



SOLAPUR DISTRICT

CONTINGENT CROP PLANNING AND AGRO ADVISORY

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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 Region (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 (Eastern), Part of Sangli (Eastern),								
	Geographic coordinates of district headquarters		Latitude	Longitude		Altitude					
Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTS		17°41'		75°56'		483.6m					
Mention the KVK located in the district											
Zonal Agricultural Research Station, Krishak Bhavan, Near Dayanand College, Solapur – 413 002.											
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)		488.6	28	1 st week to 2 nd week of June	2 nd to 3 rd week of October					
	NE Monsoon(Oct-Dec)		119.6	6	-	-					
	Winter (Jan- Feb)		6.1	0	-	-					
	Summer (Mar-May)		33.0	3	-	-					
	Annual		647.2	37	-	-					
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	1326.0	35.3	15.3	47.2	41.6	6.1	64.0	135.5	118.0

(Source: www.mahaagri.gov. in 2015)

1.4	Major Soils	Area ('000 ha)	Per cent of total area
	Shallow black soil	699.0	67.8
	Medium black soil	143.7	13.9
	Deep black soil	188.1	18.2

(Source: NBSS & LUP, Nagpur)

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity (%)
	Net sown area	1006.47	133.44
	Area sown more than once	102.80	
	Gross cropped area	1343.05	

1.6	Irrigation	Area ('000 ha)	Percentage of total irrigated area
	Net irrigated area	251.5	
	Gross irrigated area	271.0	
	Rainfed area	759.9	
	Sources of Irrigation	Number	Area ('000 ha)
	Canals	--	31.4
	Tanks	10	0.5
	Open wells	7873	22.81
	Bore wells	10188	5.0
	Lift irrigation schemes	150	26.0
	Micro-irrigation	-	-
	Other sources (please specify)	-	-
	Total Irrigated Area		251.5
	Pump sets (Diesel + Electrical)	338382	
	No. of Tractors	11,000	
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area
	Over exploited	01	40
	Critical	01	20
	Semi-critical	-	-
			Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
			Good
			Good

	Plantation crops	Total area	Irrigated	Rainfed
1	Others such as industrial pulpwood crops etc (specify)		Not applicable	
	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)		158.49	
	Crossbred cattle		207.08	
	Non descriptive Buffaloes (local low yielding)		262.51	
	Graded Buffaloes		-	
	Goat			706.41
	Sheep			186.06
	Others (Camel, Pig, Yak etc.)			14.92
	Commercial dairy farms (Number)			2.5
1.9	Poultry	No. of farms	Total No. of birds ('000)	
	Commercial	--	2252.24	
	Backyard	--	1626.86	

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)						
	ii) Fresh water (Data Source: Fisheries Department)				NA		
	Others						

(Source: Livestock census 2015)

1.11 Production and productivity of major crops (Average of last 5 years: 2010-11 to 2015-16)

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)			
Major Field crops										
1	Sorghum	-	-	427.88	395	-	-	427.88	395	-
2	Pearlmillet	9.06	366	-	-	-	-	9.06	366	-
3	Maize	25.25	1626	35.52	2034	-	-	60.77	1830	-
4	Chickpea	-	-	33.61	716	-	-	33.61	716	-
5	Safflower	-	-	4.37	583	-	-	5.20	520	-
6	Sunflower	0.58	595	11.25	676	-	-	15.64	600	-
7	Sugarcane	-	-	-	-	-	-	11129.04	87	-
8	Pigeonpea	6.98	666	-	-	-	-	6.98	666	-
Major Horticultural crops -										
Fruits										
1	Pomegranate	-	-	-	-	-	-	261.88	9000	-
2	Ber	-	-	-	-	-	-	45.60	17000	-
3	Custard apple	-	-	-	-	-	-	10.82	7000	-
4	Grape	-	-	-	-	-	-	242.75	20000	-
5	Banana	-	-	-	-	-	-	284.54	60000	-
Vegetable										
1	Tomato	9.90	13000	-	-	-	-	35.31	13000	-
2	Onion	753.00	20000	-	-	-	-	753.00	20000	-
3	Drumstick	-	-	-	-	-	-	-	-	-
4.	Brinjal	22.90	60000	-	-	-	-	22.90	60000	-

(Source: Epitome of Govt. of Maharashtra 2015)

1.12	Sowing window for 5 major field crops	Pigeonpea	Sunflower	Safflower	Sorghum	Chickpea	Wheat
	<i>Kharif</i> - Rainfed	15 th June to 15 th July	15 th June to 15 th Aug	--	--	--	--
	<i>Kharif</i> -Irrigated	15 th June to 15 th Aug.	15 th June to 15 th Aug	--	--	--	--
	<i>Rabi</i> - Rainfed	--	15 th Sept to 15 th Oct	15 th Sept to 10 th Oct	15 th Sept to 15 th Oct	25 th Sept to 15 th Oct	--
	<i>Rabi</i> -Irrigated	--	15 th Sept to 30 th Oct	15 th Sept to 30 th Oct	15 th Sept to 15 th Oct	20 th Oct to 20 th Nov	1 st Nov to 15 th Nov

1.13	What is the major contingency the district is prone to?	Regular	Occasional	None
	Drought	√	--	--
	Flood	--	√ (Rare in Pandharpur and South Solapur tehsil)	--
	Cyclone	--	--	√
	Hail storm	--	√ (Separate sheet attached)	--
	Heat wave	--	√	--
	Cold wave	--	√	--
	Frost	--	--	√
	Sea water intrusion	--	--	√
	Pests and disease outbreak / incidence (specify)	--	- Woolly aphids and army worm in sugarcane, - Oily spot in pomegranate, - Pod borer in pigeonpea and chickpea, - Shootfly and stem borer in <i>Rabi</i> sorghum	--

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	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		Remarks on Implementation
			Change in crop / cropping system	Agronomic measures	
Early season drought (delayed onset) Delay by 2 weeks (June 4 th week)	Shallow black soils	Sunflower	- Sole Sunflower (Phule Bhaskar, LSFH-171) or Sunflower (Phule Bhaskar, LSFH 171) + Pigeonpea (Vipula, BDN-708, Phule Rajeshwari, BDN-711, BSMR-853) (2:1)	- Opening of ridges and furrows for soil and water conservation before onset of monsoon, - scooping in between rows to harvest rainfall - hoeing at 25 DAS. - Preparation of furrows for moisture conservation after harvest of intercrop	Seed source : SAU, NSC, MSSC, Private co. Distributors Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough
			- Sole Green gram - Pigeonpea + Green gram (Phule Vaibhav, BPMR-145, PKVAKM-4, BM 2003-2) (1:3)	- As above	
		Green gram	- Sole Black gram - Pigeonpea + Black gram (TAU-1, TPU-4) (1:3)	- As above	
		Pearl millet	- Sole Pearl millet (Adishakti, Dhanshakti, Shanti) - Pearl millet + Horsegram (Sina, Phule Sakas) (2:1) - Pearl millet + Mothbean (MBS-27) (2:1)	- One weeding and one hoeing before 30 DAS	
		Horse gram	- No change	--	
		Moth bean	- No change	--	
		<i>Kharif</i>	<i>Kharif</i>	<i>Rabi</i>	
		Green gram / Blackgram / Cowpea	Fallow	No Change	
		Pigeonpea	No change	--	

Suggested Contingency measures					
Condition	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 2 weeks (June 4 th week)	Medium black soils	Sunflower	<ul style="list-style-type: none"> - Sole Sunflower (Phule Bhaskar, LSFH-171) or - Sunflower (Phule Bhaskar, LSFH 171) + Pigeonpea (Vipula, BDN-708, BDN-711, BSMR-853, Phule Rajeshwari) (2:1) 	<ul style="list-style-type: none"> - Opening of ridges and furrows for soil and water conservation before onset of monsoon, - scooping in between rows to harvest rainfall - hoeing at 25 DAS. - Preparation of furrows for moisture conservation after harvest of intercrop 	Seed source : SAU, NSC, MSSC, Private co. Distributors Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough
		Pigeonpea	<ul style="list-style-type: none"> - Pigeonpea (Vipula, BDN-708, BDN-711, BSMR-853, Phule Rajeshwari) - Pearl millet (Adishakti, Dhanshakti) + Pigeonpea (Vipula, BDN-708, BDN-711, BSMR-853) (2:1), - Soybean (Phule Agrani, Phule Sangam, JS-335) + Pigeonpea (Vipula, BDN-708, BDN-711, BSMR-853) (3:1) (Barshi area) 	<ul style="list-style-type: none"> - As above 	
		Green gram	<ul style="list-style-type: none"> - Sole Green gram - Pigeonpea + Green gram (Phule Vaibhav, BPMR-145, PKVAKM-4, BM 2003-2) (1:3) 	<ul style="list-style-type: none"> - As above 	
		Black gram	<ul style="list-style-type: none"> - Sole Black gram - Pigeonpea + Black gram (TAU-1, TPU-4) (1:3) 	<ul style="list-style-type: none"> - As above 	

