

CONTINGENCY PLANS FOR RABI AND SUMMER CROPS

District: Rajkot Gujarat State

1. Rainfall Information(Average of 10 year-2006-7 to 2015-16)

		Oct – Dec	Jan – Mar
(a)	Normal rainfall during <i>Rabi</i> season:	17.08	-
(b)	Number of rainy days :	1.1	-

2. Rabi and summer crops cultivated

2a Area Production statistics(2010-11 to 2015-16)

S. No	Cropping System	Crop name	Area '000 ha	Production '000 t	Productivity Kg/ha
1	Groundnut based cropping system	Wheat	72.203	291.506	4037
		Chickpea	6.072	8.972	1478
		Cumin	5.900	4.130	700
		Coriander	2.900	5.655	1950
		Onion	1.700	44.200	26000
		Cabbage	1.525	33.550	22000
		Pearlmillet	1.200	2.950	2460
		Greengram	1.005	1.580	1573
		Okra	1.185	8.800	7426
		Cucurbits	1.289	16.469	12777
		Garlic	1.400	13.650	9750
		Chilli(dry)	1.225	2.364	1930
2	Cotton based cropping system	Groundnut (summer)	5.649	13.506	2391
		Sesame (summer)	4.603	6.633	1633
3.	Horticulture –Fruit crops	Acid lime	0.761	9.512	12499
		Pomegranate	0.635	9.112	14349

(Source: Reports of Rajkot District Panchayat, Department of Agriculture and Horticulture, Government of Gujarat, 2015-16)

2b Source wise (Water) cultivated area

S. No	Crop name	Cultivated area under ('000 ha)			
		Residual moisture condition/rainfed	Ground water irrigated	Tank irrigated	Canal irrigated
Field crops					
1	Wheat	-	62.203	-	10.000
2	Chickpea	-	4.072	-	2.000
3	Groundnut (summer)	-	5.649	-	-
4	Sesame (summer)	-	4.603	-	-
5	Pearlmillet	-	1.200	-	-
6	Greengram	-	1.005	-	-
Spices crops					
1	Cumin	-	5.900	-	-
2	Coriander	-	2.900	-	-
Vegetables crops					
1	Onion	-	1.700	-	-
2	Cabbage	-	1.525	-	-
3	Okra	-	1.185	-	-
4	Cucurbits	-	1.289	-	-
5	Garlic	-	1.400	-	-
6	Chilli	-	1.225	-	-
Fruit crops					
1	Acid lime	-	0.761	-	-
2	Pomegranate	-	0.635	-	-

(Source: Reports of Rajkot District Panchayat, Department of Agriculture and Horticulture, Government of Gujarat, 2015-16 and PMKSY District Irrigation plan (2016-2020) Rajkot, Gujarat, 2016)

3. Sowing window information

S.No.	Soil type	Cropping system	Crop name	Optimum sowing window	
1	Medium black soils	Groundnut based cropping system	Wheat	2 nd week of Nov.to 4 th week of Nov.	
			Chickpea	2 nd week of Nov.to 4 th week of Nov.	
			Cumin	2 nd week of Nov.to 4 th week of Nov.	
			Coriander	2 nd week of Nov.to 4 th week of Nov.	
			Onion	1 st week of Nov. to 3 rd week of Nov.	
			Cabbage	1 st week of Nov. to 3 rd week of Nov.	
			Pearlmillet	3 rd week of Feb. to 4 th week of Feb.	
			Greengram	3 rd week of Feb. to 4 th week of Feb.	
			Okra	2 nd week of Feb. to 2 nd week March	
			Cucurbits	3 rd week of Feb. to 4 th week of Feb.	
			Garlic	2 nd week of Oct.to 2 nd week of Nov.	
			Chilli summer	2 nd week of Dec. to 2 nd week January	
				Cotton based cropping system	Groundnut (summer)
				Sesame (summer)	3 rd week of Feb. to 4 th week of Feb.
2	Alluvial soils	Groundnut based cropping system	Wheat	2 nd week of Nov.to 4 th week of Nov.	
			Chickpea	2 nd week of Nov.to 4 th week of Nov.	
			Cumin	2 nd week of Nov.to 4 th week of Nov.	
			Coriander	2 nd week of Nov.to 4 th week of Nov.	
			Onion	1 st week of Nov. to 3 rd week of Nov.	
			Cabbage	1 st week of Nov. to 3 rd week of Nov.	
			Pearlmillet	3 rd week of Feb. to 4 th week of Feb.	
			Greengram	2 nd week of Feb. to 3 th week of Feb.	
			Okra	2 nd week of Feb. to 2 nd week March	
			Cucurbits	3 rd week of Feb. to 4 th week of Feb.	
			Garlic	2 nd week of Oct. to 2 nd week of Nov.	
			Chilli summer	2 nd week of Dec. to 2 nd week January	
				Cotton based cropping system	Groundnut (summer)
				Sesame (summer)	3 rd week of Feb. to 4 th week of Feb.

4.Contingency measures Field crops

For crops grown with residual moisture i.e., under rainfed condition

(a) Excess residual moisture

S. No.	Soil type	Cropping system	Crop name	Sowing Window	Variety	Management practices
1	Medium black soils	NA	-	-	-	-
2	Alluvial soils	NA	-	-	-	-

(b) Less than optimum moisture i.e., 25% less than normal, which can happen due to insufficient rainfall during September/October months. Deficit of 20-40% rainfall

S. No.	Soil type	Cropping system	Crop name	Sowing Window	Variety	Management practices
1	Medium black soils	NA	-	-	-	-
2	Alluvial soils	NA	-	-	-	-

(c) Severe limitation in moisture. Deficit of rainfall during September/October months by more than 40%.

