State: MAHARASHTRA

Agriculture Contingency Plan for District: JALGAON

1.0 District Agriculture profile					
1.1	**Agro-Climatic/Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	Deccan plateau, hot semi-arid eco-region (6.3) Western Maharashtra plateau, hot moist semi-arid eco- subregion			
	Agro-Climatic Zone (Planning Commission)	Western Plateau and Hills Region (IX)			
	Agro Climatic Zone (NARP)	Western Maharashtra Scarcity Zone (MH-6)			
	List all the districts or part thereof falling under the NARP Zone	Jalgaon, Ahmednagar, Sangli, Dhule			
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude	
		$21^0$00'47.96" N	74^0 33'50.30" E	244m MSL	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Oilseeds Research Station, MPKV,Jalgaon -425 001 Phone-(0) 0257 2250888,Fax 2253228, e- mail- oilseeds_jal@rediffmail.com ZARS, Krishak Bhavan, Near DAV College, Solapur,Pin 413001			
	Mention the KVK located in the district	Krishi Vignyan Kendra, Pal, Tal- Rawer, Dist- Jalgaon.			
1.2	**Rainfall**	Normal RF (mm)	Normal Rainy days	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	639.8	33	2nd week of June	3rd week of Oct
	NE Monsoon(Oct-Dec):	73.4	4	-	-
	Winter (Jan- Feb)	16.8	2	-	-
	Summer (March -May)	20.0	1	-	-
	Annual	750	40	-	-

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)	1163.9	852.5	155.9	14.5	38.6	6.4	2.8	80.4	8.3	4.5

(Source: Agricultural Statistical Information, Maharashtra State 2006 (Part II)

1. 4	**Major Soils**	**Area ('000 ha)**
	Shallow black soils	349.1
	Medium deep black soils	289.8
	Deep black soils	213.5

(Source: NBSS & LUP, Nagpur)

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	844.2	156.9
	Area sown more than once	480.6	
	Gross cropped area	1324.8	

1.6	**Irrigation**	Area (‘000 ha)		
	Net irrigated area	213		
	Gross irrigated area	295		
	Rainfed area	717		
	Sources of Irrigation	Number	Area (‘000 ha)	Percentage of total irrigated area
	Canals	--	5.1	2.3
	Tanks	-	--	--
	Open well	61449	214.3	97.6
	Bore well			
	Lift irrigation schemes		5.8	
	Micro-irrigation			
	Other sources (please specify)			
	Total Irrigated Area		219.35	
	Pump sets	34000		
	No. of Tractors	6000		
	Groundwater availability and use*	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			
	Wastewater availability and use			
	Ground water quality	Good		

* Source - Agricultural Statistical Data 2008-09 DSA, Jalgaon, Epitome of Govt. of Maharashtra 2004, 05, 06, 07, 08, 09

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

1.7	Major field crops cultivated	Area ('000 ha)							
		Kharif			*Rabi*			Summer	Total
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	
	Cotton	151.2	204.9	356.1					**356.1**
	Sorghum	-	168.2	168.2	3.9	-	3.9		**172.1**
	Maize	58.4		58.4					**58.4**
	Black gram		35.8	35.8					**35.8**
	Wheat				25.03	-	25.03		**25.0**
	Sesamum		19.2	19.2					**19.2**
	Groundnut		1.6	1.6				6.9	**8.5**
	Horticulture crops - Fruits	**Total area**			**Irrigated**		**Rainfed**		
	Banana	48.0			48.0		-		
	Acid lime	3.5			3.5		-		
	Sweet orange	2.5			2.5		-		
	Guava	1.5			1.5		-		
	Horticultural crops - Vegetables	**Total area**			**Irrigated**		**Rainfed**		
		-			-		-		
	Medicinal and Aromatic crops	**Total area**			**Irrigated**		**Rainfed**		
	NA	NA			NA				
	Plantation crops	**Total area**			**Irrigated**		**Rainfed**		
	NA	NA			NA		NA		
	Fodder crops	**Total area**			**Irrigated**		**Rainfed**		
		NA			NA		NA		
	Total fodder crop area	NA			NA		NA		