		Suggested Contingency measures			
Condition	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)	Medium black soils	- <i>Kharif</i> Fallow - <i>Rabi</i> sorghum (Phule Vasudha, Phule Suchitra) / Safflower (Bhima / SSF-708, SSF-733, SSF-748, PBNS-12), Sunflower / Chickpea (Vijay / Digvijay) / Strip cropping of Chickpea + Safflower (6:3)	- No change	- <i>In situ</i> soil moisture conservation measures in <i>kharif</i> fallow (in first week of August) viz., ridges and furrows, compartment bunding, Tied ridges in saline soils	Seed source : SAU, NSC, MSSC, Private co. Distributors
Delay by 2 weeks (June 4 th week)		- Strip cropping of <i>Rabi</i> sorghum + Chickpea (6:3)			Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough
		<i>Kharif</i>	<i>Kharif</i>		
		Green gram / Blackgram / Cowpea	Fallow		
		<i>Rabi</i>	<i>Rabi</i>		
		Rabi sorghum / Safflower / Chickpea	No Change		
		--	No change		
		Pigeonpea	--		

Suggested Contingency measures					
Condition	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 2 weeks (June 4 th week)	Deep black soils	Sunflower	<ul style="list-style-type: none"> - Sole Sunflower (Phule Bhaskar, LSFH-171) or - Sunflower (Phule Bhaskar, LSFH 171) + Pigeonpea (Vipula, BDN-708, Phule Rajeshwari, BDN-711, BSMR-853) (2:1) 	<ul style="list-style-type: none"> - Opening of ridges and furrows for soil and water conservation before onset of monsoon, - scooping in between rows to harvest rainfall - hoeing at 25 DAS. - Preparation of furrows for moisture conservation after harvest of intercrop 	Seed source : SAU, NSC, MSSC, Private co. Distributors. Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough
		Pigeonpea	<ul style="list-style-type: none"> - Pigeonpea (Vipula, BDN-708) - Pearl millet (Adishakti, Dhanshakti) + Pigeonpea (Vipula, BDN-708, Phule Rajeshwari, BDN-711, BSMR-853) (2:1), - Soybean (Phule Agrani, Phule Sangam, JS-335) + Pigeonpea (Vipula, BDN-708, BDN-711, BSMR-853) (3:1) (Barshi area) 	<ul style="list-style-type: none"> - As above 	
		Green gram	<ul style="list-style-type: none"> - Sole Green gram - Pigeonpea + Green gram (Phule Vaibhav, BPMR-145, PKVAKM-4, BM 2003-2) (1:3) 	<ul style="list-style-type: none"> - As above 	
		Black gram	<ul style="list-style-type: none"> - Sole Black gram - Pigeonpea + Black gram (TAU-1, TPU-4) (1:3) 	<ul style="list-style-type: none"> - As above 	

Suggested Contingency measures							
Condition	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system		Agronomic measures	Remarks on Implementation	
Early season drought (delayed onset) Delay by 2 weeks (June 4 th week)	Deep black soils	<i>Khharif</i> Fallow - <i>Rabi</i> sorghum (Phule Vasudha, Phule Suchitra) / Safflower (Bhima / SSF-708, SSF-733, SSF-748, PBNS-12), Sunflower / Chickpea (Vijay / Digvijay) / Strip cropping of Chickpea + Safflower (6:3), Strip cropping of <i>Rabi</i> sorghum + Chickpea (6:3)	- No change		<i>In situ</i> soil moisture conservation measures in <i>khharif</i> fallow (in first week of August) viz., ridges and furrows, compartment bunding, Tied ridges in saline soils	Seed source : SAU, NSC, MSSC, Private co. Distributors Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough	
			<i>Khharif</i>	<i>Rabi</i>			No change
			Green gram / Blackgram / Cowpea	<i>Rabi</i> sorghum / Safflower / Chickpea			Fallow
	Pigeonpea	--	No change	--			

Condition	Major Farming situation	Normal Crop/ cropping system	Suggested Contingency measures			Remarks on Implementation
			Change in crop / cropping system	Agronomic measures		
Early season drought (delayed onset) Delay by 4 weeks (July 2 nd week)	Shallow black soils	Pearlmillet	<ul style="list-style-type: none"> - Pearlmillet - Mothbean, - Horsegram - Sole Sataria (<i>Rala</i>) 	<ul style="list-style-type: none"> - Application of 25 kg K₂O per ha for pearlmillet - Opening of alternate dead furrows for water / moisture conservation 30 DAS - One hoeing and weeding before 30 DAS 	Seed source : SAU, NSC, MSSC, Private co. Distributors Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough	
		Mothbean	<ul style="list-style-type: none"> - Mothbean - Pearlmillet + Pigeonpea (2:1) - Sole Sataria (<i>Rala</i>) 	<ul style="list-style-type: none"> - Application of 25 kg K₂O per ha for pearlmillet - Opening of alternate dead furrows for water / moisture conservation 30 DAS - One hoeing and weeding before 30 DAS 		
		Khariif	Khariif			
		Rabi	Rabi			
		Green gram / Blackgram / Cowpea	Fallow	No Change		
		Pigeonpea	No change	--		

Suggested Contingency measures					
Condition	Major Farming situation	Normal Crop/ cropping system	Change in crop / cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)	Medium black soils	Sunflower	- Sunflower - Pigeonpea	- Opening of alternate dead furrows for water / moisture conservation at 30 DAS - One hoeing and weeding before 30 DAS	Seed source : SAU, NSC, MSSC, Private co. Distributors Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough
		Pigeonpea	- Pigeonpea - Sunflower - Pigeonpea + Clusterbean (Pusa Sadabahar, Pusa Navbahar) (1:2)	- As above	
Delay by 4 weeks (July 2 nd week)		Green gram	- Cowpea (Phule Vithai) - Pigeonpea + Coriander (Indore-1, Indore-2, Jabalpur-1) (1:2), - Amaranthus (<i>Rajgira</i>) - Phule Suvarna	- As above	
		Black gram	- Cowpea (Phule Vithai) - Pigeonpea + <i>Shepu</i> (Local) (1:2)	- As above	
		<i>Kharif</i> fallow	<i>Kharif</i> fallow followed by <i>Rabi</i> crop	- Opening of ridges and furrows across the slope for moisture conservation	

Suggested Contingency measures						
Condition	Major Farming situation	Normal Crop/ cropping system	Change in crop / cropping system	Agronomic measures	Remarks on Implementation	
Early season drought (delayed onset) Delay by 4 weeks (July 2 nd week)	Deep black soils	Sunflower	- Sunflower - Pigeonpea	- Opening of alternate dead furrows for water / moisture conservation at 30 DAS - One hoeing and weeding before 30 DAS	Seed source : SAU, NSC, MSSC, Private co. Distributors Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough	
		Pigeonpea	- Pigeonpea - Sunflower - Pigeonpea + Clusterbean (Pusa Sadabahar, Pusa Navbahar) (1:2)	- As above		
		Green gram	- Cowpea (Phule Vithai) - Pigeonpea + Coriander (Indore-1, Indore-2, Jabalpur-1) (1:2), - Amaranthus (<i>Rajgira</i>) - Phule Suvarna	- As above		
		Black gram	- Cowpea (Phule Vithai) - Pigeonpea + <i>Shepu</i> (Local) (1:2)	- As above		
		<i>Kharif</i> fallow	- <i>Kharif</i> fallow followed by <i>Rabi</i> crop	- Opening of ridges and furrows across the slope for moisture conservation		

Suggested Contingency measures					
Condition	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)	Deep black soils	<i>Kharif</i> Fallow - <i>Rabi</i> sorghum / Safflower/ Sunflower / Strip cropping of Chickpea + Safflower (6:3) / Strip cropping of <i>Rabi</i> sorghum + Chickpea (6:3)	No change	- <i>In situ</i> soil moisture conservation measures in <i>kharif</i> fallows: ridges and furrows or compartment bund - Tied ridges in saline soils for timely sowing of <i>rabi</i> crops	Seed source : SAU, NSC, MSSC, Private co. Distributors
Delay by 4 weeks (July 2 nd week)		<i>Kharif</i> Pigeonpea	<i>Kharif</i> Fallow	- <i>In situ</i> soil and moisture conservation measures in <i>Kharif</i> fallows: ridges and furrows for timely contour / regular sowing of <i>Rabi</i> crops - Application of 25 kg K ₂ O per ha for sorghum	Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough
			No change		
			No change		