S. No.	Soil type	Cropping system	Crop name	Sowing Window	Variety	Management practices
1	Medium black soils	NA	-	-	-	-
2	Alluvial soils	NA	-	-	-	-

For crops grown with groundwater

(a) Above normal rainfall in *Kharif* coupled with good distribution

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
1	Medium black soils	Groundnut based cropping system	Wheat	2 nd week of Nov.to 4 th week of Nov.	Lok-1, GW-463, GW-496, GW-366, GW-451	<ul style="list-style-type: none"> Adopt recommended agronomic and irrigation practices. Immediate after last irrigation spray 2 % urea and mencozeb 75 % WP (27 g/10 litre water) for better quality of grain.
			Chickpea	2 nd week of Nov.to 4 th week of Nov.	GG-1, GG-2, GJG-3, 5	<ul style="list-style-type: none"> Adopt recommended agronomic practices Monitor the crop for heliothis and prodenia infestation, if infestation observed above ETL spray spinosad 45 % SC (3 ml/10 lit. water).

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
			Cumin	2 nd week of Nov. to 4 th week of Nov.	GC-3, 4	<ul style="list-style-type: none"> Adopt recommended agronomic and irrigation practices Seed treatment with thirum @ 2-3 gm/kg seed for prevention of wilt disease After germination make alternative spray of mencozeb 75 % WP (27 g/10 litre water) and hexaconazole 5 % EC (10 ml/10 lit. water) for prevention of blight and PM diseases at 10-12 days interval. Under cloudy weather and fog condition make extra spray of mencozeb 75 % WP (27 g/10 litre water) for prevention of blight.
			Coriander	2 nd week of Nov. to 4 th week of Nov.	Guj. Coriander-2 and 3	<ul style="list-style-type: none"> Adopt recommended agronomic practices and apply control irrigation Spray profenofos 20 % EC (10 ml/ 10lit. water) and hexaconazole 5 % EC (10 ml/10 lit. water) for control of thrips and to prevent PM disease infestation.
			Pearlmillet	3 rd week of Feb. to 4 th week of Feb.	GHB-538, 732, and Govt. approved Hybrids	<ul style="list-style-type: none"> Adopt recommended agronomic practices
			Greengram	Feb. 2 nd week to Feb. 3 rd week	Moong- GM 4	<ul style="list-style-type: none"> Adopt recommended package of practices. Spray profenofos 20 % EC (10 ml/ 10lit. water) and quinalphos 25% EC (20ml/10lit) for control of thrips and pod borer, respectively.
		Cotton based cropping system	Groundnut (summer)	2 nd week of February to 4 th week of February	GG-2, GG-6, TAG-24, TPG-41, TG-37A	<ul style="list-style-type: none"> Adopt recommended package of practices
			Sesame (summer)	3 rd week of February to 4 th week of February	GT-3,4,5	<ul style="list-style-type: none"> Adopt recommended package of practices
2.	Alluvial soils	Groundnut based cropping system	Wheat	2 nd week of Nov. to 4 th week of Nov.	Lok-1, GW-463, GW-496, GW-366, GW-451	<ul style="list-style-type: none"> Adopt recommended agronomic and irrigation practices. Immediate after last irrigation spray 2 % urea and mencozeb 75 % WP (27 g/10 litre water) for better quality of grain.

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
			Chickpea	2 nd week of Nov. to 4 th week of Nov.	GG-1, GG-2, GJG-3, 5	<ul style="list-style-type: none"> • Adopt recommended agronomic practices • Monitor the crop for heliothis and prodenia infestation, if infestation observed above ETL spray spinosad 45 % SC (3 ml/10 lit. water).
			Cumin	2 nd week of Nov. to 4 th week of Nov.	GC-3, 4	<ul style="list-style-type: none"> • Adopt recommended agronomic and irrigation practices • Seed treatment with thirum @ 2-3 gm/kg seed for prevention of wilt disease • After germination make alternative spray of mencozeb 75 % WP (27 g/10 litre water) and hexaconazole 5 % EC (10 ml/10 lit. water) for prevention of blight and PM diseases at 10-12 days interval. • Under cloudy weather and fog condition make extra spray of mencozeb 75 % WP (27 g/10 litre water) for prevention of blight.
			Coriander	2 nd week of Nov. to 4 th week of Nov.	Guj. Coriander-2 and 3	<ul style="list-style-type: none"> • Adopt recommended agronomic practices and apply control irrigation • Spray profenofos 20 % EC (10 ml/ 10lit. water) and hexaconazole 5 % EC (10 ml/10 lit. water) for control of thrips and to prevent PM disease infestation.
			Pearlmillet	3 rd week of Feb. to 4 th week of Feb.	GHB-538, 732, and Govt. approved Hybrids	<ul style="list-style-type: none"> • Adopt recommended agronomic practices
			Greengram	Feb. 2 nd week to Feb. 3 rd week	Moong- GM 4	<ul style="list-style-type: none"> • Adopt recommended package of practices. • Spray profenofos 20 % EC (10 ml/ 10lit. water) and quinalphos 25% EC (20ml/10lit) for control of thrips and pod borer, respectively
		Cotton based cropping system	Groundnut (summer)	2 nd week of February to 4 th week of February	GG-2, GG-6, TAG-24, TPG-41, TG-37A	<ul style="list-style-type: none"> • Adopt recommended package of practices
			Sesame (summer)	3 rd week of February to 4 th week of February	GT-3,4,5	<ul style="list-style-type: none"> • Adopt recommended package of practices

