State: MAHARASHTRA

Agriculture Contingency Plan for District: SOLAPUR

1.0 District Agriculture Profile

1.1	**Agro-Climatic/Ecological Zone**										
	Agro Ecological Sub Region (ICAR)	Deccan Plateau, hot semi-arid eco sub region (6.1)									
	Agro-Climatic Zone (Planning Commission)	Western Plateau and Hills Region (6)									
	Agro Climatic Zone (NARP)	Western Maharashtra Scarcity zone. (MH-6)									
	List all the districts or part thereof falling under the NARP Zone	Solapur, Ahmednagar, Dhule, Part of Nasik, Sangli									
	Geographic coordinates of district headquarters	Latitude			Longitude				Altitude		
		$17^0 41'$			$75^0 56'$				483.6m		
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Zonal Agricultural Research Station, 97, Raviwar Peth, P.B. No. 207, Near Dayanand College, Solapur – 413 002.									
	Mention the KVK located in the district	Krishi Vignyan Kendra, At/Post: Khed, Tal. : North Solapur, Dist. : Solapur Pin:413 002									

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)	550.5	23	1st week to 2nd week of June	2nd to 3rd week of October
	NE Monsoon(Oct-Dec)	115.9	10	-	-
	Winter (Jan- Feb)	4.7	2	-	-
	Summer (Mar-May)	52.3	6	-	-
	Annual	723.4	41	-	-

1.3	**Land use pattern of the district**	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)	1487.8	1030.9	35.3	5.2	66.1	39.4	6.0	63.7	111.2	121.0

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

1. 4	**Major Soils**	**Area ('000 ha)**	**Per cent of total area**
	Shallow Black soil	699.0	67.8
	Deep Black soil	188.1	18.2
	Medium Black soil	143.7	13.9

(Source: NBSS & LUP, Nagpur)

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity (%)
	Net sown area	919.7	111.1
	Area sown more than once	102.8	
	Gross cropped area	1022.5	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	251.5		
	Gross irrigated area	271.0		
	Rainfed area	759.9		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	--	31.4	12.5
	Tanks	10	0.5	0.2
	Open wells	68411	188.5	74.9
	Bore wells	10712	5.0	1.9
	Lift irrigation schemes	150	26.0	10.3
	Micro-irrigation		-	-
	Other sources (please specify)		-	-
	Total Irrigated Area		251.5	100
	Pump sets (Diesel + Electrical)	7,485 + 1,69,010 =1,76,495		
	No. of Tractors	11,000		
	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	01	40	Good
	Critical	01	20	Good
	Semi- critical	-	-	
	Safe	08	20	Good
	Wastewater availability and use	-	-	

	Ground water quality	-		

(Source - District statistical report 2008-09)

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

1.7		**Major field crops**	**Area ('000 ha)**							
			Kharif			***Rabi***			**Summer**	**Total**
		Cultivated	**Irrigated**	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**		
	1	Sorghum	-		-	-	707.0	707.0	-	707.0
	2	Wheat	-	-	-	58.9	-	58.9	-	58.9
	3	Chickpea	-	-	-	-	43.9	43.9	-	43.9
	4	Sunflower	-	12.1	12.1	-	24.9	24.9	-	37.0
	5	Pigeonpea	-	18.9	18.9	-	-		-	18.9
	6	Sugarcane	14.9	-	14.9	-	-	-	-	14.9
	7	Safflower	-	-	-	-	12.5	12.5	-	12.5
		Horticulture crops - Fruits	**Total area ('000 ha)**			**Irrigated**			**Rainfed**	
	1	Pomegranate	41.0			41.0			-	
	2	Ber	18.5			18.5			-	
	3	Grape	10.6			10.6			-	
	4	Custard apple	1.9			1.9			-	
	5	Banana	5.7			5.7			-	
		Vegetables	**Total area ('000 ha)**			**Irrigated**			**Rainfed**	
	1	Tomato	1.65			1.65			-	
	2	Onion	1.99			1.99			-	
		Medicinal and Aromatic crops	**Total area**			**Irrigated**			**Rainfed**	
	1	Not Applicable	Not Applicable							

		Plantation crops	**Total area**	**Irrigated**	**Rainfed**
	1	Not Applicable	Not applicable		
		Others such as industrial pulpwood crops etc (specify)			
		Fodder crops	**Total area**	**Irrigated**	**Rainfed**
	1	Maize	20.2	20.2	--
	2	Grasses	7.8	7.8	-
		Others (specify)	-	-	--
		Total fodder crop area	28.0	28.0	-
		Grazing land	38.0	--	38.00
		Sericulture etc	1.2	1.2	-
		Others (Specify)	-	-	-

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)			659.11
	Crossbred cattle			
	Non descriptive Buffaloes (local low yielding)			388.95
	Graded Buffaloes			
	Goat			834.27
	Sheep			253.71
	Others (Camel, Pig, Yak etc.)			21.8
	Commercial dairy farms (Number)			2.5
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	--	792.8	
	Backyard	--	948.9	
1.10	**Fisheries**			