Suggested Contingency measures					
Condition	Major Farming situation	Normal Crop / cropping system	Change in crop/ cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 6 weeks (July 4 th week)	Shallow black soils	Pearlmillet	- Pigeonpea + coriander (1:2)	- Immediate sowing of the crops after onset of monsoon	Seed source : SAU, NSC, MSSC, Private co. Distributors Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough
		Horse gram	- Pigeonpea + coriander (1:2) - Seteria (<i>Rala</i>)	- As above	
		<i>Kharif</i>	<i>Kharif</i>		
		<i>Rabi</i>	<i>Rabi</i>		
		Green gram / Blackgram / Cowpea / Horsegram	Fallow	- <i>In situ</i> SWC measures in <i>Kharif</i> fallows: ridges and furrows, for timely sowing of <i>Rabi</i> crops	
		Pigeonpea	No change		
		--	--		

Condition		Major Farming situation	Suggested Contingency measures			Remarks on Implementation
Early season drought (delayed onset)	Delay by 6 weeks (July 4 th week)		Normal Crop/cropping system	Change in crop / cropping system	Agronomic measures	
		Medium black soils	Sunflower	<ul style="list-style-type: none"> - Sunflower - Pigeonpea + clusterbean (1:2) - Sunflower + pigeonpea(2:1) 	<ul style="list-style-type: none"> - 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 	Seed source : Central campus MPKV, Rahuri, College of Agril., Pune ,Kolhapur and Dhule NSC, MSSC, Private co.-op. , Distributors
		Pigeonpea	<ul style="list-style-type: none"> - Pigeonpea - Pigeonpea + coriander (1:2) - Pigeonpea + clusterbean (1:2) 	<ul style="list-style-type: none"> - As above 		
		Green gram	<ul style="list-style-type: none"> - Pigeonpea + <i>Shepu</i> (1:2) 	<ul style="list-style-type: none"> - As above 	Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough	
		Black gram	<ul style="list-style-type: none"> - Pearl millet + Pigeonpea (2:1) 	<ul style="list-style-type: none"> - As above 		
		<i>Kharif</i> fallow	<ul style="list-style-type: none"> - <i>Kharif</i> fallow followed by <i>rabi</i> crop 	<ul style="list-style-type: none"> - Opening of ridges and furrows across the slope in the month of August 		
		<i>Kharif</i> Fallow - <i>Rabi</i> sorghum / Safflower/ Sunflower / Strip cropping of Chickpea + Safflower (6:3) / Strip cropping of <i>Rabi</i> sorghum + Chickpea (6:3)	<ul style="list-style-type: none"> - No change 	<ul style="list-style-type: none"> - <i>In situ</i> SWC measures in <i>Kharif</i> fallows: ridges and furrows, compartmental bunding, for timely sowing of <i>Rabi</i> crops 		

Suggested Contingency measures					
Condition	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agromomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 6 weeks (July 4 th week)	Deep black soils	Sunflower	<ul style="list-style-type: none"> - Sunflower - Pigeonpea + clusterbean (1:2) - Sunflower + pigeonpea(2:1) 	<ul style="list-style-type: none"> - 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 	Seed source : Central campus MPKV, Rahuri, College of Agril., Pune ,Kolhapur and Dhule NSC, MSSC, Private co.-op. , Distributors
		Pigeonpea	<ul style="list-style-type: none"> - Pigeonpea - Pigeonpea + coriander (1:2) - Pigeonpea + clusterbean (1:2) 	As above	
		Green gram	Pigeonpea + <i>Shepu</i> (1:2)	As above	
		Black gram	Pearlmillet + Pigeonpea (2:1)	As above	
		<i>Kharif</i> fallow	<i>Kharif</i> fallow followed by <i>rabi</i> crop	Opening of ridges and furrows across the slope in the month of August	
		<i>Kharif</i> Fallow - <i>Rabi</i> sorghum / Safflower/ Sunflower / Strip cropping of Chickpea + Safflower (6:3) / Strip cropping of <i>Rabi</i> sorghum + Chickpea (6:3)	No change	<i>In situ</i> SWC measures in <i>Kharif</i> fallows: ridges and furrows, compartmental bunding, for timely sowing of <i>Rabi</i> crops	

Suggested Contingency measures					
Condition	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 8 weeks (2 nd week of August)	Medium deep to deep black soils	--	<ul style="list-style-type: none"> - Sorghum for fodder - Leafy coriander - Leafy vegetables 	<ul style="list-style-type: none"> - <i>In situ</i> soil conservation measures in <i>Kharif</i> : ridges and furrows or compartment bund for timely sowing of <i>Rabi</i> crops 	<p>Seed source : SAU, NSC, MSSC, Private co. Distributors</p> <p>Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough</p>

Condition		Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures			Remarks on Implementation
Early season drought (Normal onset)	Normal onset followed by 15-20 days dry spell after sowing leading to poor germination / crop stand etc.			Crop management	Soil nutrient & moisture conservation measures		
		Shallow black soils	Pearlmillet	<ul style="list-style-type: none"> - Resowing - If pearl millet fails prefer alternate crops like Sunflower, Horse gram 	<ul style="list-style-type: none"> - Thinning - Weeding and - Hoeing 	Seed source : SAU, NSC, MSSC, Private co. Distributors Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough	
			Horse gram	<ul style="list-style-type: none"> - Resowing - If horse gram fails prefer alternate crops like pearl millet, setaria 	- As above		
			Moth bean	<ul style="list-style-type: none"> - Resowing - If moth bean fails prefer alternate crops like setaria 	- As above		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures			Remarks on Implementation
			Crop management	Soil nutrient & moisture conservation measures		
Early season drought (Normal onset) Normal onset followed by 15-20 days dry spell after sowing leading to poor germination / crop stand etc.	Medium black soils	Sunflower Pigeonpea Green gram Black gram <i>Kharif</i> Fallow - <i>Rabi</i> sorghum /Safflower/ Sunflower/ Strip cropping of Chickpea + Safflower (6:3)	- Resowing in case of poor germination	- Hoeing at 21 DAS	Seed source : SAU, NSC, MSSC, Private co. Distributors Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough	
			- Thinning and weeding			
			- Foliar spray of water			
			- As above	- As above		
			- As above	- As above		
			- As above	- As above		
- No change	- <i>In situ</i> SWC measures in <i>Kharif</i> fallows: ridges and furrows, compartment bund, Tied ridges in saline soils for timely sowing of <i>Rabi</i> crops					

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures			Remarks on Implementation
			Crop management	Soil nutrient & moisture conservation measures		
Early season drought (Normal onset) Normal onset followed by 15-20 days dry spell after sowing leading to poor germination / crop stand etc.	Deep black soils	Sunflower Pigeonpea Green gram Black gram <i>Kharif</i> Fallow - <i>Rabi</i> sorghum /Safflower/ Sunflower / Strip cropping of Chickpea + Safflower (6:3)	- Resowing in case of poor germination	- Hoeing at 21 DAS	Seed source : SAU, NSC, MSSC, Private co. Distributors Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough	
			- Thinning and weeding			
			- Foliar spray of water			
			- As above	- As above		
			- As above	- As above		
			- As above	- As above		
			- No change	- <i>In situ</i> SWC measures in <i>Kharif</i> fallows: ridges and furrows, compartment bund, Tied ridges in saline soils for timely sowing of <i>Rabi</i> crops		

Suggested Contingency measures					
Condition	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period) At vegetative stage	Shallow soils	<ul style="list-style-type: none"> - Pearl millet - Horse gram - Mothbean - Green gram/ Black gram / Cowpea – <i>Rabi</i> Sorghum / Chickpea / Safflower 	<ul style="list-style-type: none"> - Protective irrigation - Foliar spray of nutrient viz., KNO₃ - Foliar spray of water and nutrient viz., KNO₃ - As above - Protective irrigation 	<ul style="list-style-type: none"> - Weeding - Hoeing - As above - As above - Opening of conservation furrows at an interval of 15-20 m for <i>rabi</i> crops 	<p>Seed source : SAU, NSC, MSSC, Private co. Distributors</p> <p>Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough</p>