* Source - Agricultural Statistical Data 2008-09 DSA, Jalgaon

1.8	**Livestock**	**Male (‘000)**	**Female (‘000)**	**Total (‘000)**
	Non descriptive Cattle (local low yielding)	288.2	198.5	486.7
	Crossbred cattle	21.5	46.2	67.7
	Non descriptive Buffaloes (local low yielding)	0	0	0
	Graded Buffaloes	0	0	0
	Goat	101.3	319.7	421.0
	Sheep	10.1	20.3	30.5
	Others (Camel, Pig, Yak etc.)			
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds (‘000)**	
	Commercial	13	84.8	
	Backyard	0	248.1	

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)	
		NA	NA	NA	NA	NA	NA
	ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
		0		**116**		**6**	

	B. Culture			
		Water Spread Area (ha)	**Yield (t/ha)**	**Production (tons)**
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)			
	ii) **Fresh water** (Data Source: Fisheries Department)	15090	0.296	4470
	Others			

* Source - Agricultural Statistical Data 2008-09 DSA, Jalgaon

1.11 Production and Productivity of major crops (Average of last 5 years: 2004, 05, 06, 07, 08, 09)

1.11	Name of crop	*Kharif*		*Rabi*		Summer		Total		Crop residue as fodder (‘000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major field crops (Crops to be identified based on total acreage)										
	Sorghum	245.1	1994	64.2	1745	-	-	309.4	1869.5	
	Cotton	948.5	388	-	-	-	-	948.5	388	
	Wheat	-	-	137.7	2919	-	-	137.7	2919	
	Maize	195.1	2815	85.91	2286	2.64	1661	283.6	2254	
	Black gram	26.67	470	-	-	-	-	26.6	470	
	Groundnut	18.4	1077	-	-	5.65	1747	24.0	1412	
	Sesamum	7.68	355	-	-	-	-	7.6	355	
Major horticultural crops (Crops to be identified based on total acreage)										
	Banana							31.2	65000	
	Acid lime							24.2	7000	
	Sweet orange							34.4	14000	
	Guava							20.8	14000	

* Source - Agricultural Statistical Data 2008-09 DSA, Jalgaon

1.12	**Sowing window for 5 major field crops**	Cotton	Maize	Groundnut	Sesamum	Sorghum	Blackgram
	Kharif- Rainfed	2rd week of June to 2nd week of July	--	2nd week of June to 2nd week of July	2nd week of June to 2nd week of July	3rd week of June to 2nd week of July	3rd week of June to 2nd week of July
	Kharif-Irrigated	3rd week of May to End of May	2ndrd week of June to 1st week of July	2nd week of June to 2nd week of July	-		-
	Rabi- Rainfed	-		-		3rd week of September to 1st week of October	-
	Rabi-Irrigated	-	3rd week of October to Mid of November	-		-	-
	Summer-irrigated	-		3rd week of January to Mid of February.		-	-

1.13	**What is the major contingency the district is prone to?**	Regular	Occasional	None
	Drought	-	√	-
	Flood	-	-	√
	Cyclone/	-	-	√
	Hail storm	-	-	√
	Heat wave	-	-	√
	Cold wave	-	-	√
	Frost	-	-	√
	Sea water intrusion	-	-	√
	Pests and disease outbreak (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

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	Medium to deep black soils,	Cotton	Bt cotton	Opening of furrows for moisture conservation in between two rows Drip irrigation	Linkages with central campus MPKV, Rahuri, College of Agril., Pune and Dhule • NSC, MSSC Private co. Distributers
		Sorghum	CSH-15,16,17	Hoeing at 25 DAS	
		Black gram	TPU-1,4	Hoeing at 25 DAS, weeding	
		Sesamum	PT-1, JLT-7, JLT -408	Conservation furrow after every 12th row, Thinning before 20th DAS	
	Shallow to medium deep black soils	Desi cotton	(Y-1, Nanded 44,)	Opening of furrows for moisture conservation in between two rows	
		Pearl millet	Shraddha, Saburi, Shanti	Conservation furrow after every 12th row,	
		Groundnut	Jl-24,Jl-501,Jl-286	Hoeing at 20 DAS, Weeding	
		Green gram	Vaibhav	-do-	