	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					
	ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
		NA					
	B. Culture						
		Water Spread Area (ha)		**Yield (t/ha)**		**Production ('000 tons)**	
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	**NA**					
	ii) **Fresh water** (Data Source: Fisheries Department)						
	Others						

(Source: 17th Livestock census 2003)

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**	Productivity (kg/ha)	**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)		
Major Field crops										
1	Sorghum	-	-	457.84	529	-	-	457.84	529	
2	Pearlmillet	8.66	695	-	-	-	-	8.66	695	
3	Maize	28.12	1422	28.88	2117	-	-	57.00	1769	
4	Chickpea	-	-	27.30	670	-	-	27.30	670	
5	Safflower	-	-	5.2	520	-	-	5.20	520	
6	Sunflower	6.34	573	9.30	628			15.64	600	

7	Sugarcane	-	-	-	-	-	-	5613.50	81000	
Major Horticultural crops -										
Fruits										
1	Pomegranate	-	-	-	-	-	-	259.25	7500	-
2	Ber	-	-	-	-	-	-	100	10000	-
3	Custard apple	-	-	-	-	-	-	71.4	14275	-
4	Grape	-	-	-	-	-	-	280.55	26370	-
5	Banana	-	-	-	-	-	-	210	36777	-
	Vegetable									
1	Tomato	35.31	21.4	-	-	-	-	35.31	21.4	-
2	Onion	24.03	12.08	-	-	-	-	24.03	12.08	-

(Source: Epitome of Govt. of Maharashtra 2004, 05, 06, 07, 08, 09)

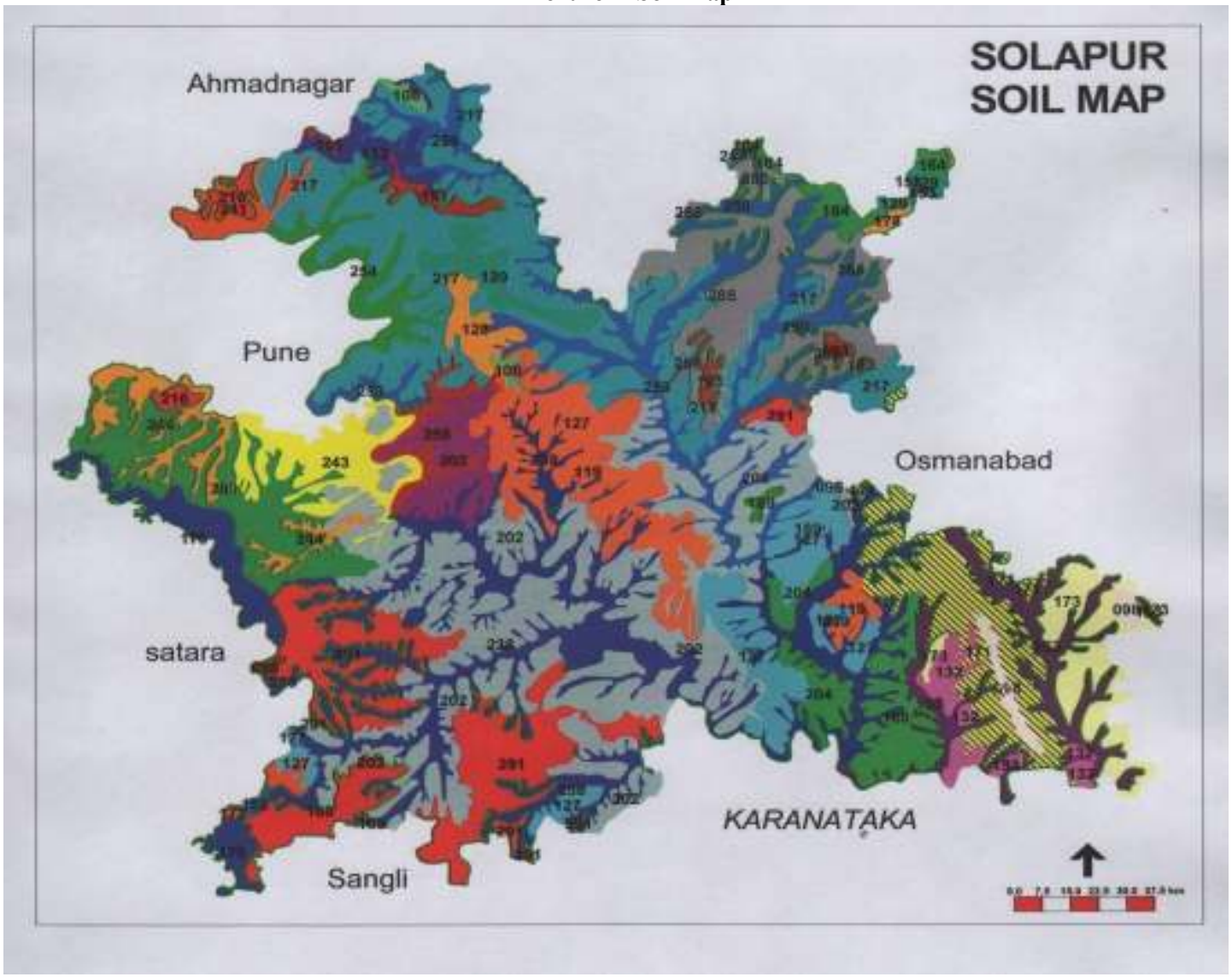
1.12	**Sowing window for 5 major field crops**	**Pigeonpea**	**Sunflower**	**Safflower**	**Sorghum**	**Chickpea**	**Wheat**
	Kharif- Rainfed	15th June to 15th July	15th June to 15th Aug	--	--	--	--
	Kharif-Irrigated	15th July to 15th Aug.	15th June to 15th Aug	--	--	--	--
	Rabi- Rainfed	--	15th Sept to 15th Oct	15th Sept to 15th Oct	15th Sep to 15th Oct	25th Sept to 15th Oct	--
	Rabi-Irrigated	--	15th Sept to 30th Oct	15th Sept to 30th Oct	30th Sep to 15th Oct	20th Oct to 20th Nov	15th Nov to 15th Dec