(b) Normal rainfall

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
1	Medium black soils	Groundnut based cropping system	Wheat	2 nd week of Nov. to 4 th week of Nov.	Lok-1, GW-463, GW-496, GW-366, GW-451	<ul style="list-style-type: none"> Adopt recommended agronomic and irrigation practices. Immediate after last irrigation spray 2 % urea and mencozeb 75 % WP (27 g/10 litre water) for better quality of grain.
			Chickpea	2 nd week of Nov. to 4 th week of Nov.	GG-1, GG-2, GJG-3, 5	<ul style="list-style-type: none"> Adopt recommended agronomic practices Monitor the crop for heliothis and prodenia infestation, if infestation observed above ETL spray spinosad 45 % SC (3 ml/10 lit. water).
			Cumin	2 nd week of Nov. to 4 th week of Nov.	GC-3, 4	<ul style="list-style-type: none"> Adopt recommended agronomic and irrigation practices Seed treatment with thirum @ 2-3 gm/kg seed for prevention of wilt disease After germination make alternative spray of mencozeb 75 % WP (27 g/10 litre water) and hexaconazole 5 % EC (10 ml/10 lit. water) for prevention of blight and PM diseases at 10-12 days interval. Under cloudy weather and fog condition make extra spray of mencozeb 75 % WP (27 g/10 litre water) for prevention of blight.
			Coriander	2 nd week of Nov. to 4 th week of Nov.	Guj. Coriander- 2 and 3	<ul style="list-style-type: none"> Adopt recommended agronomic practices and apply control irrigation Spray profenofos 20 % EC (10 ml/ 10lit. water) and hexaconazole 5 % EC (10 ml/10 lit. water) for control of thrips and to prevent PM disease infestation.
			Pearlmillet	3 rd week of Feb. to 4 th week of Feb.	GHB-538, 732, and Govt. approved Hybrids	<ul style="list-style-type: none"> Adopt recommended agronomic practices
			Greengram	Feb. 2 nd week to Feb. 3 rd week	Moong- GM 4	<ul style="list-style-type: none"> Adopt recommended package of practices. Spray profenofos 20 % EC (10 ml/ 10lit. water) and quinalphos 25% EC (20ml/10lit) for control of thrips and pod borer, respectively

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
		Cotton based cropping system	Groundnut (summer)	2 nd week of Feb to 4 th week of Feb	GG-2, GG-6, TAG-24, TPG-41, TG-37A	<ul style="list-style-type: none"> Adopt recommended package of agronomic and irrigation practices
			Sesame (summer)	3 rd week of Feb to 4 th week of Feb	GT-3,4,5	<ul style="list-style-type: none"> Adopt recommended package of agronomic and irrigation practices
2.	Alluvial soils	Groundnut based cropping system	Wheat	2 nd week of Nov. to 4 th week of Nov.	Lok-1, GW-463, GW-496, GW-366, GW-451	<ul style="list-style-type: none"> Adopt recommended agronomic and irrigation practices. Immediate after last irrigation spray 2 % urea and mencozeb 75 % WP (27 g/10 litre water) for better quality of grain.
			Chickpea	2 nd week of Nov. to 4 th week of Nov.	GG-1, GG-2, GJG-3, 5	<ul style="list-style-type: none"> Adopt recommended agronomic practices Monitor the crop for heliothis and prodenia infestation, if infestation observed above ETL spray spinosad 45 % SC (3 ml/10 lit. water).
			Cumin	2 nd week of Nov. to 4 th week of Nov.	GC-3, 4	<ul style="list-style-type: none"> Adopt recommended agronomic and irrigation practices Seed treatment with thirum @ 2-3 gm/kg seed for prevention of wilt disease After germination make alternative spray of mencozeb 75 % WP (27 g/10 litre water) and hexaconazole 5 % EC (10 ml/10 lit. water) for prevention of blight and PM diseases at 10-12 days interval. Under cloudy weather and fog condition make extra spray of mencozeb 75 % WP (27 g/10 litre water) for prevention of blight.
			Coriander	2 nd week of Nov. to 4 th week of Nov.	Guj. Coriander- 2 and 3	<ul style="list-style-type: none"> Adopt recommended agronomic practices and apply control irrigation Spray profenofos 20 % EC (10 ml/ 10lit. water) and hexaconazole 5 % EC (10 ml/10 lit. water) for control of thrips and to prevent PM disease infestation.

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
			Pearlmillet	3 rd week of Feb. to 4 th week of Feb.	GHB-538, 732, and Govt. approved Hybrids	<ul style="list-style-type: none"> • Adopt recommended agronomic practices
			Greengram	Feb. 2 nd week to Feb. 3 rd week	Moong- GM 4	<ul style="list-style-type: none"> • Adopt recommended package of practices. • Spray profenofos 20 % EC (10 ml/ 10lit. water) and quinalphos 25% EC (20ml/10lit) for control of thrips and pod borer, respectively
		Cotton based cropping system	Groundnut (summer)	2 nd week of February to 4 th week of February	GG-2, GG-6, TAG-24, TPG-41, TG-37A	<ul style="list-style-type: none"> • Adopt recommended package of agronomic and irrigation practices
			Sesame (summer)	3 rd week of February to 4 th week of February	GT-3,4,5	<ul style="list-style-type: none"> • Adopt recommended package of agronomic and irrigation practices

(c) Deficient rainfall in *Kharif* season (25-50% deficient)

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
1	Medium black soils	Groundnut based cropping system	Wheat	1 st week of Nov. to 2 nd week of Nov.	Lok-1, GW-463, GW-496, GW-366, GW-451	<ul style="list-style-type: none"> • Adopt management practices as given in point 4.4(a) plus following practices • Use organic manure • Use MIS irrigation system and irrigate at critical stages only • Give irrigation during night time to reduce transpiration
			Chickpea	1 st week of Oct. to 3 rd week of Nov.	GG-1, GG-2, GJG-3,5	<ul style="list-style-type: none"> • Adopt management practices as given in point 4.4(a) plus following practices • Use organic manure • Use MIS irrigation • Irrigate at critical stages only. • Give irrigation during night time to reduce transpiration