Condition	Suggested Contingency measures				
Early season drought (delayed onset)	**Major farming situation**	**Normal crop/ cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks July 2nd week	Medium to deep black soils,	Cotton	Bt Cotton	Opening of furrows for moisture conservation in between two rows • Drip irrigation	Linkages with central campus MPKV, Rahuri, College of Agril., Pune and Dhule • NSC, MSSC Private co. Distributers
		Sorghum	Sorghum(CSH-15,16,17)+ Green gram(Vaibhav0/Black gram (TPU-1,4)/Cowpea for fodder (2:1)	• Hoeing at 25 DAS,	
		Blackgram	• Pigeonpea (Vipula)+ black gram (TPU-1,4) (1:3)	• Hoeing at 25 DAS • Opening of conservation furrow after harvest of	

				Blackgram	
		Sesamum	PT-1, JLT-7, JLT -408	Conservation furrow after every 12th row, Thinning before 20th DAS	
	Shallow to medium deep black soils	Desi cotton	Desi cotton (Y-1, Nanded 44,) + pigeonpea (Vipula)(6:1) Desi cotton(Y-1, Nanded 44,) + Green gram (Vaibhav)/Black gram (TPU-1,4) (1:1)	• Hoeing at 20,40 and 60 DAS • Opening of conservation furrow after harvest of intercrop	
		Pearl millet	Pearl millet (Shraddha, Saburi, Shanti)+ cowpea (Phule Pandhari,C-152)	• Hoeing at 25 DAS	
		Groundnut	Groundnut (Jl-24,Jl-501,Jl-286)+ green gram(Vaibhav)/Black gram (TPU-1,4) (6:2)	• Hoeing at 15 and 30 DAS	
		Green gram	Pearl millet(Shraddha, Saburi, Shanti) + Green gram(Vaibhav) (6:3)	• Hoeing at 25 DAS,Weeding	

Condition	**Suggested contingency measures**				
Early season drought (delayed onset)	**Major farming situation**	**Normal crop/ cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks July 4th Week	Medium to deep black soils,	Cotton	Pigeonpea (Vipula)	Opening of furrows for moisture conservation in between two rows Drip irrigation, Paired row planting 90 cm between two rows and 180 cm between two paired rows	Linkages with central campus MPKV, Rahuri, College of Agril., Pune and Dhule • NSC, MSSC Private co. Distributers
		Sorghum	Maize(Rajarshee, Karveer)	Sowing on ridges	
		Black gram	Pearl millet(Shraddha, Saburi, Shanti	Hoeing at 25 DAS	
		Sesamum	Maize(Rajarshee, Karveer)	Sowing on ridges	
	Shallow to medium deep black soils	Desi cotton	Pigeon pea (Vipula)	Opening of furrows for moisture conservation in	

				between two rows Drip irrigation, Paired row planting 90 cm between two rows and 180 cm between two paired rows	
		Pearl millet	Maize Rajarshee, Karveer)	Sowing on ridges & furrows	
		Groundnut	Pearl millet(Shraddha, Saburi, Shanti	Hoeing at 25 DAS	
		Green gram	Maize(Rajarshee, Karveer)	Sowing on ridges	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major farming situation**	**Normal crop/ cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 week 2nd week of August	Medium to deep black soils,	Cotton	Maize	Sowing on ridges & furrows	Linkages with central campus MPKV, Rahuri, College of Agril., Pune and Dhule • NSC, MSSC Private co. Distributers
		Sorghum	Fodder maize(African tall) /Sorghum(Phule Amrita)	Drill fodder maize and / sorghum	
		Maize	Pearl millet (Shraddha, Saburi, Shanti	Hoeing at 25 DAS	
		Black gram	Onion (Phule samartha,N-2-4-1)	Sowing / planting on ridges & furrows for sprinkler / Drip method of irrigation	
		Sesamum	Onion (Phule samartha,N-2-4-1)	As above	
	Shallow to medium deep black soils	Deshi cotton	Maize(Rajarshee, Karveer)	Sowing on ridges & furrows	
		Pearl millet	Pearl millet(Shraddha, Saburi, Shanti	Hoeing at 25 DAS	
		Soybean	Sunflower (SS-56, Bhanu,Phule Raviraj)	Opening of conservation furrows	
		Groundnut	Onion (Phule samartha,N-2-4-1)	Sowing / planting on ridges & furrows for sprinkler / Drip method of irrigation	