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)	--	- Wooly aphids and army worm in sugarcane, - Oily spot in pomegranate, - Pod borer in pigeonpea and chickpea, - Shootfly and stem borer in *Rabi* sorghum	--

1.14	**Include Digital maps of the District for**	Location map of district within State as Annexure I	Enclosed: No
		Mean annual rainfall as Annexure 2	Enclosed: No
		Soil map as Annexure 3	Enclosed: Yes

Annexure I Location Map

Annexure II Soil Map



Source: NBSSLUP

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[a]**	**Normal Crop / Cropping system[b]**	**Change in crop / cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 2 weeks (June 4th week)	Medium deep to deep black soils	Sunflower	Sunflower + pigeonpea (2:1)	Opening of ridges and furrows for soil and water conservation before onset of monsoon, hoeing at 25 DAS Preparation of furrows for moisture conservation after harvest of sunflower Heliothis: Need base IPM package Hoeing at 25 DAS	**Seed source :** Central campus MPKV, Rahuri, College of Agril., Pune and Dhule NSC, MSSC Private co. Distributers Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough
		Pigeonpea	Pearlmillet + pigeonpea (2:1) Soybean + pigeonpea (3:1)	As above	
		Greengram	Pigeonpea + green gram (1:3)	As above	
		Blackgram	Pigeonpea + black gram (1:3)	As above	
		Kharif - Fallow During Rabi - Rabi sorghum Safflower Sunflower Chickpea Strip cropping of Chickpea + Safflower (6:3), Strip cropping of Rabi sorghum + Chickpea (6:3)	No change	*In situ* SWC measures in fallow: ridges and furrows, Tied ridges, Compartmental bunding to conserve the rain water during *kharif* for regular sowing of *Rabi* crops as above	

		Kharif	***Rabi***	***Kharif***	***Rabi***		
		Green gram / Blackgram / Cowpea	Rabi sorghum / Safflower / Chickpea	Fallow	No Change		
		Pigeonpea	--	No change	--		
	Shallow to Medium deep black soils	Pearl millet		Pearlmillet + horse gram (2:1) Pearlmillet + moth bean (2:1)		Gap filling, thinning One hoeing and weeding before 30 DAS	
	Shallow black soils	Castor		Castor + cluster bean (1:2) Castor and ridge gourd (mixed cropping)		As above + Spraying of 50 WP Carbaryl @ 2 g per lit. of water for control of semilooper	
		Horse gram		No change		Use of improved cultivar	
		Moth bean		No change		As above	
		Grasses (Marvel, Madras Anjan) Forest tree plantation (Leucaena Spp., Glyricidia)		Ber plantation + grasses (Stylo), Custard apple Horse gram, Moth bean Setaria spp. Niger		Compartment bunds, CCT, opening of ridges and furrows for soil and water conservation. Making of semi circular basin around the trees for moisture conservation Mulching, Kaolin spray 8%. Use wind breaks ,Shelter belts	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/ cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 4 weeks (July 2nd week)	Medium deep to deep black soils	Sunflower	Pigeonpea, Castor	Opening of alternate dead furrows for water / moisture conservation at 30 DAS Gap filling, thinning One hoeing and weeding before 30 DAS IPM techniques	**Seed source :** • Central campus MPKV, Rahuri, College of Agril., Pune and Dhule • NSC, MSSC Private co. Distributeurs Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough
		Pigeonpea	Pigeonpea + clusterbean (1:2)	As above	
		Green gram	Pigeonpea + coriander(1:2)	As above	
		Black gram	Pigeonpea + deel(1:2)	As above	
		Kharif fallow	*Kharif* f allow followed by *Rabi* crop	Opening of ridges and furrows across the slope for moisture conservation	
		Kharif - Fallow During *Rabi* - *Rabi* sorghum Safflower Sunflower, Strip cropping of Chickpea + Safflower (6:3) Strip cropping of *Rabi* sorghum + Chickpea (6:3)	No change	*In situ* SWC measures in fallow: ridges and furrows, Tied ridges, Compartmental bunding to conserve the rain water during *kharif* for regular sowing of *Rabi* crops as above	
	Shallow to medium deep black soils	Pearlmillet	Mothbean, Horsegram	Application of 25 kg K_2O per ha for pearlmillet Opening of alternate dead furrows for water / moisture conservation 30 DAS Gap filling, thinning One hoeing and weeding before 30 DAS IPM techniques	
		Horsegram	Sunflower + pigeonpea (2:1)	As above	
		Mothbean	Pearlmillet + pigeonpea	As above	