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
			Cumin	1 st week of Nov. to 2 nd week of Nov.	GC-3, 4	<ul style="list-style-type: none"> Adopt management practices as given in point 4.4(a) plus following practices. Use organic manure Use MIS irrigation system and irrigate upto flowering stage only Give irrigation during night time to reduce transpiration
			Coriander	1 st week of Nov. to 2 nd week of Nov.	Guj. Coriander-2 and 3	<ul style="list-style-type: none"> Adopt management practices as given in point 4.4(a) plus following practices Use organic manure Adopt MIS with organic mulching Irrigate at critical stages only. Give irrigation during night time to reduce transpiration
		Cotton based cropping system	Groundnut (summer)	-	-	<ul style="list-style-type: none"> Avoid summer crop sowing
			Sesame (summer)	-	-	<ul style="list-style-type: none"> Avoid summer crop sowing
2.	Alluvial soils	Groundnut based cropping system	Wheat	1 st week of Nov. to 2 nd week of Nov.	Lok-1, GW-463, GW-496, GW-366, GW-451	<ul style="list-style-type: none"> Adopt management practices as given in point 4.4(a) plus following practices Use organic manure Use MIS irrigation system and irrigate at critical stages only Give irrigation during night time to reduce transpiration
			Chickpea	1 st week of Oct. to 3 rd week of Nov.	GG-1, GG-2, GJG-3,5	<ul style="list-style-type: none"> Adopt management practices as given in point 4.4(a) plus following practices Use organic manure Use MIS irrigation Irrigate at critical stages only. Give irrigation during night time to reduce transpiration
			Cumin	1 st week of Nov. to 2 nd week of Nov.	GC-3, 4	<ul style="list-style-type: none"> Adopt management practices as given in point 4.4(a) plus following practices. Use organic manure Use MIS irrigation system and irrigate upto flowering stage only Give irrigation during night time to reduce transpiration

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
			Coriander	1 st week of Nov. to 2 nd week of Nov.	Guj. Coriander-2 and 3	<ul style="list-style-type: none"> • Adopt management practices as given in point 4.4(a) plus following practices • Use organic manure • Adopt MIS with organic mulching • Irrigate at critical stages only. • Give irrigation during night time to reduce transpiration
		Cotton based cropping system	Groundnut (summer)	-	-	<ul style="list-style-type: none"> • Avoid summer crop sowing
			Sesame (summer)	-	-	<ul style="list-style-type: none"> • Avoid summer crop sowing

(d) Scanty rainfall in *Kharif* season

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
1	Medium black soils	Groundnut based cropping system	Chickpea	1 st week of Oct. to 3 rd week of Nov.	GG-1, GG-2, GJG-3,5	<ul style="list-style-type: none"> • Adopt management practices as given in point 4.4(a) plus following practices • Use organic manure • Use MIS irrigation • Irrigate at critical stages only. • Remove weeds • Irrigate during night to reduce transpiration
			Cumin	1 st week of Nov. to 2 nd week of Nov.	GC-3, 4	<ul style="list-style-type: none"> • Adopt management practices as given in point 4.4(a) plus following practices • Use organic manure • Use MIS irrigation system and irrigate up to flowering stage only • Give irrigation during night time to reduce transpiration • Remove weeds • Seed treatment with thirum @ 2-3 gm/kg seed for prevention of wilt disease

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
			Coriander	1 st week of Nov. to 2 nd week of Nov.	Guj. Coriander- 2 and 3	<ul style="list-style-type: none"> • Adopt management practices as given in point 4.4(a) plus following practices • Use organic manure • Use MIS irrigation • Irrigate at critical stages only. • Thinning of plants and sell as green coriander • Remove weeds • Irrigate during night to reduce transpiration
		Cotton based cropping system	Groundnut (summer)	-	-	<ul style="list-style-type: none"> • Avoid summer crop sowing
			Sesame (summer)	-	-	<ul style="list-style-type: none"> • Avoid summer crop sowing
2.	Alluvial soils	Groundnut based cropping system	Chickpea	1 st week of Oct. to 3 rd week of Nov.	GG-1, GG-2, GJG-3,5	<ul style="list-style-type: none"> • Adopt management practices as given in point 4.4(a) plus following practices • Use organic manure • Use MIS irrigation • Irrigate at critical stages only. • Remove weeds • Irrigate during night to reduce transpiration
			Cumin	1 st week of Nov. to 2 nd week of Nov.	GC-3, 4	<ul style="list-style-type: none"> • Adopt management practices as given in point 4.4(a) plus following practices • Use organic manure • Use MIS irrigation system and irrigate up to flowering stage only • Give irrigation during night time to reduce transpiration • Remove weeds • Seed treatment with thirum @ 2-3 gm/kg seed for prevention of wilt disease
			Coriander	1 st week of Nov. to 2 nd week of Nov.	Guj. Coriander- 2 and 3	<ul style="list-style-type: none"> • Adopt management practices as given in point 4.4(a) plus following practices • Use organic manure • Use MIS irrigation • Irrigate at critical stages only. • Thinning of plants and sell as green coriander • Remove weeds • Irrigate during night to reduce transpiration

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
		Cotton based cropping system	Groundnut (summer)	-	-	<ul style="list-style-type: none"> • Avoid summer crop sowing
			Sesame (summer)	-	-	<ul style="list-style-type: none"> • Avoid summer crop sowing

e) Management practices for unseasonal rains

Condition	Management practices to be adopted			
	Vegetative stage	Flowering stage	Crop maturity stage	Post-harvest
Continuous high rainfall in a short span leading to water logging				
Wheat	-	-	<ul style="list-style-type: none"> • Surface drainage (for management of water logging, lodging crop) • To control black point in grain, spray mancozeb 0.2%(27 g/10 litre water). 	<ul style="list-style-type: none"> • Protect product with plastic sheet (100 μ UV stabilized colour plastic) or shift produces to farm shed • Protection against pest/disease damage in storage etc., • Preparation for quick drying technique • Separate good and bad lot.
Groundnut (summer)	-	-	<ul style="list-style-type: none"> • Immediately harvest bunch groundnut. • Quick surface drainage, open channel around field. 	<ul style="list-style-type: none"> • Protect product with plastic sheet (100 μ UV stabilized colour plastic) or shift produces to farm shed • Protection against pest/disease damage in storage etc., • Preparation for quick drying technique • Separate good and bad lot.
Sesame (summer)	-	-	<ul style="list-style-type: none"> • Quick surface drainage, open channel around field. 	<ul style="list-style-type: none"> • Protect product with plastic sheet (100 μ UV stabilized colour plastic) or shift produces to farm shed • Protection against pest/disease damage in storage etc., • Preparation for quick drying technique • Separate good and bad lot.