		Green gram	Onion (Phule samartha,N-2-4-1)	As above	

Condition	**Suggested contingency measures**				
Early season drought (Normal onset)	**Major farming situation**	**Normal crop/cropping system**	**Crop management**	**Soil nutrient and moisture conservation measures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading the poor germination / crop stand	Medium to deep black soils,	Cotton	Use of poly bag seedlings for gap filling if needed	Opening of furrows for moisture conservation in between two rows Drip irrigation	Linkages with central campus MPKV, Rahuri, College of Agril., Pune and Dhule • NSC, MSSC Private co. Distributers
		Sorghum	• Re sowing in case of poor germination • Thinning and weeding	Hoeing Weeding	
		Sesamum			
		Black gram	--		
	Shallow to medium deep black soils	Desi cotton	Use of poly bag seedlings in cotton for gap filling	Hoeing Weeding	
		Pearlmillet	Resowing in case of poor germination		
		Groundnut	--		
		Green gram	--		

Condition	Suggested contingency measures				
Mid season drought , long dry spell, consecutive 2 weeks, rainless (>2.5 mm)period	**Major farming situation**	**Normal crop/cropping system**	**Crop management**	**Soil nutrient and moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Medium to deep black soils,	Cotton	• Protective irrigation, • Urea (2%) spray • DAP (2%) spray	Opening of furrows for moisture conservation in between two rows Drip irrigation, 8% Kaolin Spray, hoeing	Linkages with central campus MPKV, Rahuri, College of Agril., Pune and Dhule • NSC, MSSC Private co. Distributers
		Sorghum	• Protective irrigation, • Reduce plant population (30%)and apply as mulch • Urea (2%) spray • DAP (2%) spray	Hoeing	
		Blackgram	-	As above	
		Sesamum	-	Opening of furrows for moisture conservation in between two rows	
	Shallow to medium deep black soils	Desi cotton	• Protective irrigation, • Urea (2%) spray • DAP (2%) spray	Opening of furrows for moisture conservation in between two rows Drip irrigation, 8% Kaolin Spray, hoeing	
		Pearlmillet	Remove every third row and used for fodder	Hoeing	
		Groundnut	--	As above	
		Green gram	--	As above	

Condition	Suggested contingency measures				
Mid season drought long dry spell, consecutive 2 weeks, rainless (>2.5 mm)period	**Major farming situation**	**Normal crop/cropping system**	**Crop management**	**Soil nutrient and moisture conservation measures**	**Remarks on Implementation**
At flowering / fruiting stage	Medium to deep black soils,	Cotton	• Protective irrigation, • Urea (2%) spray • DAP (2%) spray • Topping	Opening of furrows for moisture conservation in between two rows Drip irrigation, 8% Kaolin Spray, hoeing	Use of farm ponds for life saving irrigation

		Sorghum	Protective irrigation	-	
		Black gram	Protective irrigation	-	
		Sesamum	Protective irrigation	-	
	Shallow to medium deep black soils	Desi cotton	• Protective irrigation, • Urea (2%) spray • DAP (2%) spray Topping	Opening of furrows for moisture conservation in between two rows Drip irrigation, 8% Kaolin Spray, hoeing	
		Pearl millet	Protective irrigation	-	
		Groundnut	Protective irrigation	-	
		Green gram	Protective irrigation	-	

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**
	Medium to deep black soils,	Cotton	Protective irrigation -	Rabi sorghum, chickpea,	Use of farm ponds for life saving irrigation
		Sorghum	Protective irrigation, In case of poor grain filling harvest for fodder	As above	
		Black gram	Harvest at physiological maturity	As above	
		Sesamum	Harvest at physiological maturity	As above	
	Shallow to medium deep black soils	Desi cotton	Protective irrigation -	As above	As above
		Pearlmillet	Protective irrigation, In case of poor grain filling harvest for fodder	As above	
		Groundnut	harvest at physiological maturity	As above	
		Green gram	harvest at physiological maturity	As above	

2.1.2 Irrigated situation

Condition			Suggested contingency measures		
Delayed release of water in canals due to low rainfall	**Major farming situation**	**Normal crop/cropping system**	**Crop management**	**Agronomic measures**	**Remarks on Implementation**
	Not applicable				
Limited release of water in canals due to low rainfall	Not applicable				

Condition					
Non release of water in canals under delayed onset of monsoon in catchment area	**Major farming situation**	**Normal crop/cropping system**	**Crop management**	**Agronomic measures**	**Remarks on Implementation**
	Not applicable				

Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Not applicable	

Condition			Suggested Contingency measures		
Insufficient ground water recharge due to low rainfall	**Major farming situation**	**Normal crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Medium to deep black soils- Open well irrigated	Cotton	Btcotton/pearlmillet(Shraddha,Saburi, Shanti) / pigeonpea (Vipula) /sunflower(SS-56, Bhanu, Phule	In case of Bt cotton Drip irrigation, Skip row irrigation, hoeing In case of Pigeonpea,	**Seed source :** Central campus

			Raviraj)	Pearlmillet and Sunflower - Hoeing, irrigation at critical growth stages	MPKV, Rahuri, College of Agril., Pune ,Kolhapur and Dhule • NSC, MSSC Private co. Distributers
		Maize	Rajarshee, Karveer	Sowing on ridges , Skip row irrigation,	
		Soybean	JS-335, DS-228	Hoeing at 25 DAS	
	Shallow to medium deep black soils- Open well irrigated	Desi cotton	Cotton (Y-1, Nanded -44)	In case of Bt cotton Drip irrigation, Skip row irrigation, hoeing	
		Chickpea	Vijay, Digvijay	Sprinkler irrigation	

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**
Cotton	Drain out excess water	Drain out excess water, NAA spray, drenching of 1.5% Urea + 1.5 % MOP	Harvest at physiological maturity	Shift the produce to safer place
Sorghum	As above	Drain out excess water	As above	As above
Maize	As above	As above	As above	As above
Black gram	As above	As above	As above	As above
Sesamum/Groundnut	As above	As above	As above	As above
Horticulture				
Banana	• Draining out excess water • Cleaning and maintenance • Drenching of orchard – Copper fungicides • Spraying with 2% urea and application of fertilizers after flood	• Draining out excess water • Cleaning and maintenance • Drenching of orchard – Copper fungicides • Spraying with 2% urea and application of fertilizers after flood	• Draining out excess water • Cleaning and maintenance • Drenching of orchard – Copper fungicides • Spraying with 2% urea and application of fertilizers after flood	Shift the produce to safer place
Acid lime	As above	As above	As above	
Sweet orange	As above	As above	As above	

Heavy rainfall with high speed winds in a short span
NA

Outbreak of pests and diseases due to unseasonal rains	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Cotton	**Insect pest :-** Aphids,Jassids,Thrips **Spray** NSKE @ 5%,Dimethoate 1.5 ml/l, Imidacloprid 0.5ml/lit alternating spray	**Insect pest :-**Boll worm Use Bt Cotton, Spray HNPV, use IPM Technology **Disease:-** Alternaria leaf blight Spray COC (0.25%), Reddening-2% DAP spray Para wilt:-Timely irrigation ,2% DAP drenching	**Insect pest :-** White fly Spray Acetamiprid2 g / 10 lit, water, Dimethoate 1 ml/ lit water Pink Bollworm:- USE IPM Technology	
Sorghum	**Insect pest :-**Shootfly /Stem borer Endosulfan 35 EC 1.5ml/lit water	**Insect pest :-** Army worm Quinolphos 1.5 % or carbaril 10 % 20 kg/ha dusting **Disease :-** Leaf Blight , spry COC 3 g/ lit water	**Insect pest :-**Ear head caterpillar Endosulfan 35 EC 1.5ml/lit water	
Maize	**Insect pest :-**Aphid, Jassids spray Dimethoate 30EC or Monocrotophos 36 SL 1ml / lit water	**Insect pest :-**Stem Borer Endosulfan 35 EC 75s0 ml in 500 lit water		
Black gram	**Insect pest :-**Aphid, Jassids spray Dimethoate 30EC @ 1ml / lit	**Insect pest :-** Hairy caterpillar Spray Endosalfan 1.5 ml / lit water **Disease**:- Powdery midew, Spray wettable sulphur 2.5 g/ lit, Yellow Vein Mosaic- Spray dimethoate 30EC 1.5 ml/lit for white fly		
Sesamum		**Insect pest :-** leaf eating caterpillar Endosulphan 1.5 ml/lit / quinolphos 2ml/lit **Disease:-** Alternaria blight spray COC 3g/lit		
Horticulture				