				(2:1)			
		Kharif	***Rabi***	***Kharif***	***Rabi***		
		Green gram / Blackgram / Cowpea	Rabi sorghum / Safflower / Chickpea	Fallow	No Change		
		Pigeonpea	--	No change	--		
	Shallow black soils	Grasses (Marvel, Madras Anjan) Forest tree plantation		Grasses (Dongari, Madras anjan)			

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 6 weeks (July 4th week)	Medium deep to deep black soils	Sunflower	Pigeonpea + clusterbean (1:2) Sunflower + pigeonpea(2:1) Castor Setaria spp.	Opening of ridges and furrows for soil and water conservation before onset of monsoon Immediate sowing of the crops after onset of monsoon Opening of alternate dead furrows for water / moisture conservation 30 DAS for sole crop Use of short duration varieties Use of herbicides in sole crops	**Seed source :** Central campus MPKV, Rahuri, College of Agril., Pune ,Kolhapur and Dhule NSC, MSSC, Private co.-op. , Distributeurs
		Pigeonpea	Pigeonpea + coriander (1:2) Castor, Setaria spp.	As above	
		Green gram	Pigeonpea + deel (1:2) Castor Setaria spp.	As above	
		Black gram	Pearlmillet + pigeonpea (2:1)	As above	
		Kharif fallow	*Kharif* fallow followed by *rabi* crop	Opening of ridges and furrows across the slope	Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough
		Kharif - Fallow During *Rabi* - *Rabi* sorghum Safflower	No change	*In situ* SWC measures in fallow: ridges and furrows, Tied ridges, Compartmental bunding to conserve the rain water during *kharif* for	

		Sunflower, Strip cropping of Chickpea + Safflower (6:3) Strip cropping of *Rabi* sorghum + Chickpea (6:3)		regular sowing of *Rabi* crops as above	

	Shallow to medium deep black soils	Pearlmillet		Castor and ridge gourd Pigeonpea + coriander (1:2)		Immediate sowing of the crops after onset of monsoon	
		Horse gram		As above		As above	
		Moth bean		As above		As above	
		Kharif	***Rabi***	***Kharif***	***Rabi***		
		Green gram / Blackgram / Cowpea	Rabi sorghum / Safflower / Chickpea	Fallow	No Change		
		Pigeonpea	--	No change	--		
	3. Scarcity low rainfall, shallow soils	Grasses (Marvel, madras anjan) Forest tree plantation (Leucana Spp., Glyricidia)		Grasses Plantation of drum stick		Opening and filling of pits with compost ,trash and methyl parathion powder before onset of monsoon Making of semi circular basin around the tree for moisture conservation	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 8 weeks (2nd week of August)	Medium deep to deep black soils	Sunflower	Sunflower Castor Castor + Ridge gourd (mixed cropping) Setaria spp.	Use of short duration cultivars Gap filling, thinning and hoeing Opening of alternate dead furrows for water / moisture conservation 30 DAS for sole crop	**Seed source :** • Central campus MPKV, Rahuri, College of Agril., Pune ,Kolhapur and Dhule • NSC, MSSC Private co. Distributers Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough
		Pigeonpea	As above	As above	
		Greengram	As above	As above	
		Blackgram	As above	As above	
		Kharif fallow	*Kharif* fallow followed by *Rabi* crop	Opening of ridges and furrows across the slope	
		Kharif - Fallow During *Rabi* - *Rabi* sorghum Safflower Sunflower, Strip cropping of Chickpea + Safflower (6:3) Strip cropping of *Rabi* sorghum + Chickpea (6:3)	No change	*In situ* SWC measures in fallow: ridges and furrows, Tied ridges, Compartmental bunding to conserve the rain water during *kharif* for regular sowing of *Rabi* crops as above	
	Shallow to medium deep black soils	Pearlmillet	Sunflower Castor Horse gram Castor and ridge gourd (mixed cropping)	Opening of alternate dead furrows for water / moisture conservation 30 DAS for sole crop	-
		Horse gram	As above	As above	
		Moth bean	As above	As above	
		Kharif / ***Rabi***	***Kharif*** / ***Rabi***		
		Green gram / Blackgram / Cowpea / Rabi sorghum / Safflower / Chickpea	Fallow / No Change	-	-
		Pigeonpea / --	Fallow / *Rabi* sorghum + Chickpea (6:3)		
	Shallow black soils	Grasses (marvel, madras anjan)	Grasses	--	