Suggested Contingency measures					
Condition	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Medium black soils	- Sunflower	- Water spray, - Protective irrigation (sprinkler irrigation) - Spraying of 2% urea after receipt of soaking rainfall - Spraying of 6 - 8% kaolin, - Defoliation of lower matured leaves	- Weeding - Hoeing	- Rainwater harvesting and utilization through farm ponds - Linkage with NREGA for SWC measures
At vegetative stage		- Pigeonpea	- Protective irrigation - Foliar spray of nutrient viz., KNO ₃ , Urea, DAP, 19:19:19	- Weeding, Hoeing - Opening of furrow in between rows	
		- Green gram	- Protective irrigation - Foliar spray of nutrient viz., KNO ₃	- Weeding - Hoeing	
		- Black gram	- As above	- As above	
		- <i>Kharif</i> Fallow - <i>Rabi</i> sorghum /Safflower / Sunflower / - Strip cropping of Chickpea + Safflower (6:3) / - Strip cropping of <i>Rabi</i> sorghum + Chickpea (6:3)	- No change	- <i>In situ</i> soil moisture conservation measures in <i>kharif</i> fallows: ridges and furrows, compartment bund, Tied ridges in saline soils for timely sowing of <i>rabi</i> crops	

Suggested Contingency measures					
Condition	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Deep black soils	- Sunflower	- Water spray, - Protective irrigation (sprinkler irrigation) - Spraying of 2% urea after receipt of soaking rainfall - Spraying of 6 - 8% kaolin, - Defoliation of lower matured leaves	- Weeding - Hoeing	- Rainwater harvesting and utilization through farm ponds - Linkage with NREGA for SWC measures
At vegetative stage		- Pigeonpea	- Protective irrigation - Foliar spray of nutrient viz., KNO ₃ , Urea, DAP, 19:19:19	- Weeding, Hoeing - Opening of furrow in between rows	
		- Green gram	- Protective irrigation - Foliar spray of nutrient viz., KNO ₃	- Weeding - Hoeing	
		- Black gram - <i>Kharif</i> Fallow - <i>Rabi</i> sorghum /Safflower / Sunflower / - Strip cropping of Chickpea + Safflower (6:3) / - Strip cropping of <i>Rabi</i> sorghum + Chickpea (6:3)	- As above - No change	- As above - <i>In situ</i> soil moisture conservation measures in <i>kharif</i> fallows: ridges and furrows, compartment bund, Tied ridges in saline soils for timely sowing of <i>rabi</i> crops	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		Remarks on Implementation
			Crop management	Soil nutrient & moisture conservation measures	
Mid season drought (long dry spell) At flowering/ fruiting stage	Shallow to medium deep soils	- Pigeonpea	- Protective irrigation	-	Seed source : SAU, NSC, MSSC, Private co. Distributors Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough
		- Green gram	- As above	-	
		- Black gram	- As above	-	
		- Greengram/ Blackgram / Cowpea – <i>Rabi</i> Sorghum / Chickpea / Safflower	- As above	- Opening of conservation furrows at an interval of 15-20 m for <i>rabi</i> crops	

		Suggested Contingency measures			
Condition	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell)	Medium black soils	<ul style="list-style-type: none"> - Sunflower 	<ul style="list-style-type: none"> - Water spray, - Protective irrigation - Spraying of 2% urea - Spraying of 6 - 8% kaolin, - Spraying of 1-2 % KNO₃ - Defoliation of lower matured leaves - Spraying of 2% Boron at Button stage 	<ul style="list-style-type: none"> - Removal of 10-15% plant population under severe drought condition 	Rainwater harvesting and utilization through farm ponds
At flowering/ fruiting stage		<ul style="list-style-type: none"> - Pigeonpea 	<ul style="list-style-type: none"> - Water spray, - Protective irrigation - Spraying of 2% urea - Spraying of 6 - 8% kaolin 	<ul style="list-style-type: none"> - Removal of 10-15% plant population under severe drought condition - Dust mulching / Hoeing 	
		<ul style="list-style-type: none"> - Green gram 	<ul style="list-style-type: none"> - Spraying of 6 - 8% kaolin - 1-2% KNO₃ 	<ul style="list-style-type: none"> - 	
		<ul style="list-style-type: none"> - Black gram 	<ul style="list-style-type: none"> - As above 	<ul style="list-style-type: none"> - 	
		<ul style="list-style-type: none"> - <i>Kharif</i> Fallow - <i>Rabi</i> sorghum /Safflower / Sunflower/ - Strip cropping of Chickpea + Safflower (6:3)/ - Strip cropping of <i>Rabi</i> sorghum + Chickpea (6:3) 	<ul style="list-style-type: none"> - No change 	<ul style="list-style-type: none"> - <i>In situ</i> soil moisture conservation measures in <i>kharif</i> fallows: ridges and furrows, Tied ridges in saline soils for timely sowing of <i>rabi</i> crops 	

Condition		Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
Mid season drought (long dry spell)	At flowering/ fruiting stage			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
		Deep black soils	- Sunflower	<ul style="list-style-type: none"> - Water spray, - Protective irrigation - Spraying of 2% urea - Spraying of 6 - 8% kaolin, - Spraying of 1-2 % KNO₃ - Defoliation of lower matured leaves - Spraying of 2% Boron at Button stage 	- Removal of 10-15% plant population under severe drought condition	Rainwater harvesting and utilization through farm ponds
			- Pigeonpea	<ul style="list-style-type: none"> - Water spray, - Protective irrigation - Spraying of 2% urea - Spraying of 6 - 8% kaolin 	<ul style="list-style-type: none"> - Removal of 10-15% plant population under severe drought condition - Dust mulching / Hoeing 	
			- Green gram	- Spraying of 6 - 8% kaolin / 1-2% KNO ₃	--	
			- Black gram	- As above	--	
			- <i>Kharif</i> Fallow - <i>Rabi</i> sorghum /Safflower / Sunflower/	- No change	- <i>In situ</i> soil moisture conservation measures in <i>Kharif</i> fallows: ridges and furrows, Tied ridges in saline soils for timely sowing of <i>Rabi</i> crops	
			- Strip cropping of Chickpea + Safflower (6:3)/ - Strip cropping of <i>Rabi</i> sorghum + Chickpea (6:3)			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		Remarks on Implementation
			Crop management	Rabi Crop planning (if <i>Kharif</i> crop fails)	
Terminal drought Early withdrawal of monsoon	Shallow black soils	- Pigeonpea	- Protective irrigation	--	Rainwater harvesting and utilization through farm ponds
		- Green gram	- As above	- Plan for sowing of <i>rabi</i> sorghum, chickpea	
		- Black gram	- As above	- As above	
		- Green gram – <i>Rabi</i> Sorghum /Chickpea / Safflower	- Harvest green gram for residue incorporation	- As above	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		Remarks on Implementation
			Crop management	Rabi Crop planning (if <i>Kharif</i> crop fails)	
Terminal drought Early withdrawal of monsoon	Medium black soils	- Sunflower	- Removal of 1/3 rd plant population under severe drought condition	- Plan for sowing of <i>rabi</i> sorghum, chickpea	Rainwater harvesting and utilization through farm ponds
		- Pigeonpea	- Protective irrigation	--	
		- Green gram	- As above	- Plan for sowing of <i>rabi</i> sorghum, chickpea	
		- Black gram	- As above	- As above	
		- Pearl millet	- Harvest crop for fodder purpose	- Plan for sowing of <i>rabi</i> sorghum, chickpea	
		- <i>Kharif</i> Fallow - <i>Rabi</i> sorghum /Safflower /	- No change	- <i>In situ</i> SWC measures in <i>Kharif</i> fallows: ridges and furrows, Tied ridges in saline soils for timely sowing of <i>Rabi</i> crops	
		- Sunflower/ Strip cropping of Chickpea + Safflower (6:3) /			
		- Strip cropping of <i>Rabi</i> sorghum + Chickpea (6:3)			

Condition		Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
Terminal drought	Early withdrawal of monsoon			Crop management	Rabi Crop planning (if <i>Kharif</i> crop fails)	Remarks on Implementation
		Deep black soils	<ul style="list-style-type: none"> - Sunflower 	<ul style="list-style-type: none"> - Removal of 1/3rd plant population under severe drought condition - Protective irrigation - Protective irrigation 	<ul style="list-style-type: none"> - Plan for sowing of <i>rabi</i> sorghum, chickpea 	Rainwater harvesting and utilization through farm ponds
			<ul style="list-style-type: none"> - Pigeonpea 	<ul style="list-style-type: none"> - -- 		
			<ul style="list-style-type: none"> - Green gram 	<ul style="list-style-type: none"> - As above 	<ul style="list-style-type: none"> - Plan for sowing of <i>rabi</i> sorghum, chickpea 	
			<ul style="list-style-type: none"> - Black gram 	<ul style="list-style-type: none"> - As above 	<ul style="list-style-type: none"> - As above 	
			<ul style="list-style-type: none"> - Pearl millet 	<ul style="list-style-type: none"> - Harvest crop for fodder purpose 	<ul style="list-style-type: none"> - Plan for sowing of <i>rabi</i> sorghum, chickpea 	
			<ul style="list-style-type: none"> - <i>Kharif</i> Fallow - <i>Rabi</i> sorghum /Safflower / Sunflower/ - Strip cropping of Chickpea + Safflower (6:3) / - Strip cropping of <i>Rabi</i> sorghum + Chickpea (6:3) 	<ul style="list-style-type: none"> - No change 	<ul style="list-style-type: none"> - <i>In situ</i> soil moisture conservation measures in <i>kharif</i> fallows: ridges and furrows, Tied ridges in saline soils for timely sowing of <i>rabi</i> crops 	

