situation before forecasting of flood. 2) Site should be away from flood prone area. 3) Dyke should be stable in all weather condition & not liable to collapse during heavy rains. 4) Proper channels to be provided to pass surplus water & to avoid breakage to the bundh. 5) Proper facility construction for ponds and its stock safety. 6) Development of flood control management plan. 7) Preparedness with emergency backup equipment on site.	1. On the basis of forecasting information to farmers for sale of marketable fish with sufficient transport facility through various media. Proper drainage should be adopted so that inundation with flood water should be minimized. 2. On the basis of forecasting, information to farmers for sale of marketable fish with sufficient transport facility through various media. 3. Proper drainage should be adopted so that inundation with flood water should be minimized. Excess water should be drained from pond	Planning even after the event should be made for proper drainage and creating awareness and trainings in flood situations. 2). Pinning even after the event should be made for proper drainage & creating awareness & training in flood situation. 3) Support to rehabilitation, logistics, training and awareness build up & testing and updating the plan 4) Reallocate fish to maintain appropriate biomass so that waste assimilation capacity of pond is not exceeded. 5) Reduce or cease feeding because uneaten food and fish waste decreases the dissolved oxygen level. 6) Strengthening of water bodies/ponds. 7) Loss assessment & insurance claim.

	8) Stock insurance. 9) Preventive measures against entry of alien/wild organisms through flood water.	by providing screen outlets or using pumps. 4. Arrangement for evacuation. 5. Arrangement for rescue and casualty care. 6. Arrangement for burial control room. 7. Restoration of essential services, security and protection of property. 8. Coordination of assistance. 9. Damage and need assessment. 10. Immediate management of relief supplies. 11. Release excess water from height of T. 12. Lower the water level in culture facilities.	
ii) Water contamination and changes in water quality	1. Availability of water purifier i.e., chlorine, alum etc at district level. 2. Availability of water disinfectant such as chlorine, alum etc at district level. 3. Use of calcium hydroxide @ 150 kg/ha 4. Store chemicals, disinfectants and therapeutic drugs 5. Develop flood control management plan	1). Supply of water purifier for the ponds to overcome the contamination and changes in BOD. 2). Supply of water filtration system for ponds to overcome the contamination. Use of $kmno_4$ for bath of fish as prophylactics 3) . Do not use contaminated water. 4) Proper preparation and management through emergency aeration (paddle wheel aerator/circulating aerator), that may improve water quality in affected areas. 5) Use appropriate amount of disinfectants, chemicals and therapeutic drugs. 6) Maintaining the purity and	1). Supply of water purifier even after the event and creating awareness in farmers. 2). Supply of water filtration system even after the event & crating awareness in farmers. 3). Lime treatment for oxidation 4). To maintain water quality, need based research data should be generated 5). Dumping of solid, liquid and waste should be stopped through enactment of legislation. 6). Immediate remedy and cleaning of water bodies. 7). Regular water monitoring and bio-monitoring of water bodies for formulation of management plan.

		quality of water bodies. 7) Need based bioremediation	
iii) Health and diseases	1. Storage of water purifiers and control measures for diseases should be available. 2. Personnel should be trained for health & disease management through training 3. & list of trained personnel should be available at each district level. 4. Adequate stock of medicine should be available at each district level. 5. Antibiotics fortified feeding as prophylactics 6. Advance planning and preparedness. 7. Store chemicals, disinfectants and therapeutic drugs. Stock sufficient emergency medicines	1. Periodical checking particularly with respective fish mortality should be done during flood. 2. Services of trained personnel need to be made available in affected areas with sufficient supply of life saving medicines. 3. Disinfectants formalin treatments as prophylactics 4. Identification of type of disease outbreak, immediate removal of disease causing agents/ dead fish. 5. Use appropriate amount of disinfectants, chemicals and therapeutic drugs. 6. Determination of nature and speed of transmission of diseases. 7. Emergency aeration or splashing in water bodies.	1). Setting health and disease management training centre at district level for fishermen and government officials. 2). Routine training programmed as a refresher course need to be implemented in relation to health & disease management during flood. 3) .Lime treatment for oxidation 4). Laboratory diagnosis of diseased fish, generation of data about type or kind of disease spread. 5). Eradicating the disease. 6). Follow up surveillance and monitoring. 7). Proper disposal of dead fish. 8). Loss assessment & insurance claim.
iv) Loss of stock and inputs (feed chemicals etc.)	1). Harvestable sized fishes shall be marketed before the event to avoid losses. The inputs like feed and chemical etc. shall be stored at safe places. 2).Flood situation going to exist then move the feed, chemicals & other accessories to safer places. 3). Keep the stock/input at safe place for emergency purpose. 4). Store fuels, food/other item. 5) .Develop flood control management plan. 6). Stock material insurance	1).The pond embankments will be fenced with netting to avoid fish losses. The store rooms for inputs like feed, chemicals etc. shall be created. 2).Available fish stock should be recovered. Stock of inputs must be stored in well protected area. 3). Search/locate the stock/input. 4). Purchase/hire valuable stock/inputs from distant areas not affected by flood.	1) The fish farmers shall be provided with fish seed and feed at concessional rates. 2) Feeds, chemicals etc required for the culture operation should be purchased. 3) Strengthening of stocks. 4) Assessment of total loss. 5) Insurance claims.