		Forest tree plantation (Leucana Spp., Glyricidia)			

Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation**[a]	**Normal Crop/cropping system**[b]	**Crop management**[c]	**Soil nutrient & moisture conservation measues**[d]	**Remarks on Implementation**[e]
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination / crop stand etc.	Medium deep to deep black soils	Sunflower	Resowing in case of poor germination Thinning and weeding Hoeing Water spray		Use slit and entire blade hoe
		Pigeonpea	As above	As above	
		Green gram	As above	As above	
		Black gram	As above	As above	
		Kharif - Fallow During *Rabi* - *Rabi* sorghum Safflower Sunflower, Strip cropping of Chickpea + Safflower (6:3) Strip cropping of *Rabi* sorghum + Chickpea (6:3)	No change	Ridge and Furrows, Compartmental bunding, Tied ridges to conserve rainwater during *kharif* for regular sowing of *rabi* crops	
	Shallow to medium deep black soils	Pearlmillet	Sunflower Castor Horse gram Castor and ridge gourd (mixed cropping)	Opening of alternate dead furrows for water / moisture conservation 30 DAS for sole crop	
		Horse gram	As above	As above	
		Moth bean	As above	As above	
	Shallow black soils	Grasses (marvel, madras anjan) Forest tree plantation (Leucana Spp., Glyricidia)	Replanting in case of poor germination	--	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation[e]**
At vegetative stage	Medium deep to deep black soils	Sunflower	Water spray Hoeing Protective irrigation (sprinkler irrigation) Spraying of 2% urea after receipt of rainfall Spraying of 8% kaolin Defoliation of lower mature leaves	Application of remaining 50 % N dose after receipt of rainfall.	Use of farm ponds for life saving irrigation
		Pigeonpea	As above	As above	
		Green gram	As above	As above	
		Black gram	As above	As above	
		Kharif - Fallow During *Rabi* - *Rabi* sorghum Safflower Sunflower, Strip cropping of Chickpea + Safflower (6:3) Strip cropping of *Rabi* sorghum + Chickpea (6:3)	No change	Ridge and Furrows, Compartmental bunding, Tied ridges to conserve rainwater during *kharif* for regular sowing of *rabi* crops	
	Shallow to medium deep black soils	Pearlmillet	As above	As above	As above
		Horse gram	As above	As above	
		Mothbean	As above	As above	
		Greengram/ Blackgram /Cowpea – *Rabi* Sorghum /Chickpea / Safflower	-	Opening of conservation furrows at an interval of 15-20 m	

	Shallow black soils	Grasses (marvel, madras anjan) Forest tree plantation (Leucana Spp., Glyricidia)	--	--	--

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation**
At flowering/ fruiting stage	Medium deep to deep black soils	Sunflower	Protective irrigation (sprinkler) Defoliation of lower mature leaves Water spray Spraying of 2 % KCl	-	Use of farm ponds for life saving irrigation
		Pigeonpea	As above	-	
		Green gram	As above	-	
		Black gram	As above	-	
		Kharif - Fallow During *Rabi* - *Rabi* sorghum Safflower Sunflower, Strip cropping of Chickpea + Safflower (6:3) Strip cropping of *Rabi* sorghum + Chickpea (6:3)	No change	Ridge and Furrows, Compartmental bunding, Tied ridges to conserve rainwater during *kharif* for regular sowing of *rabi* crops	
	Shallow to medium deep soils	Pigeonpea	As above	-	
		Green gram	As above	-	
		Black gram	As above	-	
		Greengram/ Blackgram /Cowpea – *Rabi* Sorghum /Chickpea / Safflower	-	Opening of conservation furrows at an interval of 15-20 m	
	Shallow black soils	Grasses (marvel, madras anjan), Forest tree plantation	-		

Condition			**Suggested Contingency measures**		
Terminal drought	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	***Rabi* Crop planning[d] (if *Kharif* crop fails)**	**Remarks on Implementation[e]**
(Early withdrawal of monsoon)	Medium deep to deep black soils	Sunflower	Protective irrigation Spraying of 8% Kaolin Defoliation of lower mature leaves	Sowing of sorghum, chickpea, linseed, safflower	Use of farm ponds for life saving irrigation
		Pigeonpea	As above	As above	
		Green gram	As above	As above	
		Black gram	As above	As above	
		Kharif - Fallow During *Rabi* - *Rabi* sorghum Safflower Sunflower, Strip cropping of Chickpea + Safflower (6:3) Strip cropping of *Rabi* sorghum + Chickpea (6:3)	No change	Ridge and Furrows, Compartmental bunding, Tied ridges to conserve rainwater during *kharif* for regular sowing of *rabi* crops	
	Shallow to medium deep black soils	Pigeonpea	As above	As above	As above
		Green gram	As above	As above	
		Black gram	As above	As above	
		Greengram – *Rabi* Sorghum /Chickpea / Safflower	Harvest greengram	--	
	Shallow black soils	Grasses (marvel, madras anjan) Forest tree plantation (Leucana Spp., Glyricidia)			