Farming System :

Considering highly erratic situation in scarcity area Farming System is preferable for sustainability of dryland farmer as below :

Integrated Farming System for dryland agriculture for small farmers (1 ha area)

Area (ha)	% Area allotted	Season		
		<i>Kharif</i>	Rabi	Summer
Crop component (50%)				
0.30	30	Cowpea	Sorghum	Fallow
0.10	10	Maize fodder	Sorghum fodder	Fallow
0.10	10	Fallow	Chickpea	Fallow
Horticulture component(40%)				
0.40	40	Dry land orchard with inter crop of (Pearl millet + Pigeon pea 2:1)		
Animal component (5%)				
0.05	5	Dairy farming: 1 Buffalo (Pandharpuri), Back yardPoultry:30 birds in 5 lot/year (Giriraj), Goat rearing: 10 female + 1 male (Osmanabadi)		
Farm pond (5%)				
0.05	5	Size 15 X 15 X 3 m		

2.1.2 Irrigated situation

Condition	Major Farming situation	Normal Crop/ cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall Or Limited release of water in canals due to low rainfall	Shallow black soils	<ul style="list-style-type: none"> - <i>Kharif</i> Pearl millet 	<ul style="list-style-type: none"> - Groundnut (JL-220, JL-286, JL-501, TAG-24) - Maize (African tall) for fodder 	<ul style="list-style-type: none"> - Planting on BBF, polythene mulching, sprinkler/drip irrigation - -- 	<p>Seed source : SAU, NSC, MSSC, Private co. Distributors</p>
	Medium black soils	<ul style="list-style-type: none"> - <i>Kharif</i> Pearl millet - Preseasonal sugarcane - Maize for fodder and grain purpose - Soybean - Pigeonpea - Onion (N-2-4-1, Phule Samarth, B-780) 	<ul style="list-style-type: none"> - Pearl millet followed by onion - Green manuring followed by preseasonal sugarcane, Sugarcane + cabbage / onion / potato / chickpea - wheat / <i>rabi</i> sorghum - Leafy vegetables followed by preseasonal sugarcane 	<ul style="list-style-type: none"> - Use of drip / sprinkler / micro irrigation / raingun - Use of paired row plantation in sugarcane - Foliar application of 2% DAP - Alternate furrow irrigation - Mulching - Weeding 	<p>Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough</p>
	Deep black soils	<ul style="list-style-type: none"> - <i>Kharif</i> Pearl millet - Preseasonal sugarcane - Maize for fodder and grain purpose - Soybean - Pigeonpea - Onion 	<ul style="list-style-type: none"> - Pearl millet followed by onion - Green manuring followed by preseasonal sugarcane, Sugarcane + cabbage / onion / potato / chickpea - wheat / <i>rabi</i> sorghum - Leafy vegetables followed by preseasonal sugarcane 	<ul style="list-style-type: none"> - Use of drip / sprinkler / micro irrigation / raingun - Use of paired row plantation in sugarcane - Foliar application of 2% DAP - Alternate furrow irrigation - Mulching - Weeding 	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		Remarks on Implementation
			Change in crop/cropping system	Agronomic measures	
Non release of water in canals under delayed onset of monsoon in catchment	Shallow black soils	- <i>Kharif</i> Pearl millet	- Mothbean, - Horsegram - <i>Setaria</i> spp.	- Spraying of 2% DAP	Seed source : SAU, NSC, MSSC, Private co. Distributors Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough
	Medium black soils	- <i>Kharif</i> Pearl millet - Preseasonal sugarcane - Maize for fodder and grain purpose, Soybean, - Pigeonpea, - Onion	- Pearl millet / - Pigeonpea / - Sunflower / - Maize for fodder	- Thinning in cereal crops - Weeding / hoeing - Water spray - Defoliation of lower matured leaves	
	Deep black soils	- <i>Kharif</i> Pearl millet - Preseasonal sugarcane - Maize for fodder and grain purpose, Soybean, - Pigeonpea, - Onion	- Pearl millet / - Pigeonpea / - Sunflower / - Maize for fodder	- Thinning in cereal crops - Weeding / hoeing - Water spray - Defoliation of lower matured leaves	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		Remarks on Implementation
			Change in crop/cropping system	Agronomic measures	
Lack of inflows into tanks due to insufficient /delayed onset of monsoon					Not applicable

Condition	Major Farming situation ^f	Suggested Contingency measures				
		Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation	
Insufficient groundwater recharge due to low rainfall	Medium deep black soils – Open well irrigated	- Pigeonpea	- Pigeonpea - Pigeonpea + Sunflower (1:2)	- In pigeonpea, increase row spacing to 90 to 180cm, - Weeding - Hoeing, - Alternate furrow irrigation - Protective irrigation,	Seed source : SAU, NSC, MSSC, Private co. Distributors	
		- Sunflower	- Sunflower - Pigeonpea + Sunflower (1:2)	- Weeding, - Hoeing, - Protective irrigation, - Alternate furrow irrigation		Linkage with NREGA for SWC measures; Schemes for Ridger, bund former, MB plough
		- Maize	- No change	- Protective irrigation, - Opening of conservation furrow in between two rows		
		- Rabi sorghum	- No change	- Alternate furrow irrigation		
		- Chickpea	- No change	- Weeding - Hoeing, - Protective irrigation,		
				- As above		

(For better utilization of available water go for shade net / polyhouse for growing of capsicum, all leafy vegetables, flowers, etc.)

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
Pigeonpea / Greengram / Blackgram	<ul style="list-style-type: none"> - Drain out excess water - 2% Urea spray 	<ul style="list-style-type: none"> - Drain out excess water 	<ul style="list-style-type: none"> - Drain out excess water - Harvesting at physiological maturity 	<ul style="list-style-type: none"> - Shifting of economic produce to safer place for drying
Pearlmillet	<ul style="list-style-type: none"> - As above 	<ul style="list-style-type: none"> - If flowers washed out, immediately harvest for fodder 	<ul style="list-style-type: none"> - As above 	<ul style="list-style-type: none"> - As above
Sunflower	<ul style="list-style-type: none"> - Drain out excess water 	<ul style="list-style-type: none"> - Drain out excess water - Spraying of 2% Boron 	<ul style="list-style-type: none"> - Drain out excess water - Harvesting at physiological maturity 	<ul style="list-style-type: none"> - Shifting of economic produce to safer place for drying
Maize	<ul style="list-style-type: none"> - As above 	<ul style="list-style-type: none"> - As above 	<ul style="list-style-type: none"> - As above 	<ul style="list-style-type: none"> - As above
Rabi Sorghum	<ul style="list-style-type: none"> - As above 	<ul style="list-style-type: none"> - If flowers washed out, immediately harvest for fodder 	<ul style="list-style-type: none"> - As above 	<ul style="list-style-type: none"> - As above
Chickpea	<ul style="list-style-type: none"> - Drain out excess water 	<ul style="list-style-type: none"> - Drain out excess water 	<ul style="list-style-type: none"> - Drain out excess water - Harvesting at physiological maturity 	<ul style="list-style-type: none"> - Shifting of economic produce to safer place for drying
Safflower	<ul style="list-style-type: none"> - As above 	<ul style="list-style-type: none"> - As above 	<ul style="list-style-type: none"> - As above 	<ul style="list-style-type: none"> - As above
Sugarcane	<ul style="list-style-type: none"> - Drain out excess water 	<ul style="list-style-type: none"> - Drain out excess water 	<ul style="list-style-type: none"> - Drain out excess water 	<ul style="list-style-type: none"> - --

(For frequent water logged condition use Mole Drainage System for draining out excess water)

Horticulture	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
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 % carbendazim to the bunches to protect from diseases
Banana	- Drain out excess water by opening the trenches - Spraying of Urea and KNO ₃ - As above	- Providing drainage trench (1.5 cu. ft) across the slope - Spraying of Urea and KNO ₃ - As above	As above	-
Pomegranate	- As above	- As above	--	--
Vegetable crops				
Onion	- Providing drainage trench (1.5 cu. ft) across the slope - Spraying of Urea and KNO ₃	- Providing drainage trench (1.5 cu. ft) across the slope - Spraying of Urea and KNO ₃	--	- Store in well ventilated structure
Tomato	- Drain out excess water and staking - Spraying of Urea and KNO ₃	- Application of 10 ppm NAA spray - Spraying of Urea and KNO ₃	-	-
Drumstick	- Drain out excess water	- Drain out excess water		
Green Chillies	- As above	- Application of 10 ppm NAA spray	-	-
Brinjal	- As above	- Application of 10 ppm NAA spray	-	-
Okra	- As above	- 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	As above	- As above		
Jasmine	As above	- As above		
Heavy rainfall with high speed winds in a short span - Not applicable				