Banana	**Disease:-**Sigatoka leaf blight Spray Carbendazim 1 gm/lit, Spray Propiconazole 1ml/l With sticker	Such as – Pests - stem borer, thrips, aphids, nematodes Diseases – Sigatoka, bunchy top, cigar end rot, erwinia rot Remedies • Cleaning and maintenance of the orchads • Drain out excess water from the orchads • Drenching with 0.4 % copper fungicides • Staking with available material • Sanitation of the affected plants 1. Spray the crops with 0.20 to 0.25 % copper fungicide for control of fungal diseases. 2. Drench 200 ml of solution (15 g Streptocycline + 300 g COC + 300 ml Chlorpyriphos in 100 L of water) per plant. 3. Spraying with Imidachloprid 17.8 SL @ 3-4 ml/ 10 L of water for control of sucking pests.	**Insect pest :-** Thrips Acitamiprid 2.0 gm/ 10 lit water	
Acid lime	**Disease :-** Citrus canker spray 1 % BM, COC 0.3 % + Streptocycline 100 ppm **Insect pest :-**Mealy bug Methyl demeton 1.5 ml/lit	**Disease :-** Citrus canker spray 1 % BM, COC 0.3 % + Streptocycline 100 ppm **Insect pest :-**Mealy bug Methyl demeton 1.5 ml/lit	**Insect pest :-**Mealy bug Methyl demeton 1.5 ml/lit **Disease :-** Citrus canker spray 1 % BM, COC 0.3 % + Streptocycline 100 ppm	
Sweet orange	As above	**Insect pest :-** Fruit fly Baiting of malathion 200ml + 1 kg Jaggery + 1 Lit Fruit Juice + 10 lit water for 10 Plants	**Insect pest :-** Fruit fly Bating of malathion 200ml + 1 kg Jaggery + 1 Lit Fruit Juice + 10 lit water for 10 Plants	

2.3 Floods : Not applicable

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

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Feed and fodder availability	Proper preservation of available groundnut haulms and sorghum stover at individual farmer level Sowing of cereals (Sorghum/ Maize/Bajra) and leguminous crops (Lucerne, Horse gram, Cowpea) during North-East monsoon under dry land system for fodder production. Motivating the maize farmers to convert green maize tops in to silage by the end of February Preserving the green maize fodder as silage Establishment of fodder bank at village level with available dry fodder (Sorghum kutty/Bajra stover/wheat straw) 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 Formation of village Disaster Management Committee Capacity building and preparedness of the stakeholders and official staff for the drought/floods	Harvest and use biomass of dried up crops (Sorghum/Bajra,/maize/wheat/sesamum/groundnut/balck gram etc) material as fodder Use of unconventional and locally available cheap feed ingredients especially sesamum/groundnut seed/ oil extracted cake 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 cultivation of Horse gram/sunhemp 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. Continuous supplementation of minerals to	Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize(UP 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

		prevent infertility. Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals	
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 disease management	Procure and stock emergency medicines and vaccines for 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	Carryout deworming to all animals entering into 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	Keep close surveillance on disease outbreak. Undertake the vaccination depending on need Keep the animal houses and milking sheds 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	In case of early forewarning (EFW), harvest all the crops (Sorghum/Bajra,/maize/wheat/sesamum/groundnut/ balck gram etc) that can be useful as feed/fodder in future (store properly) Keeping sufficient of dry fodder (sorghum kutty) to transport to the flood affected villages Don't allow the animals for grazing if severe floods are forewarned Keep stock of bleaching powder and lime Carry out Butax spray for control of external parasites Identify the Clinical staff and trained paravets and indent for their services as per schedules Identify the volunteers who can serve in need of emergency	Transportation of animals to elevated areas Proper hygiene and sanitation of the animal shed In severe storms, un-tether or let loose the animals Use of unconventional and locally available cheap feed ingredients for feeding of livestock. Avoid soaked and mould infected feeds / fodders to livestock Emergency outlet establishment for required medicines or feed in each village Spraying of fly repellants in animal sheds	Repair of animal shed Bring back the animals to the shed Cleaning and disinfection of the shed Bleach (0.1%) drinking water / water sources Encouraging farmers to cultivate short-term fodder crops like sunhemp. Deworming with broad spectrum dewormers Proper disposable of the dead animals / carcasses by burning / deep burying (4-8 feet) with lime powder (1kg for small ruminants and 5kg for large ruminants) in pit Drying the harvested crop material and proper storage for use as fodder.
Cyclone	Harvest all the possible wetted grain (Sorghum/Bajra,/maize/wheat/sesamum/groundnut/ balck gram etc) and use as animal feed. Stock of anti-diarrheal drugs and electrolytes should be made available for emergency transport Don't allow the animals for grazing in case of early forewarning (EFW) of cyclone Incase of EFW of severe cyclone, shift the animals to safer places.	Treatment of the sick, injured and affected animals through arrangement of mobile emergency veterinary hospitals / rescue animal health workers. Diarrhea out break may happen. Health camps should be organized In severe cases un-tether **or** let loose the animals Arrange transportation of highly productive animals to safer place Spraying of fly repellants in animal sheds	Repair of animal shed Deworm the animals through mass camps Vaccinate against possible disease out breaks like HS, BQ, FMD and PPR Proper dispose of the dead animals / carcasses by burning / deep burying (4-8 feet) with lime powder (1kg for small ruminants and 5kg for large ruminants) in pit Bleach / chlorinate (0.1%) drinking water or water resources Collect drowned crop material, dry it and store for future use Sowing of short duration fodder crops in unsown and water logged areas when crops are damaged and no chance to replant