2.1.2 Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/ cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Delayed release of water in canals due to low rainfall	Medium black soils with canal irrigation	*Kharif* Pearlmillet Preseasonal sugarcane Maize for fodder and grain purpose Soybean Pigeonpea Onion	Pearlmillet followed by onion Green manuring followed by preseasonal sugar cane, Sugarcane + onion Sugarcane + cucumber Sugarcane + cabbage Leafy vegetables followed by preseasonal sugarcane	Use of drip/sprinkler/micro irrigation/raingun Use of paired row plantation in sugarcane Foliar application of 2% DAP Alternate furrow irrigation	**Seed source :** Central campus MPKV, Rahuri, College of Agriculture, Pune ,Kolhapur and Dhule NSC, MSSC Private co. Distributers
	Light soils canal irrigation ,	*Kharif* Pearlmillet	Groundnut Pomegranate, *Ber*, Custard apple, Drumstick, *Aonla*	Use of BBF method for groundnut. Use of polyethylene mulch for groundnut Use of sprinkler/drip/ micro irrigation	
Limited release of water in canals due to low rainfall	Medium black soils with canal irrigation	*Kharif* pearlmillet Preseasonal sugarcane Maize for fodder and grain purpose Soybean Pigeonpea Onion	Pearlmillet followed by onion Green manuring followed by preseasonal sugar cane, Sugarcane + onion Sugarcane + cucumber Sugarcane + cabbage Leafy vegetables followed by preseasonal sugarcane Banana	Use of Drip Alternate furrow irrigation Use of trash mulch in sugarcane Trash management in ratoon sugarcane Use of organic material like FYM, vermicompost	

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/ cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Non release of water in canals under delayed onset of monsoon in catchment	Medium black soils with canal irrigation	*Kharif* Pearlmillet Preseasonal sugarcane Maize for fodder and grain purpose Soybean Pigeonpea Onion	*Kharif* pearlmillet Pigeonpea Sunflower Maize	Trash management in sugarcane Thinning in cereal crops Weeding / hoeing Water spray Defoliation of lower matured leaves Harvesting of sugarcane for fodder	
	Light soils with canal irrigation	*Kharif* Pearlmillet *Ber* Pomegranate Custard apple	Mothbean Horsegram Setaria spp.	Spraying of 2% DAP Use of drought tolerant cultivar Use of wind breaks, shelter belts Mulching in fruit crops Reduction of fruit load in plantation crops	
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Scarcity low rainfall medium black soils with canal irrigation	*Kharif* Pearlmillet Preseasonal sugarcane Maize Soybean Pigeonpea Onion	*Kharif* pearlmillet Pigeonpea Sunflower Maize	Use of micro irrigation system Water spray Use of drought tolerant cultivars	
Insufficient groundwater recharge due to low rainfall	Kharif	*Kharif* Pearlmillet Preseasonal sugarcane Maize Soybean Pigeonpea Onion	Sowing of short duration fodder crops, leafy vegetables	Timely sowing, Use of improved short duration cultivars Minimization of plant population Interculturing	

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[k]**	**Flowering stage[l]**	**Crop maturity stage[m]**	**Post harvest[n]**
Pigeonpea	Drain out excess water	Drain out excess water	Drain out excess water Harvesting at physiological maturity	Shifting of economic produce to safer place for drying
Pearlmillet	As above	If flowers washed out, immediately harvest the crop	As above	As above
Sunflower	As above	As above	As above	As above
Maize	As above	Drain out excess water	Drain out excess water	As above
Inter Cropping System	As above	As above	As above	As above
Horticulture				
Grape	Drain out excess water by opening the trenches	Provide drainage trench (1.5 cu. ft) across the slope and application of 10 ppm NAA spray	Provide drainage trench (1.5 cu. ft) across the slope	Treatment of 0.1 % carbendizime to the bunches to protect from diseases
Banana	-do-	Providing drainage trench (1.5 cu. ft) across the slope	-do-	-
Pomegranate	Drain out excess water by opening the trenches	--	--	--
Vegetable crops				
Onion	Providing drainage trench (1.5 cu. ft) across the slope	Providing drainage trench (1.5 cu. ft) across the slope	2000 ppm of MH spray 15 days before the harvest to control sprouting in storage	Store in well ventilated structure
Tomato	-do-	Application of 10 ppm NAA spray	-	-
Green Chillies	-do-	Application of 10 ppm NAA spray	-	-
Brinjal	-do-	Application of 10 ppm NAA spray	-	-