Condition	Management practices to be adopted			
	Vegetative stage	Flowering stage	Crop maturity stage	Post-harvest
Continuous high rainfall in a short span leading to water logging				
Chickpea	-	-	<ul style="list-style-type: none"> • Provide drainage, harvest immediately after drying 	<ul style="list-style-type: none"> • Protect product with plastic sheet (100 μ UV stabilized colour plastic) or shift produces to farm shed • Protection against pest/disease damage in storage etc., • Preparation for quick drying technique • Separate good and bad lot.
Cumin	<ul style="list-style-type: none"> • Surface drainage (For management of water logging condition) 	<ul style="list-style-type: none"> • Surface drainage for management of water logging 	<ul style="list-style-type: none"> • Surface drainage (for management of water logging crop • To control cumin blight) spray mancozeb 0.2%(27 g/10 litre water) • Spray 0.2% (30 g/10 litre water) wettable sulphur for protection against powdery mildew disease 	<ul style="list-style-type: none"> • Protect product with plastic sheet (100 μ UV stabilized colour plastic) or shift produces to farm shed • Protection against pest/disease damage in storage etc., • Preparation for quick drying technique • Separate good and bad lot.
Coriander	<ul style="list-style-type: none"> • Surface drainage (For management of water logging condition) 	<ul style="list-style-type: none"> • Surface drainage for management of water logging 	<ul style="list-style-type: none"> • Surface drainage (for management of water logging crop • Spray 0.2% (30 g/10 litre water) wettable sulphur for protection against powdery mildew disease 	<ul style="list-style-type: none"> • Protect product with plastic sheet (100 μ UV stabilized colour plastic) or shift produces to farm shed • Protection against pest/disease damage in storage etc., • Preparation for quick drying technique • Separate good and bad lot.
Perl millet (summer)	-	-	<ul style="list-style-type: none"> • Immediately harvest the crop Surface drainage (for management of water logging) 	<ul style="list-style-type: none"> • Protect product with plastic sheet (100 μ UV stabilized colour plastic) or shift produces to farm shed • Protection against pest/disease damage in storage etc., • Preparation for quick drying technique • Separate good and bad lot.

Condition	Management practices to be adopted			
	Vegetative stage	Flowering stage	Crop maturity stage	Post-harvest
Continuous high rainfall in a short span leading to water logging				
Green gram	-	-	<ul style="list-style-type: none"> Immediately harvest the crop Surface drainage (for management of water logging) 	<ul style="list-style-type: none"> Protect product with plastic sheet (100 μ UV stabilized colour plastic) or shift produces to farm shed Protection against pest/disease damage in storage etc., Preparation for quick drying technique Separate good and bad lot.

For crops grown with Canal Irrigation: The scenario would be based on the storage available in the reservoirs.

a. Limited release of water

S.No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
1	Medium black soils	Groundnut based cropping system	Chickpea	1 st week of Oct. to 3 rd week of Nov.	GG-1, GG-2, GJG-3,5	<ul style="list-style-type: none"> Irrigate at branching stage. If two irrigations are possible, irrigate during branching and pod development stages only.
			Cumin	2 nd week of Nov. to 4 th week of Nov.	GC-3, 4	<ul style="list-style-type: none"> Canal water should be released to irrigate during critical stages only Conjunctive use of canal and groundwater Groundwater should be utilized during later stages
			Coriander	2 nd week of Nov. to 4 th week of Nov.	Guj. Coriander-2 and 3	<ul style="list-style-type: none"> Thinning of plants and sell as green coriander Canal water should be released to irrigate during critical stages only Conjunctive use of canal and groundwater Groundwater should be utilized during later stages
			Pearlmillet	3 rd week of Feb.	GHB-538, 732, and Govt. approved Hybrids	<ul style="list-style-type: none"> Avoid pearl millet sowing in summer
			Greengram	Feb. 2 nd week	Moong-GM 4	<ul style="list-style-type: none"> Avoid Green gram sowing in summer

S.No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices	
		Cotton based cropping system	Groundnut (summer)	-	-	<ul style="list-style-type: none"> • Avoid groundnut sowing in summer 	
			Sesame (summer)	-	-	<ul style="list-style-type: none"> • Avoid sesame sowing in summer 	
2.	Alluvial soils	Groundnut based cropping system	Chickpea	1 st week of Oct. to 3 rd week of Nov.	GG-1, GG-2, GJG-3,5	<ul style="list-style-type: none"> • Irrigate at branching stage. • If two irrigations are possible, irrigate during branching and pod development stages only. 	
			Cumin	2 nd week of Nov. to 4 th week of Nov.	GC-3, 4	<ul style="list-style-type: none"> • Canal water should be released to irrigate during critical stages only • Conjunctive use of canal and groundwater • Groundwater should be utilized during later stages 	
			Coriander	2 nd week of Nov. to 4 th week of Nov.	Guj. Coriander-2 and 3	<ul style="list-style-type: none"> • Thinning of plants and sell as green coriander • Canal water should be released to irrigate during critical stages only • Conjunctive use of canal and groundwater • Groundwater should be utilized during later stages 	
			Pearlmillet	3 rd week of Feb.	GHB-538, 732, and Govt. approved Hybrids	<ul style="list-style-type: none"> • Avoid pearl millet sowing in summer 	
			Greengram	Feb. 2 nd week	Moong-GM 4	<ul style="list-style-type: none"> • Avoid green gram sowing in summer 	
			Cotton based cropping system	Groundnut (summer)	-	-	<ul style="list-style-type: none"> • Avoid groundnut sowing in summer
				Sesame (summer)	-	-	<ul style="list-style-type: none"> • Avoid sesame sowing in summer

b. Delayed release of water

For head reach:

Water Distribution management:

- Repair and maintenance of field channel.
- Cleaning and lining of distributaries and main canal.