v) Infrastructure damage (pumps, aerators, huts etc.)	1) Prior information regarding removal of Pumps and aerators shall be given to the fish farmers. 2) Flood situation going to exist then move the pumps, aerators & other accessories to safer places. 3) Educate and provide training for the repair of infrastructure. 4) Follow flood control management plan. 5) Store raw materials for repairing of pumps aerators, huts etc. 6) Infrastructure insurance.	1) Pumps, aerator and generators shall be removed from the pond before the event. 2) Use manual techniques for aeration or make substitute arrangement for the same. 3) Notify utilities of the critical demand. 4) Coordination of assistance. 5) Immediate management of relief supplies	1. Suitable Compensation for the damaged machinery shall be given to the fish farmers. 2. Install the equipments during flood. 3. Damaged infrastructure enumeration and need assessment. 4. Locate backup equipment and verify its operation. 5. Repair of damaged infrastructure. 6. Loss assessment & insurance claim.
2.5.3 Fisheries			
Measures suggested for Cyclone			
Inland Aquaculture			
i) Overflow/flooding of ponds	1. If intensity of cyclone with heavy rain fall exists then harvest existing fish stock. 2. Dike should be stable in all weather condition & not liable to collapse during flood.	1. On the basis of forecasting information to farmers for sale of marketable fish with sufficient transport facility through various media. Proper drainage should be adopted so that inundation with storm water should be managed 2. Enhancement of dykes height by sand bags	Planning even after the event should be made for proper drainage & creating awareness & training in storm situation.
i) Changes in water quality (fresh/brackish water ratio)	1. Supply of water for correcting the changes in fresh water & brackish water. 2.Maintain salinity by addition of fresh water up to 20-25 ppt.	1. Supply of water for correcting the changes in fresh water & brackish water. 2. Use euryhaline species	1. Water storage facility needs to be developed to overcome the problem of changes in fresh & brackish water ratio. 2. use Euryhaline species for culture
iii) Health and disease	1. Water filtration system & control measures for disease should be available.	1. Periodically checking particularly in respective of fish mortality & water	1. Settling health & disease management training centre at district level for fishermen & Govt. official.

	2. Adequate stock of medicine should be available at each district level. 3. Liming and formalin treatment	parameter during flood. 2. Disinfectants treatments	
iv) Loss of stock and inputs (feed, chemicals etc.)	1. Cyclone with heavy rain fall situation going to exist then move the feed, chemicals & other accessories to safer places. 2. Stock cover under insurance	1. Available fish stock should be recovered.	1. Feeds, chemicals etc required for the culture operation should be purchased. 2. Seed and feed to be supplied through Deptt of fisheries,
v) Infrastructure damage (pumps, aerators, shelters/huts etc)	1) Cyclone with heavy rain fall situation going to exist then shifted the pumps, aerators & other accessories to safer places.	1) Use manual techniques for aeration or make substitute arrangement for the same.	1) Compensation on assessment of actual losses & damage of pumps, aerators, shelters/huts given through RKVY, NCDC, NREGSui
2.5.3 Fisheries			
Measures suggested for Heat Wave and Cold Wave			
Inland			
Aquaculture			
i) Changes in pond environment (water quality)	1)If intensity of heat wave high, add water from other source. 2)Harvest existing fish stock. 3)Adequate facility should be ready for heat wave & system for changing water temperature during cold wave. 4)Listen to local weather forecasts and stay aware of upcoming temperature changes. 5) Arrange the aerators. 6) Ensure sufficient water quantity in water bodies. 7)Formulate strategic fishing management for the heat /cold waves. 8) Tree plantation around fish ponds	1) Adequate facility should be ready for heat wave & system for changing water temperature during cold wave. 2) Monitor fishing sites frequently to ensure that they are not affected by heat or cold waves. 3) Use dark materials to cover the water bodies during excessive heat waves. 4) Stay hydrated by drinking plenty of fluids during fishing/field work. 5) Adopt proper care and management during the fishing period of cold/heat wave like keeping stock of drinking water and extra cloths. 6) Educating the farmers through electronic or print media	1)Adequate facility should be ready for heat wave & system for changing water temperature during cold wave. 2) Intensive afforestation program for reducing heat waves. 3) Collect basic weather data and incidence of extreme and physical data of water bodies, water chemistry and seasonal changes, plankton profile and seasonal blooms, topography and soil composition. 4) Gather information about history of catch per unit effort as well as fish yield rate during heat wave and cold wave and accordingly simulate future plan for sustainable fishing. 5) Loss assessment & insurance claim.

		7) Maintain Water level in pond	
ii) Health and diseases management	1) Adequate stock of medicine should be available at each district level. 2) Advance planning and preparedness. 3) Store chemicals, disinfectants and therapeutic drugs. 4) Develop heat/ cold wave control management plan. 5) Stock sufficient emergency medicines.	1)Periodical checking particularly with respective fish mortality should be done. 2)Identification of type of disease outbreak, immediate removal of disease causing agents/ dead fish. 3) Use appropriate amount of disinfectants, chemicals and therapeutic drugs. 4) Determination of nature and speed of transmission of diseases. 5)Emergency aeration or splashing in water bodies 6)Bleaching powder 1 to 2 % , formalin treatment to prevent disease	1)Setting health & disease management training centre at district level for fishermen & Govt. official. 2) Laboratory diagnosis of diseased fish, generation of data about type or kind of disease spread. 3) Eradicating the disease. 4) Follow up surveillance and monitoring. 5) Proper disposal of dead fish. 6) Loss assessment & insurance claim. 7)KMNO4 2 % to maintain oxygen level

Annexure-I

Map 1: Location Map of Maharashtra and Satara in India

Annexure-III

Soil Map of Satara District