Okra	-do-	Application of 10 ppm NAA spray	-	-
Flowers				
Marigold	Providing drainage trench (1.5 cu. ft) across the slope	Providing drainage trench (1.5 cu. ft) across the slope	-	-
Chrysanthemum	-do-	-do-		
Jasmine	-do-	-do-		
Heavy rainfall with high speed winds in a short span[2]				
Pigeonpea	Drain out excess water	Drain out excess water	Drain out excess water	Shifting of economic produce to safer place for drying
Horticulture				
Grape	Drain out excess water	Drain out excess water	Go for resin making	Shifting of economic produce to safer place
Pomegranate	As above	As above	Damaged fruits should be used for preparation of *anardana*	As above
Banana	As above	As above	In case of damage of stem / bunch, the immature fruits should be used for preparation of chips	As above

Outbreak of pests and diseases due to unseasonal rains	**Vegetative stage[k]**	**Flowering stage[l]**	**Crop maturity stage[m]**	**Post harvest[n]**
Pigeonpea	**Leaf roller –** - Collection and destruction of affected leaves **Wilt** – Drain out excess water - Drenching with copper oxychloride 50 WP (0.4 %) - Uproot and burn	**Pod borer –** - Spraying of 5 % NSKE - Use of pheromone traps - HNPV 1 ml / lit. spray - Spraying of chlorpyriphos 2 ml / lit. - Drain out excess water - Drenching with copper oxychloride 50 WP (0.4 %) - Uproot and burn	-	
Pearlmillet	**a) Insect pest - Grass hopper** - Dusting of methyl parathion 2% 20 kg /	**Blister beetle** - Dusting of methyl parathion 2% 20 kg /ha	-	

	ha	**Rust –** - Spraying of mancozeb 75 WP 0.25 %		
Sunflower	**i) Thrips** **-** Imidachloprid 17 SL 0.5 ml / lit. ii) **Hairy catterpillar -** - Collection and destruction of egg masses, early instar larvae and affected plant parts - Spraying of 50 % carbaryl 2g/lit.	**Heliothis-** -Endosulphon 35 EC 2 ml/ lit. **Alternaria / Cercospora Leaf blight –** - Spraying of mancozeb 75 WP 0.25%	-	
Rabi sorghum	**i) Shoot fly** - Installation of 5 fish meal traps per ha - Spraying of Endosulfan 35 EC 2 ml/lit. **ii) Stem borer** - Spraying of Endosulfan 35 EC 2 ml / lit. **iii) Aphids/ Jassids –** Spraying of Dimethoate 30 EC 1.5 ml / lit.	**i) Web worm** - Spraying of Endosulfan 35 EC 2 ml / lit. **i) Leaf spot-** - Spraying of mancozeb 75 WP 0.25 %	-	
Outbreak of pests and diseases due to unseasonal rains	**Vegetative stage[k]**	**Flowering stage[l]**	**Crop maturity stage[m]**	**Post harvest[n]**
Chickpea	**Wilt / root rot-** - Seed treatment with carbendazim + thiram (2 g each / kg) or Phule Trichoderma 5 g /kg	**Heliothis** - Use of 5 pheromone traps per ha - Spraying of Quinalphos / Chlorpyriphos 2 ml/lit. **Wilt / root rot-** - Seed treatment with carbendazium + thiram (2 g each / kg) or Phule Trichoderma 5 g /kg	**a) Insect pest** – **Heliothis** - Use 5 pheromone traps per ha - Spraying of Quinolphos / Chlorpyriphos 2 ml/lit.	
Safflower	**i) Aphids –** Spraying of 5% NSE followed by Thiamethaxam 25 WG 0.5g/ lit. **Wilt / root rot-** - Seed treatment with carbendazim + thiram (2 g each / kg) or Phule Trichoderma 5 g /kg	**Heliothis** - Spraying of Endosulfan / Quinalphos 2 ml/lit. **Alternaria blight-** - Spraying of carbendazim (12%) + mancozeb (63%) (0.25%)	-	
Sugarcane	**i) Stem borer –** - Soil application of 10G Phorate 20 kg/ha - Removal of dead heads **ii) Top shoot borer** - Removal of dead heads - 20 EC Chloropyriphos @ 5 lit. in 1000 lit. water through channel	**i) Top shoot borer** - Removal of dead heads - 20 EC Chloropyriphos 5 lit. in 1000 lit. water through channel **ii) Wolly aphid –** - Spraying of dimethoate or methyl demeton 1.5 ml/lit.	-	