Outbreak of pests and diseases due to unseasonal rains	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Pigeonpea	<p>Leaf roller –</p> <ul style="list-style-type: none"> - Collection and destruction of affected leaves - Spraying of monocrotophos @ 1.5 ml/lit. <p>Wilt</p> <ul style="list-style-type: none"> – Drain out excess water - Drenching with copper oxychloride 50 WP (0.4 %) - Uproot and burn affected plants 	<p>Pod borer Complex –</p> <ul style="list-style-type: none"> - Spraying of 5 % NSKE - Use of pheromone traps @ 5 / ha - HNPV 1 ml / lit. spray for Heliothis - Spraying of chlorpyrifos 2 ml / lit., - Emamectin benzoate @ 0.4-0.5 gm/lit. or spinosal @ 0.4-0.5 ml/lit. <p>Wilt</p> <ul style="list-style-type: none"> - Drain out excess water - Drenching with copper oxychloride 50 WP (0.4%) - Uproot and burn affected plants 	--	--
Pearlmillet	<p>a) Insect pest - Grass hopper</p> <ul style="list-style-type: none"> - Dusting of methyl parathion 2% or carbaryl 10% 20 kg / ha <p>Army worm –</p> <ul style="list-style-type: none"> -Spraying of Chloropyrifos + Cypermethrin @ 15 ml/10 lit. <p>Downy mildew –</p> <ul style="list-style-type: none"> - Uproot and burn affected plants at 21 days after sowing - Spray metalaxyl M2-72 4g/lit at 20 days after sowing 	<p>Blister beetle</p> <ul style="list-style-type: none"> - Dusting of methyl parathion 2% 20 kg /ha, or carbaryl 10% @ 20 kg/ha or spraying of Quinolphos / Chloropyrifos @ 15-20 ml/10 lit. <p>Ergot –</p> <ul style="list-style-type: none"> - Spray thiram 0.1 to 0.15 % at heading stage or COC + Thiram (2:1) – 0.2 % + 0.1 % 	--	--

Outbreak of pests and diseases due to unseasonal rains	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Sunflower	<p>i) Thrips</p> <ul style="list-style-type: none"> - Imidachloprid 17.8 SL 0.5 ml / lit. <p>ii) Hairy caterpillar -</p> <ul style="list-style-type: none"> - Collection and destruction of egg masses, early instar larvae and affected plant parts - Spraying of 50 % carbaryl 2g/lit. <p>iii) Bud necrosis –</p> <ul style="list-style-type: none"> - Control thrips by 3 sprays of Imidachloprid 17.8 % SL @ 2 ml / 10 lit. at 15 days interval from sowing. 	<p>Heliothis-</p> <ul style="list-style-type: none"> -Endosulphon 35 EC 2 ml/ lit. <p>Alternaria / Cercospora Leaf blight –</p> <ul style="list-style-type: none"> - Spraying of mancozeb 75 WP 0.25% 	--	--
Rabi sorghum	<p>i) Shoot fly</p> <ul style="list-style-type: none"> - Installation of 5 fish meal traps per ha - Spraying of Chlorpyrifos 20 EC @ 2 ml/lit. <p>ii) Stem borer - Spraying of Chlorpyrifos 20 EC @ 2 ml / lit.</p> <p>iii) Aphids/ Jassids – Spraying of Dimethoate 30 EC 1.5 ml / lit.</p>	<p>i) Web worm</p> <ul style="list-style-type: none"> - Spraying of Chlorpyrifos 20 EC @ 2 ml / lit. <p>ii) Leaf spot-</p> <ul style="list-style-type: none"> - Spraying of mancozeb 75 WP 0.25 % 	--	--

Outbreak of pests and diseases due to unseasonal rains	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Chickpea	<p>Wilt / root rot-</p> <ul style="list-style-type: none"> - Use resistant varieties - Drain out excess water - Seed treatment with carbendazim + thiram (2 g each / kg) or Phule Trichoderma 5 g /kg before sowing 	<p>Heliothis</p> <ul style="list-style-type: none"> - Use of 5 pheromone traps per ha - Spraying of Quinalphos / Chlorpyrifos 2 ml/lit. or Chlorantriliprol @ 0.2 ml/lit. <p>Wilt / root rot-</p> <ul style="list-style-type: none"> - Seed treatment with carbendazim + thiram (2 g each / kg) or Phule Trichoderma 5 g /kg before sowing - Drain out excess water 	<p>a) Insect pest – Heliothis</p> <ul style="list-style-type: none"> - Use 5 pheromone traps per ha - Spraying of Quinolophos / Chlorpyrifos 2 ml/lit. or Chlorantriliprol @ 0.2 ml/lit. 	--
Safflower	<p>Aphids –</p> <ul style="list-style-type: none"> - Spraying of 5% NSE followed by Dimethoate 30 EC 1.5 ml /lit. or Acephate @ 1.6 gm/lit. <p>Safflower caterpillar –</p> <ul style="list-style-type: none"> - Spraying of Quinalphos / Chlorpyrifos @ 1.5 ml/lit. <p>Wilt / root rot-</p> <ul style="list-style-type: none"> - Seed treatment with carbendazim + thiram (2 g each / kg) or Phule Trichoderma 5 g /kg before sowing 	<p>Heliothis</p> <ul style="list-style-type: none"> - Spraying of Chlorpyrifos / Quinalphos 2 ml/lit. <p>Alternaria blight-</p> <ul style="list-style-type: none"> - Spraying of carbendazim (12%) + mancozeb (63%) (0.25%) @ 2 gm/lit. 	--	--

Outbreak of pests and diseases due to unseasonal rains	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Sugarcane	<p>i) Stem borer –</p> <ul style="list-style-type: none"> - Use of trichocards @ 2 / acre - Soil application of 10G Phorate 20 kg/ha - Removal of dead heads <p>ii) Top shoot borer</p> <ul style="list-style-type: none"> - Use of trichocards @ 2 / acre - Removal of dead heads - 20 EC Chloropyriphos @ 5 lit. in 1000 lit. water through channel / drip - Spraying of Chlorantriliprol 18.5 SC @ 0.3 – 0.4 ml / lit. 	<p>i) Top shoot borer</p> <ul style="list-style-type: none"> - Use of Trichocards @ 2 /acre - Removal of dead heads - Soil application of 0.4 G Chlorantriliprol @ 20 kg / ha. - 20 EC Chloropyriphos 5 lit. in 1000 lit. water through channel / drip <p>ii) Wolly aphid –</p> <ul style="list-style-type: none"> - Spraying of dimethoate or methyl demeton 1.5 ml/lit. or use of predators and their conservation 	--	--

Outbreak / incidence of pests and diseases due to unseasonal rains	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Horticulture Grape	<p>i) Mealy bug – - Use of sticky traps on trunks and girdles - Spraying of Buprofenzin / malathion 15-20 ml / 10 lit. or <i>Vertitilium lecani</i> @ 5 gm/lit.</p> <p>a) Disease – i) Anthraxnose – Spraying of carbendazim 50 WP 0.1 % or Propineb 0.3 % or COC 0.25% or COH 0.2 % ii) Powdery mildew - Spraying of wettable sulfur 80 WP 0.2 % or dinocap or penconazole 0.05 % or triadimefon 0.1 % iii) Downy mildew – Spraying of Bordeaux mixture 0.4 to 1.0 % or metalaxyl mancozeb 0.2 % or cymoxanil mancozeb 0.2 %</p>	<p>Mealy bug – –Use of sticky traps on trunks and girdles - Spraying of Buprofenzin / malathion 15-20 ml / 10 lit. or <i>Vertitilium lecani</i> @ 5 gm/lit.</p> <p>i) Powdery mildew – Spraying of wettable sulfur 80 WP 0.2 % or penconazole 0.05%</p> <p>ii) Downy mildew – Spraying of Bordeaux mixture 0.4 to 1.0 % or metalaxyl mancozeb 0.2 % or cymoxanil mancozeb 0.2 %</p>	<p>Mealy bug – - Use of sticky traps on either side of berry bunches</p>	--