Water utilization management:

- Delay sowing up to 4th week of November for prevailing cropping patterns
- There after adopt late sowing varieties like GW173 of wheat.
- Adopt short duration crop varieties.
- Change crop according to time of water availability.
- Conjunctive use of groundwater/harvested water and canal water
- Use MIS on community base according to crops.

For Middle reach:

Water Distribution management:

- Repair and maintenance of field channel.
- Cleaning and lining of distributaries and main canal.

Water utilization management:

- Delay sowing up to 4th week of November for prevailing cropping patterns.
- Use groundwater/ harvested water for sowing and continue using till canal water reaches.
- There after adopt late sowing varieties like GW173 of wheat.
- Adopt short duration crop varieties.
- Change crop according to time of water availability.
- Conjunctive use of groundwater/harvested water and canal water
- Use MIS on community base according to crops.

For tail reach:

Water Distribution management:

- Repair and maintenance of field channel.
- Cleaning and lining of distributaries and main canal.

Water utilization management:

- Delay sowing up to 4th week of November for prevailing cropping patterns.
- Use groundwater/ harvested water for sowing of crop and continue using till canal water released.
- There after adopt late sowing varieties like GW-173 of wheat.
- Adopt short duration crop varieties.
- Change crop according to time of water availability.
- Adopt crops with stress resistant and less water requirement like cumin , semi-rabi pearl millet, fodder sorghum and chickpea
- Irrigate up to flowering stage only or critical stage irrigation approach may be adopted.

- Use alternate furrow irrigation where ever possible.
- Conjunctive use of groundwater/harvested water and canal water
- Use MIS on community base according to crops.

5. Contingency measures for Horticulture Crops (Existing / New plantations)

S. No.	Crop Name	Specific management practices to be taken up following excess/deficient/scanty rainfall	Time of intervention	Remarks
Existing plantations				
1	Acid lime	Excess rainfall		
		<ul style="list-style-type: none"> • Provide surface drainage • Add gypsum 1-2 kg per plant 	June to September	
		Deficient and scanty rainfall:		
		<ul style="list-style-type: none"> • Use of MIS • Use mulching • Use subsurface drip irrigation if possible • Apply of Maurram in soil 	December to May Oct. to May	
2	Pomegranate	Excess rainfall		
		<ul style="list-style-type: none"> • Provide surface drainage • Add gypsum 1-2 kg per plant 	June to September	
		Deficient and scanty rainfall:		
		<ul style="list-style-type: none"> • Use of MIS • Use mulching • Use subsurface drip irrigation if possible • Apply of Maurram in soil 	December to May Oct. to May	
New plantations				
1	Acid lime	Excess rainfall		
		<ul style="list-style-type: none"> • Provide proper drainage • Provide staking • Drenching of carbendazim @ 1 g/litre water • Soil pulverization around the plant base (Forking) 	June to September June to September June to September June to September	
		Deficient/scanty rainfall		
		<ul style="list-style-type: none"> • Adoption of MIS • Use of mulching • Soil pulverization around the plant base (Forking) 	December to May October to May October to May	

S. No.	Crop Name	Specific management practices to be taken up following excess/deficient/scanty rainfall	Time of intervention	Remarks
2	Pomegranate	Excess rainfall		
		<ul style="list-style-type: none"> Provide drainage 	June to September	Adopt surface drainage in case of excess rainfall.
		Deficient/scanty rainfall		
		<ul style="list-style-type: none"> Use of drip irrigation system Use of mulching Soil pulverization around the plant base (Forking) Use of Maurram 	December to May October to May October to May	Apply irrigation through drip with mulch or subsurface drip irrigation in case of last monsoon below normal

6.Contingency measures for Horticulture Crops(vegetables)

S.No.	Crop Name	Specific management practices to be taken up following excess /deficient/ scanty rainfall	Time of intervention	Remarks
1	Onion (GWO-1, Junagadh local (Pilipati), Talaja Red, Agrifound light red, GJRO-11, GJWO-3)	Excess rainfall		
		<ul style="list-style-type: none"> Provide drainage Delay in sowing 	August to September	<ul style="list-style-type: none"> Raise nursery on raised bed or broad bed and furrow Manage soil for good drainage
		Deficient/scanty rainfall		
		<ul style="list-style-type: none"> Use micro irrigation with plastic mulch 	November to February	<ul style="list-style-type: none"> Apply irrigation through MIS Use plastic mulch Give irrigation during night time to reduce transpiration Soil amendments, and/or reduced tillage.
2	Cabbage Push dram head, Early dram head, Pride of India, Golden aker and Govt. approved varieties	Excess rainfall		
		<ul style="list-style-type: none"> Provide drainage 	August to September	<ul style="list-style-type: none"> Use raised bed or broad bed and furrow system Manage soil for good drainage
		Deficient/scanty rainfall		
		<ul style="list-style-type: none"> Use micro irrigation with plastic mulch Alternate furrow irrigation 	November to February	<ul style="list-style-type: none"> Apply irrigation through drip with mulch Give irrigation during night time to reduce transpiration Apply irrigation in alternate furrow with rotation Soil amendments, and/or reduced tillage.