			Application of urea (20-25kg/ha) in the inundated areas and CPR's to enhance the bio mass production.
Heat & Cold wave	**Cold wave :** Covering all the wire meshed walls / open area with gunny bags/ polyethylene sheets (with a mechanism for lifting during the day time and putting down during night time)	Allow for late grazing between 10AM to 3PM during cold waves Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves In severe cases, put on the heaters at night times Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)
	Arrangement for protection from **heat wave** i) Plantation around the shed ii) H_2O sprinklers / foggers in the shed **iii)** Application of white reflector paint on the roof **iv)** Thatched sheds should be provided as a shelter to animal to minimize heat stress	Allow the animals early in the morning or late in the evening for grazing during heat waves Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves Put on the foggers / sprinkerlers/fans during heat weaves in case of high yielders (Jersey/HF crosses) In severe cases, vitamin 'C' and electrolytes should be added in H_2O during heat waves.	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)
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, bajra etc, Culling of weak birds	Supplementation only for productive birds with house hold grain Supplementation of shell grit	Supplementation to all

		(calcium) for laying birds	
Drinking water	Rain water harvesting	Sanitation of drinking water	Give sufficient water as per the bird's requirement
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and fowl pox	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with line powder in pit
Floods			
Shortage of feed ingredients	In case of EFW, shift the birds to safer place Storing of house hold grain like maize, broken rice, bajra etc, Culling of weak birds	Use stored feed as supplement Don't allow for scavenging	Routine practices are followed
Drinking water	Provide clean drinking water	Sanitation of drinking water	Sanitation of drinking water
Health and disease management	In case of EFW, add antibiotic powder in drinking water to prevent any disease outbreak	Sanitation of poultry house Treatment of affected birds Prevent water logging surrounding the sheds Assure supply of electricity Sprinkle lime powder to prevent ammonia accumulation due to dampness	Disposal of dead birds by burning / burying with line powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD
Cyclone			

Shortage of feed ingredients	In case of EFW, shift the birds to safer place Storing of house hold grain like maize, broken rice, bajra etc, Culling of weak birds	Use stored feed as supplement Don't allow for scavenging Protect from thunder storms	Routine practices are followed
Drinking water	Provide clean drinking water	Sanitation of drinking water	Sanitation of drinking water
Health and disease management	In case of EFW, add antibiotic powder in drinking water to prevent any disease outbreak	Sanitation of poultry house Treatment of affected birds Prevent water logging surrounding the sheds Assure supply of electricity Sprinkle lime powder to prevent ammonia accumulation due to dampness	Disposal of dead birds by burning / burying with line powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD
Heat wave			
Shelter/environment management	Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day	Routine practices are followed
Health and disease management	Deworming and vaccination against RD and fowl pox	Supplementation of house hold grain Provide cool and clean	Routine practices are followed

		drinking water with electrolytes and vit. C In hot summer, add anti-stress probiotics in drinking water or feed	
Cold wave			
Shelter/environment management	Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity	Close all openings with polythene sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening	Routine practices are followed

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine			
Inland			
(i) Shallow water depth due to insufficient rains/inflow			
(ii) Changes in water quality			
(iii) Any other			
B. Aquaculture			