Pomegranate	<p>a) Insect pest - i) Shot hole borer</p> <ul style="list-style-type: none"> - Use Geru paste with insecticides - Soil application of 10 g phorate @ 10g/plant in basin <p>ii) Thrips / Aphids –</p> <ul style="list-style-type: none"> - Spraying of Imidacloprid @ 4-5 ml or Thiamethaxam @ 4-5 gm / 10 lit. <p>iii) Nematodes –</p> <ul style="list-style-type: none"> - Soil application of <i>Trichoderma</i> plus @ 20 kg/ha. or Neem cake 1.5 to 2 tonnes/ha. <p>b) Disease - i) Bacterial blight –</p> <ul style="list-style-type: none"> - Spraying of bactinashak 250 ppm (2.5g/10 lit.) and captaf 0.25 % alternatively <p>ii) Fungal fruit and leaf spot-</p> <ul style="list-style-type: none"> - Spraying of mancozeb 75 WP 0.25 % or carbendazim 50 WP 0.1 % 	<p>i) Shot hole borer</p> <ul style="list-style-type: none"> - Use Geru paste with insecticides - Soil application of 10 g phorate @ 10g/plant in basin <p>ii) Anar caterpillar</p> <ul style="list-style-type: none"> - Spraying of Emamectin benzoate 5 SG @ 5g/10 lit. water. or Cypermethrin @ 0.4 ml/lit. <p>i) Bacterial blight –</p> <ul style="list-style-type: none"> - Spraying of bactinashak 250 ppm (2.5 g / 10 lit.) and captaf 0.25 % alternatively <p>ii) Fungal fruit and leaf spot-</p> <ul style="list-style-type: none"> - Spraying of mancozeb 75 WP 0.25 % or carbendazim 50 WP 0.1 % 	<p>i) Fruit sucking moth</p> <ul style="list-style-type: none"> - Protect the fruits either by bagging or by using repellents - Use light traps with insecticidal water - Do not remove infested fruits <p>i) Bacterial blight –</p> <ul style="list-style-type: none"> - Removal and destruction of affected fruits 	--
Drumstick	<p>a) Insect pest - Fall webworm –</p> <ul style="list-style-type: none"> - Spraying of Quinolphos @ 1.5-2 ml / lit 	<p>a) Insect pest - Fall webworm –</p> <ul style="list-style-type: none"> - Spraying of Quinolphos @ 1.5-2 ml / lit 	--	--

2.3 Floods : Not applicable. However, in Pandharpur and South Solapur tehsils being the river basin area, floods occur rarely but not of damaging nature. On river bank area, sugarcane crop gets affected so draining out the excess water is suggested.

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

Type of damage to Crop/livestock	Adaptation strategies recommended/ITK
<ul style="list-style-type: none"> ➤ Uprooting of crops due to heavy wind, ➤ Shedding of leaves, ➤ Damages to fruits due to hails, ➤ Damaged branches in vegetable crops, ➤ Decaying of fruits due to heavy rainfall and hail damage, ➤ Re- germination of grains due to rains, ➤ Built of fusarium on standing crop grains due to increase in grain moisture. 	<p style="text-align: center;">Adaptation measures recommended</p> <p>a. Banana</p> <ul style="list-style-type: none"> i) Sanitation of orchard, cutting of newly rhizomes near ground level ii) Remove damaged leaves from plant and keep 8-10 healthy leaves and then apply fungicides (Dithane M-45 25 g in 1 lit or 10 g Bavistin) iii) Remove damaged fruits from plant iv) Apply 50 g potassium di-hydrogen phosphate + 100 g urea + 10 lit. water to early developed bunch. v) Cover fruit bunches with white plastic (100 gauge and 6% micron) polythene or polypropylene of dried banana leaves. vi) Staking of developed bunches with <i>bamboo</i>/plastic packing scale vii) Give support of soil to each plant at base level viii) Establishment of wind breaks by attaching straw of bajara/jowar/maize at least at west and north direction. ix) Apply nutrients as per recommendation for <i>Mrug</i> orchard after planting apply 36 g urea and 83 g muriate of potash per plant, for <i>Kande</i> orchard after 165 days apply 82 g urea and 83 g muriate of potash per plant. If possible through drip irrigation for <i>Mrug</i> orchard apply 5.5 g urea and 7 g muriate of potash per plant per week and for <i>Kande</i> orchard apply 13 g urea and 8.5 g muriate of potash per plant per week. x) Apply water as per requirement xi) Suitable drainage system should be available in orchard to avoid water stagnation. xii) Take three sprays of Propikonazol 0.05% + 0.1 % sticker at 30 days interval to control blight/ sigatoka disease. <p>b. Grapes</p> <ul style="list-style-type: none"> i) Remove berries affected by hailstorm and high intensity rainfall and berries thinning should be carried out and apply <i>Trichoderma</i> to such orchard to control fungus attack. ii) If damage occurred on stem and other branches of harvested orchard spray copper fungicides. iii) In newly planted orchard if newly developed plant parts get damaged then it should be recut and again take new growth.

iv) Due to hot and humid climate there is possibility of increasing incidence of downy mildew and fruit flies under these condition to control downy mildew Metalaxil, Mancozeb 0.2% or Cymoxanil 0.05% or Dimethomorph 0.1% or phosphoric acid 0.2% at 12 days interval take 5 sprays and to control fruit flies take sprays of systemic insecticides.

c. Pomegranate

- i) Under cloudy and humid condition there is a possibility of increasing intensity of oily spot disease so to control this suitable preventive measure should be adopted at ground level. For this remove and burn affected leaves, branches and fruits them and then apply 1% Bordeaux mixture or 25 g COC + 10 lit water. If such humid climate lasts for long time then after 1 week then spray 2.5 g Bromopol + 10 lit of water.
- ii) Remove hailstorm affected fruits. As per tree age and damage caused by hailstorm maintain proper number of fruits by thinning. If *HastBahar* fruits are ready for harvest then quickly harvest fruits.
- iii) If damage is 100% in *AmbeBahar* orchard then it is suggested to manage *MrugBahar* effectively for these half damaged branches are cut and give proper shape. Orchards more than 5 year age give dose of 19:19:19 fertilizer 300 g per tree and give monthly two times light irrigation and give rest to orchard.
- iv) If damage is 50% in *AmbeBahar* orchard then following contingent measures are followed
 - Make bended trees straight and give support with *bamboo* and soil.
 - Establish wind breaks by using *shevari* and Maize straw.
 - As per recommendation apply proper dose of nutrients. Apply nitrogen fertilizers dose in 3-4 intervals.
 - Apply 1% Bordeaux mixture or COC to affected stems.
 - Spray orchard with 1% Bordeaux mixture (1 kg CuSO_4 + 1 kg CaSO_4 + 100 lit water) or 25 g COC fungicides in 10 lit of water.
 - Apply light irrigation to orchard if soil becomes hardy due to heavy rainfall and hailstorms.
 - Plants became weak due to heavy hailstorm are properly manured and fertilized.

d. Mango

- i) Due to high intensity rainfall inflorescence and small fruits dropping occurred. Under such condition proper orchard sanitation is needed.
- ii) Due to humid climate there are chances of increase in incidence of powdery mildew and fruit flies under such condition spray 15 ml Fipronil 5% or 3 ml Spinosad + 10 ml Hexaconzol 5% per 10 lit of water.
- iii) To control fruit drops spray 1% potassium nitrate.