S.No.	Crop Name	Specific management practices to be taken up following excess /deficient/ scanty rainfall	Time of intervention	Remarks
3.	Okra (GO-3, GJO-3, GJOH-2, 3, 4, GAO-5)	Excess rainfall		
		<ul style="list-style-type: none"> Provide drainage 	February to April	<ul style="list-style-type: none"> Manage soil for good drainage
		Deficient/scanty rainfall		
		<ul style="list-style-type: none"> Use micro irrigation with plastic mulch Alternate furrow irrigation 	February to April	<ul style="list-style-type: none"> Apply irrigation through drip with mulch Give irrigation during night time to reduce transpiration Apply irrigation in alternate furrow with rotation Soil amendments, and/or reduced tillage.
4.	Cucurbits Gourd:- (Aanad-1) Cucumber: (Gujarat cucumber-1) Sponge Gourd:GSG-1, GJSG-2, Ridge gourd: GARG-1	Excess rainfall		
		<ul style="list-style-type: none"> Provide drainage 	February to April	<ul style="list-style-type: none"> Manage soil for good drainage
		Deficient/scanty rainfall		
		<ul style="list-style-type: none"> Use micro irrigation with plastic mulch Alternate furrow irrigation 	February to April	<ul style="list-style-type: none"> Apply irrigation through drip with mulch Give irrigation during night time to reduce transpiration Apply irrigation in alternate furrow with rotation Soil amendments, and/or reduced tillage.
5.	Garlic GG-4, GJG-5	Excess rainfall		
		<ul style="list-style-type: none"> Provide drainage 	October to February	<ul style="list-style-type: none"> Manage soil for good drainage
		Deficient/scanty rainfall		
		<ul style="list-style-type: none"> Use micro irrigation with plastic mulch Alternate furrow irrigation 	October to February	<ul style="list-style-type: none"> Apply irrigation through drip with mulch Give irrigation during night time to reduce transpiration Apply irrigation in alternate furrow with rotation Soil amendments, and/or reduced tillage.
6.	Chilli summer S-49,GVC-101,111, 121 and Govt. approved varieties	Excess rainfall		
		<ul style="list-style-type: none"> Provide drainage 	November to January	<ul style="list-style-type: none"> Use raised bed or broad bed and furrow system Manage soil for good drainage
		Deficient/scanty rainfall		
		<ul style="list-style-type: none"> Use micro irrigation with plastic mulch Alternate furrow irrigation 	November to January	<ul style="list-style-type: none"> Apply irrigation through drip with mulch Give irrigation during night time to reduce transpiration Apply irrigation in alternate furrow with rotation Soil amendments, and/or reduced tillage.

7. Temperature related stresses for field and horticulture crops:

Excess temperatures/ Less than normal temperatures

Sr. No.	Crop name	Stage of crop growth	Threshold temperature	Suggested management practices
1	Wheat	Germination	>25 °C	<ul style="list-style-type: none"> • Delay sowing up to optimum temp(20-25 °C)
		Anthesis	>22 °C	<ul style="list-style-type: none"> • Light and frequent irrigation
		Milking stage	>26 °C	<ul style="list-style-type: none"> • Light and frequent irrigation
		Dough stage	7-18 °C suitable 5 to 15 days	<ul style="list-style-type: none"> • Light and frequent irrigation if temp. greater than 18 °C
		Grain filling	>30 °C not suitable	<ul style="list-style-type: none"> • Light and frequent irrigation • Use early sowing variety Lok-1 and prefer early maturing variety GW-173 and GW 11 in late sowing to avoid of high temp.
2	Chickpea	Germination	>34°C	<ul style="list-style-type: none"> • Delay sowing to get optimum temp(15-20 °C)
		Flowering	>30°C	<ul style="list-style-type: none"> • Give irrigation • External application of ABA can protect plant against heat stress
		Pod development	>30°C	<ul style="list-style-type: none"> • Give irrigation • External application of ABA can protect plant against heat stress
		Seed development	>30°C	<ul style="list-style-type: none"> • Give irrigation • External application of ABA can protect plant against heat stress
3	Cumin	Germination	>22 °C	<ul style="list-style-type: none"> • Light and frequent irrigation • Delay sowing.
4	Coriander	Germination	>25°C	<ul style="list-style-type: none"> • Light and frequent Irrigation • Delay sowing.
5.	Groundnut summer	Germination	< 17°C	<p>If temperature is below than 17°C</p> <ul style="list-style-type: none"> • Delay sowing. • Use organic mulch. • Delay second irrigation after sowing. • In case of line sowing harrowing to be followed to loose the soil surface
		Vegetative	>35°C	<ul style="list-style-type: none"> • Use sprinkler and drip irrigation
		Pegging	>30 °C	<ul style="list-style-type: none"> • Sprinkler and drip irrigation to reduce temperature • Give light and frequent irrigation
		Pod development	>34 °C	<ul style="list-style-type: none"> • Sprinkler and drip irrigation • Give light and frequent irrigation

Sr. No.	Crop name	Stage of crop growth	Threshold temperature	Suggested management practices
6.	Sesame summer	Germination	< 15 °C not suitable for germination	<ul style="list-style-type: none"> • Delay sowing.
		Growth and develop.	>30 °C	<ul style="list-style-type: none"> • Light and frequent irrigation.
		Flower dropping and pollination	>35 °C	<ul style="list-style-type: none"> • Light and frequent irrigation
7.	Cotton	Flowering and boll formation	>32 °C	<ul style="list-style-type: none"> • Drip irrigation • Straw mulching • Give frequent irrigation.
		Boll maturity	>38 °C	<ul style="list-style-type: none"> • Use drip irrigation • Straw mulching • Give frequent irrigation.
8.	Onion	Bulb develop.	>25 °C	<ul style="list-style-type: none"> • Drip irrigation • Frequent light irrigation
9.	Pearl millet Summer	Germination	<18 °C	<ul style="list-style-type: none"> • Delay sowing (Second/third week of Feb.)
		Crop growth	>33 °C	<ul style="list-style-type: none"> • Light and frequent irrigation
10.	Coriander	Germination	>25 °C	<ul style="list-style-type: none"> • Light and frequent Irrigation • Delay sowing.
11.	Chilli summer	Whole crop period	>34 °C	<ul style="list-style-type: none"> • Drip irrigation • Use of straw/ silver black plastic mulch
12.	Garlic	Bulb develop.	>32 °C	<ul style="list-style-type: none"> • Drip irrigation • Frequent light irrigation
13.	Cabbage	Whole crop period	> 25 °C	<ul style="list-style-type: none"> • Drip irrigation • Use of straw/ silver plastic mulch
14.	Acid lime	Plant growth	<15 °C & >40 °C	<ul style="list-style-type: none"> • Smudging technique during low temperature at early morning • White washing of trunk • Shelter to plant by thatching • Frequent light irrigation • Mulching with organic waste • Shelter belts/wind breaks
		Flowering & fruit setting	>35 °C during a week or more	<ul style="list-style-type: none"> • Frequent light irrigation • Mulching with organic waste • Shelter belts/wind breaks