(i) Shallow water in ponds due to insufficient rains/inflow			
(ii) Impact of salt load build up in ponds / change in water quality			
(iii) Any other			
2) Floods			
A. Capture			
Marine			
Inland			
(i) Average compensation paid due to loss of human life			
(ii) No. of boats / nets/damaged			
(iii) No.of houses damaged			
(iv) Loss of stock			
(v) Changes in water quality			
(vi) Health and diseases			
B. Aquaculture			
(i) Inundation with flood water			
(ii) Water continuation and changes in water quality			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, huts etc)			
(vi) Any other			
3. Cyclone / Tsunami			

A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives			
(ii) Avg. no. of boats / nets/damaged			
(iii) Avg. no. of houses damaged			
Inland			
B. Aquaculture			
(i) Overflow / flooding of ponds			
(ii) Changes in water quality (fresh water / brackish water ratio)			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)			
(vi) Any other			
4. Heat wave and cold wave			
A. Capture			
Marine			
Inland			
B. Aquaculture			
(i) Changes in pond environment (water quality)			
(ii) Health and Disease management			

Annexure – I : Location map

Fig 1.Location map of district within State

Annexure – II : Rainfall map of Jalgaon District

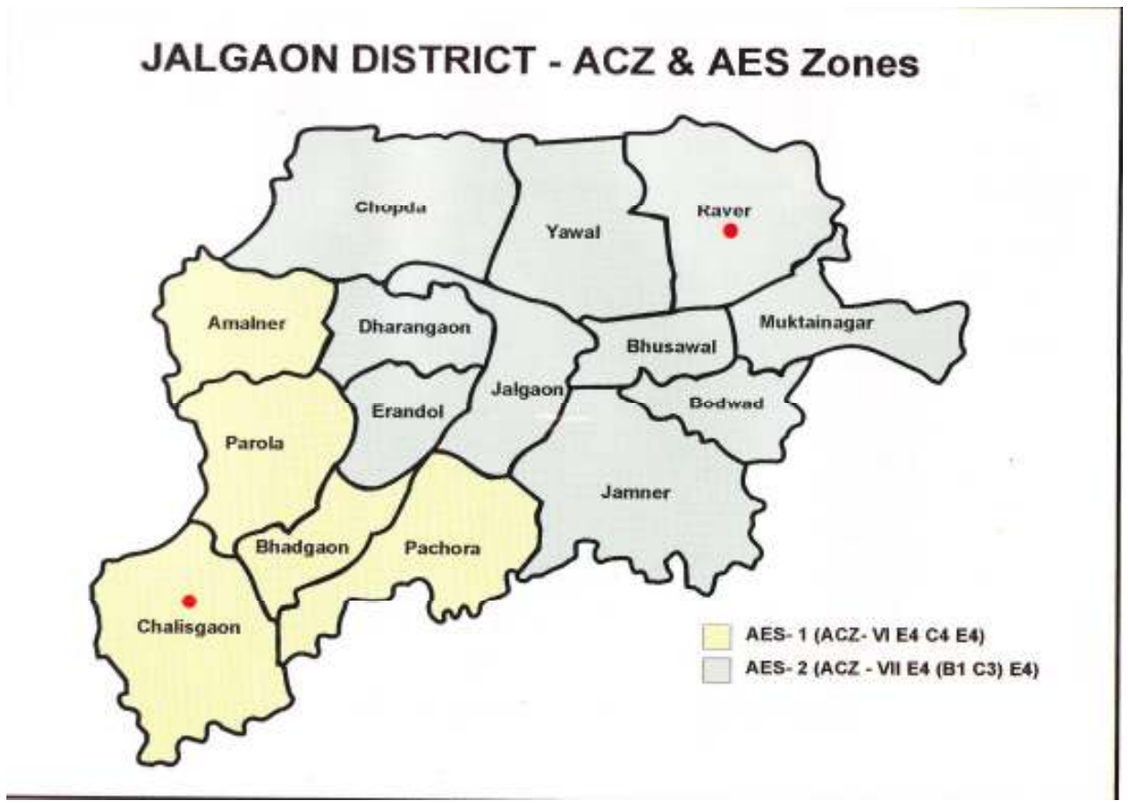

Fig 2. Rainfall map of Jalgaon District
Blue colour indicate medium to heavy soil with assured rainfall zone
Yellow colour indiocate light to medium soil with unassured rainfall

Annexure – III : Soil Map