Outbreak of pests and diseases due to unseasonal rains	**Vegetative stage[k]**	**Flowering stage[l]**	**Crop maturity stage[m]**	**Post harvest[n]**
Horticulture				
Grape	**i) Mealy bug –** - Use of sticky traps on trunks and girdles - Spraying of methyl dematon / malathion 15-20 ml / 10 lit. **a) Disease –** i) **Anthracnose** – Spraying of carbendazim 50 WP 0.1 % ii) **Powdery mildew** - Spraying of wettable sulfur 80 WP 0.2 % or penconazole 0.05 % iii) **Downy mildew** – Spraying of Bordeaux mixture 0.4 to 1.0 % or metalaxyl mancozeb 0.2 % or cymoxanil mancozeb 0.2 %	**Mealy bug –** **–** Use of sticky traps on trunks and girdles **–** Spraying of methyl dematon / malathion 15-20 ml / 10 lit. **i) Powdery mildew –** Spraying of wettable sulfur 80 WP 0.2 % or penconazole 0.05% ii) **Downy mildew** – Spraying of Bordeaux mixture 0.4 to 1.0 % or metalaxyl mancozeb 0.2 % or cymoxanil mancozeb 0.2 %	**Mealy bug –** - Use of sticky traps on either side of berry bunches **Anthracnose** – Spraying of carbendazim 50 WP 0.1 %	
Pomegranate	**a) Insect pest - Shot hole borer** **-** Use Geru paste with insecticides - Soil application of 10 g phorate @ 10g/plant in basin **b) Disease -** **i) Bacterial blight –** Spraying of bactinashak 250 ppm (2.5g/10 lit.) and captaf 0.25 % alternatively **ii) Fungal fruit and leaf spot-** Spraying of mancozeb 75 WP 0.25 % or carbendazim 50 WP 0.1 %	**i) Shot hole borer** **-** Use Geru paste with insecticides - Soil application of 10 g phorate @ 10g/plant in basin **ii) Anar caterpillar** - Spraying of Emamectin benzoate 5 SG @ 5g/10 lit. water. **i) Bacterial spot –** Spraying of bactinashak 250 ppm (2.5 g / 10 lit.) and captaf 0.25 % alternatively **ii) Fungal fruit and leaf spot-** Spraying of mancozeb 75 WP 0.25 % or carbendazium 50 WP 0.1 %	**i) Fruit sucking moth** **-** Protect the fruits either by bagging or by using repellents **i) Bacterial spot –** Spraying of bactinashak 250 ppm (2.5 g / 10 lit.) and captaf 0.25 % alternatively	

2.3 Floods

Condition	Suggested contingency measure[o]			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Pigeoenpea	Drain out excess water, resowing	Drain out excess water	Drain out excess water	Harvest immediately
Pearlmillet	As above	As above	As above	As above
Black gram	As above	As above	As above	As above
Sorghum	Drain out excess water, Gap filling ; Resowing chickpea with seed treatment in case of more than 50% mortality	Drain out excess water, Weeding and top dressing with urea	Drain out excess water, Tying up of lodged plants	Drain out excess water, Tying up of lodged plants drying of earheads and Harvesting
Chickpea	Drain out excess water, Gap filling and drenching with fungicides; Resowing wheat in case of more than 50% mortality	Drain out excess water, Weeding and top dressing with urea; Nipping of terminal bud	Drain out excess water, Spraying with NAA@ 25 ppm	Drain out excess water, Harvesting and drying of plants
Horticulture				
Grapes	Provide drainage trench (1.5 cu. ft) across the slope	Provide drainage trench (1.5 cu. ft) across the slope and application of 10 ppm NAA spray	Provide drainage trench (1.5 cu. ft) across the slope	Treatment of 0.1 % carbendizime to the bunches to protect from diseases
Pomegranate	-do	-do-	-do-	Storing in Cold storage
Banana	-do-	Provide drainage trench (1.5 cu. ft) across the slope	-do-	Storing in Cold storage
Onion	Drain out excess water, resowing, replanting	As above	As above	As above
Tomato	-	-	Loss of crop	Marketable fruit should be harvested
Continuous submergence for more than 2 days[2]				
Pigeonpea	Drain out excess water, resowing	As above	As above	As above
Pearl millet	As above	As above	As above	As above
Blackgram	As above	As above	As above	As above

Horticulture				
Onion	Drain out excess water, retrasplanting	As above	As above	As above
Tomato	As above	As above	As above	As above
Sea water intrusion[3]	--	--	--	--

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

Condition	**Suggested contingency measure**			
Transient water logging partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat wave	Not applicable			
Horticulture				
Grape	Irrigate during night	Irrigate during night	Irrigate during night	Harvest and marketing
Pomogranate	As above	As above	As above	As above
Onion	Provide shade net	As above	As above	As above
Cold wave				
Horticulture				
Grape	Cover with shade net	Smudging and irrigation	Smoking and irrigation	As above
Pomogranate	Smoking and irrigation	As above	As above	As above
Onion	Frequent irrigation	Frequent irrigation	Frequent irrigation	As above
Frost	Not applicable			
Horticulture				
Hailstorm				
Maize	Re sowing	Use as fodder	Use as fodder	Harvest
Pearl millet	As above	Use as fodder	Use as fodder	As above
Wheat	As above	--	--	As above
Gram	As above	--	--	As above
Cotton	Gap filling, resowing	Top dressing	Collect mature bolls	As above
Horticulture				
Grape	Gap filling and replanting	Application of fertilizer dose and plant protection	Application of fertilizer dose and plant protection	Resin preparation
Pomegranate	As above	As above	As above	Harvest marketable fruits
Cyclone				
(Specify)	Not applicable			
Horticulture				