Sr. No.	Crop name	Stage of crop growth	Threshold temperature	Suggested management practices
		Fruit maturity	>40°C during a week or more	<ul style="list-style-type: none"> • White washing of trunk • Frequent light irrigation • Mulching with organic waste • Shelter belts/wind breaks
15.	Pomegranate	Plant growth	<18°C low & >35 °C high	<ul style="list-style-type: none"> • Smudging technique during low temperature at early morning • Irrigation during low or high temperature • Mulching during low or high temperature • Shelter belts/wind breaks
		Flowering & fruit setting	<20°C low & >35 °C high	
		Fruit maturity	>40°C during a week or more	<ul style="list-style-type: none"> • Wrapping of individual fruits • Frequent and light irrigation • Mulching or sod culture • Shelter belts/wind breaks

* Temperature increase or decrease over normal and for number of days. For example, increase of 3 degrees over normal for a period of 5 days
ABA-Absciscic acid

8. Management practices for livestock (to cover shelter management during cold or heat waves, production/regulation of fodder in rabi season in deficient monsoon years/ excess monsoon rainfall years etc),

For Fodder crops grown with residual moisture i.e., under rainfed condition

(a) Excess (rainfall during September/October months) residual moisture

S.No.	Soil type	Cropping system	Fodder name	Variety	Management practices
1	Medium black and alluvial Soils	Groundnut based cropping system	Sorghum	Gundari GFS-3, GAFS-11, CSV-15, CSV-21F	<ul style="list-style-type: none"> • Surface drainage (to control water logging condition)

(b) Normal rainfall (rainfall during September/October months) residual moisture

S.No.	Soil type	Cropping system	Crop name	Variety	Management practices
1	Medium black and alluvial Soils	Groundnut based cropping system	Sorghum	Gundari GFS-3, GAFS-11, , CSV-15, CSV-21F	<ul style="list-style-type: none"> • Adopt recommended package of agronomic practices

(c) Less than optimum moisture i.e., 25% less than normal, which can happen due to insufficient rainfall during September/October months. Deficit of 20-40% rainfall

S.No.	Soil type	Cropping system	Fodder name	Variety	Management practices
1	Medium black and alluvial Soils	Groundnut based cropping system	Sorghum	Gundari GAFS-11, CSV-15, CSV-21F	<ul style="list-style-type: none"> • Thinning and maintain the plant stand • Don't feed as green fodder.

(d) Severe limitation in moisture. Deficit of rainfall during September/October months by more than 40%.

S.No.	Soil type	Cropping system	Fodder name	Variety	Management practices
1	Medium black and alluvial Soils	Groundnut based cropping system	Sorghum	Gundari GAFS-11, CSV-15, CSV-21F	<ul style="list-style-type: none"> • Thinning and maintain the plant stand • Don't feed as green fodder.

For fodder crops (mostly perennial fodder varieties as sole fodder crop) grown with groundwater

S.No.	Soil type	Fodder name	Variety	Management practices
1.	Medium black soils	Sorghum	Gundari GFS-3, GAFS-11, CSV-15, CSV-21F	<ul style="list-style-type: none"> • Adopt recommended package of agronomic practices
		Lucerne	Anand-2, 3	<ul style="list-style-type: none"> • Adopt recommended package of agronomic practices
		Maize	African tall	<ul style="list-style-type: none"> • Adopt recommended package of agronomic practices
		Grass	Napier, Jinjvo	<ul style="list-style-type: none"> • Adopt recommended package of agronomic practices
2.	Alluvial Soils	Sorghum	Gundari GFS-3, GAFS-11, CSV-15, CSV-21F	<ul style="list-style-type: none"> • Adopt recommended package of agronomic practices
		Lucerne	Anand-2, 3	<ul style="list-style-type: none"> • Adopt recommended package of agronomic practices
		Maize	African tall	<ul style="list-style-type: none"> • Adopt recommended package of agronomic practices
		Grass	Napier, Jinjvo	<ul style="list-style-type: none"> • Adopt recommended package of agronomic practices

Livestock management during severe heat waves

Nutritional management	Shelter management	Health management	Miscellaneous, if any
<p>Feed 25 kg green fodder along with unconventional feed per animal. Give jaggerywater with fenugreek powder. High energy density and low protein diet are beneficial. Increasing the grain/ forage ratio.</p>	<p>Covered the shelter roof with dry grasses. Provide Fans & sufficient ventilation. Use fogger/ sprinklers system. Forestry blocks can provide temporary shelter from extreme heat. Providing good-quality drinking water and shade (natural or artificial).</p>	<p>Spray them with cool water, especially on the legs and feet, or stand them in water. Lay wet towels over them. Provide Vitamine C through Syrup for heat stress management. Vaccinate the animals against infectious diseases.</p>	<p>Cattle that are heat stressed will show increased respiration rates as they try to cool themselves down. Don't allowed cattle to walk in extreme heat. Use sprinklers and shade in holding yards. Air flow is also important. Sprinklers have been found to improve milk production, reduce fly irritation and make for more contented cows in the shed with better milk let down. Cover animal under insurance</p>

Livestock management during severe cold waves

Nutritional management	Shelter management	Health management	Miscellaneous, if any
<p>Feed silage and Hay (Wheat straw treated with urea) along with concentrate feed. An increased energy requirement for maintenance as a result of increased resting metabolic rate.</p>	<p>Operate heaters protect shed by tying gunny bags around shed.</p>	<p>Add antibiotics in drinking water to protect young calves from Pneumonia. Cold environment increases the whole body glucose turnover and glucose oxidation thus resulting in less production of ketones.</p>	<p>Operate heaters, protect shed by tying gunny bags around shed. Protect animals from direct cold waves. Cover animal under insurance</p>