<p>e. Sapota</p> <p>i) Hailstorms affect sapota fruits and causes dropping of small fruits. To avoid fungus growths on damaged fruits apply proper fungicides at 15 days interval. Give spray of 2.5 g Diathane M-45 or 1 g Carbendazim per liter of water.</p> <p>f. Guava</p> <p>i) Now <i>Hasta bahar</i> is over and fruits of <i>Ambebahar</i> are small and if damaged such fruits are removed and apply COC fungicides in orchard.</p> <p>g. Mandarin, Sweet orange and Kagzi lime</p> <p>i) Remove damaged branches and apply Bordeaux paste to damaged part of stem (1 kg CuSO₄ + 1 kg CaSO₄ + 10 lit water)</p> <p>ii) As preventive measure for fungus spray COC 30g in 10 liter of water</p> <p>iii) Plants became weak due to heavy hailstorm are properly manured and fertilized.</p> <p>h. Annona</p> <p>i) Pruning should be carried out after harvesting of fruits</p> <p>ii) Spraying of COC fungicides in the orchard</p> <p>iii) To control white wooly aphid spray <i>Verticilliumleccani</i> (Phule Bugicide) in orchard.</p> <p>i. Fig</p> <p>i) There is chance of increase in incidence of rust, to control this apply 1 lit. water + Chlorothanil 2 g + Carbendazim 1 g.</p> <p>j. Aonla</p> <p>i) If possible apply COC in the orchard to control fungus</p> <p>ii) Drain out excess water from field</p> <p>k. Ber</p> <p>i) To control powdery mildew growth spray 2.5 g sulphur per liter of water at 15 days interval</p>	
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<ul style="list-style-type: none"> ● General control measures for fruit orchards <ul style="list-style-type: none"> - Remove excess water from orchard and clean the orchard. - Apply Bordeaux paste to damaged stems. - Light ploughing in the orchard. - Insect and pests controlling programme should be carry out by the suggestions of scientists. - Plants became weak due to heavy hailstorm are properly manured and fertilized with micro nutrients and growth regulators. <p>2. Remedial measures for vegetable crops</p> <p>a. Onion</p> <ol style="list-style-type: none"> i) Onion kept for drying in the field if get wet due to rains such onion dried by spreading in dried surface. ii) If onion is ready to be harvest, it should not be harvest until soil is dried. iii) If <i>rabi</i> season 2 month onion affected mostly by the hailstorm, to keep leaves green spray water soluble fertilizers 19:19:19 5 g per liter of water. iv) Due to increased humidity and cloudy weather situation fruit flies and rust disease intensity is increased to control this spray λ cyhalothrin 6 ml + Mancozeb 0.3% + sticker 10 ml per 10 liter of water. <p>b. Tomato</p> <ol style="list-style-type: none"> i) Collect and remove hailstorm damaged fruits in such area where hailstorm occurred with heavy rainfall. If stem and branches get affected due to hailstorm moderate to heavy pruning is followed. ii) Apply recommended dose of fertilizers iii) Due to increased humidity and cloudy weather situation rust, fruit rot and powdery mildew disease also white fly, fruit borer and fruit flies intensity is increased to control this spray Carbendazim or Benomil 5 g in 10 liter of water. <p>c. Brinjal</p> <ol style="list-style-type: none"> i) If plants damaged due to hailstorm moderate pruning is followed and proper dose of fertilizers is given. ii) Atmospheric condition prevailing now encourages fruit and bud borer also leaf rust and fruit rot disease may be increased. <p>d. Chilli</p> <ol style="list-style-type: none"> i) There is possibility of increase in intensity of leaf curl virus so that following sprays should be taken <ul style="list-style-type: none"> - Mancozeb 25 g + λ cyhalothrin 6 ml + 10 lit of water - Dinocap 10 ml + fipronil 15 + 10 lit water 	
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e. Ladies finger and cucurbits (cucumber, water melon, bottle gourd bitter gourd)

- i) These summer crops are planted upto 10 February. If excess water is stagnated in field should be removed quickly. If damage is high under such condition replanting should be done.
- ii) Field sanitation
- iii) Atmospheric condition prevailing now encourages disease like yellow vein mosaic, white fly and hoppers and also downy mildew and powdery mildew disease may be increased. This can be controlled by taking spraying at 15 days interval.
- iv) Thimethoxam 4 g + Metalaxil M-Z- 72, 25 g per 10 lit of water
- v) Dimethoate 15 ml + tridemorph 10 ml per 10 lit of water.

f. Field crops : cereals, pulses and oilseed crops related remedial measures

a. Wheat

- i) If leaves are not dropped such plant are regain their growth, if leaves present in more number 1% KNO₃ spray to increase size and shine of grain.
- ii) If late sown wheat is not uprooted or collapsed then spray 2 g Mancozeb + COC per liter of water

b. Gram

- i) If gram is harvested then keep it in heap and cover it properly
- ii) Rainfall and hailstorm affected wheat grain are dried properly under shade
- iii) Very late sown gram is in pod development stage in such field remove excess soil water from hailstorm and rainfall otherwise root wilt observed.

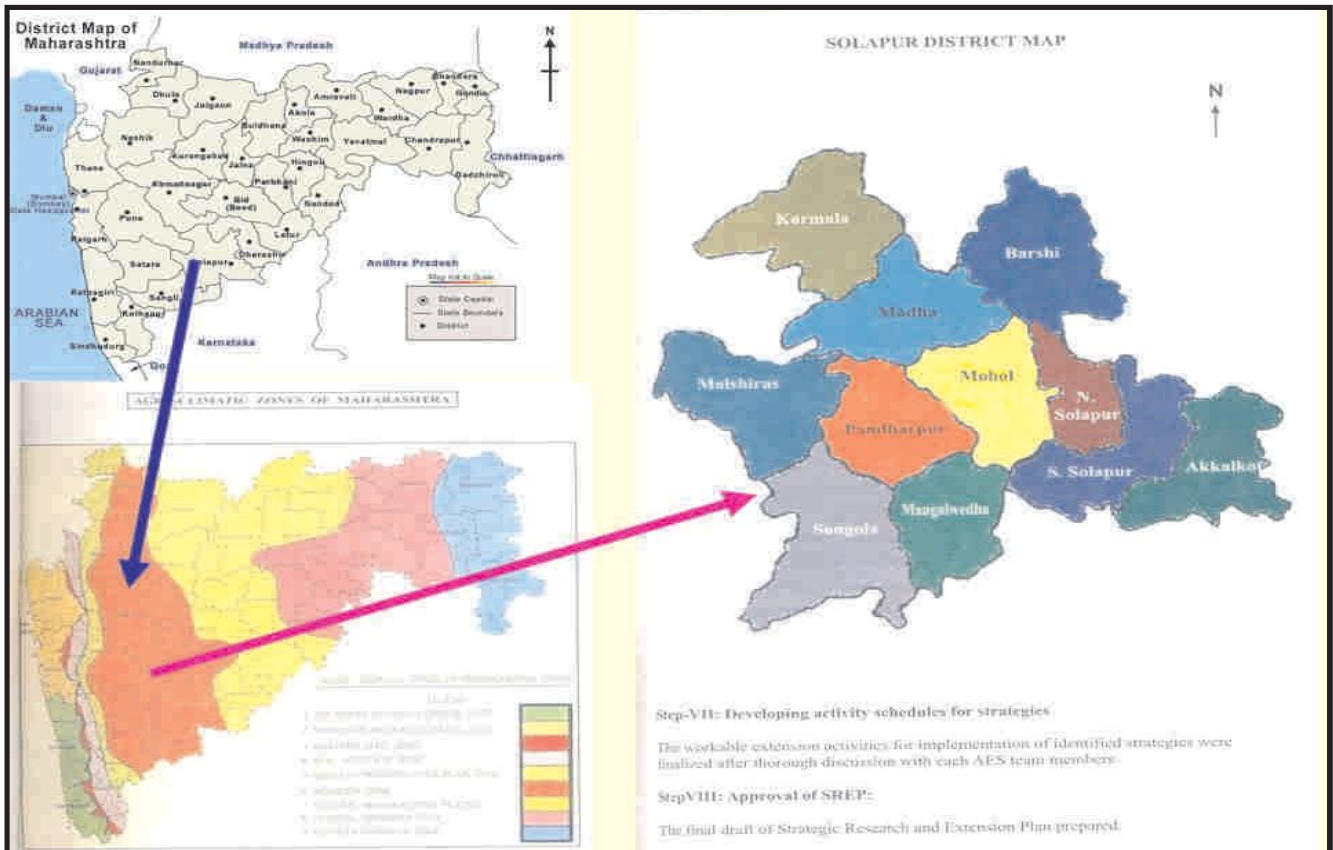
c. Rabi Jowar

- i) If harvested cobs are wet due to rainfall such cobs are dried in field itself and then threshed and grains again dried in sun.
- ii) Jowar straw also dried in sun
- iii) Dried grains are covered with plastic paper
- iv) Dry grains upto 8-10% moisture
- v) Standing *rabi*jowar should not harvest until hot and dry condition occurs

	<p>d. Summer groundnut</p> <ul style="list-style-type: none"> i) 60-65 thousand ha area of this season had been sowed in last 15 days which is in early vegetative stage. ii) Under such condition if hailstorm occurs resowing should be carried out iii) If water stagnation in field which causes yellowing of leaves to control this mix chelated micronutrients are sprayed (15-250 g powder + 10-15 lit of water) <p>g. Remedial measures for livestock</p> <p>Emergency situation occurred in state due to heavy rainfall and hailstorm. In many areas due to hailstorm sheep and goats mortality is observed. And also other animals get affected. Under such condition following measures should be carried out.</p> <ul style="list-style-type: none"> - Shifting of livestock to safe area by taking in to account the weather condition. - Barring of dead animals to avoid bad smell - Keep cattle shed warm so as to avoid problem of cold weather by making fire near cattle shed - Infected cattle treated well by consulting with veterinary doctor - Hailstorm affected field crops, fruit crops, vegetables should not fed to cattle
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2.5 Contingent strategies for Livestock, Poultry & Fisheries : Separate Chapter given (Animal Component for All District)

Annexure- I : Location Map



Annexure- II : Soil Map

