

CONTINGENCY PLANS FOR RABI AND SUMMER CROPS

District: Surendranagar Gujarat State

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

		Oct – Dec	Jan – Mar
(a)	Normal rainfall during <i>Rabi</i> season:	0	0
(b)	Number of rainy days :	0	0

2. Rabi crops cultivated

2a Area Production statistics(2012-13 to 2015-16)

S. No	Cropping System	Crop name	Area '000 ha	Production '000 t	Productivity Kg/ha
1.	Groundnut/Pearl millet/Sorghum and sesame based cropping system	Cumin	89.5	74.9	837
		Wheat irrigated	33.2	103.4	3086
		Wheat unirrigated	2.7	2.0	747
		Fennel	16.6	36.0	2170
		Coriander	5.9	9.4	1600
		Mustard	3.4	2.2	1625
		Chickpea	17.4	17.8	1124
		Brinjal	2.9	51.9	18200
		Okra	2.1	17.5	8390
		Cucurbitaceous	1.3	17.6	14150
		Onion	1.3	31.6	24269
		Tomato	1.2	27.8	23650
		Clusterbean	1.5	9.3	612
		Isabgul	1.0	1.2	1200
Chilli	1.2	2.3	1950		
2.	Cotton based cropping system	Cotton-irrigated	202.3	204.4	1052
		Summer sesame	2.2	1.1	495
		Summer groundnut	0.8	1.5	1875
3.	Horticulture fruit crop	Ber	1.5	16.8	11350

		Acid lime	1.1	14.6	12850
--	--	-----------	-----	------	-------

Source: District Panchayat reports, Agriculture department (2012-13 to 2015-16) and Director of Horticulture Department, (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
1.	Cumin	-	55.8	-	33.7
2.	Wheat	2.7	10.1	-	6.3
3.	Fennel	-	10.0	-	6.6
4.	Coriander	-	3.5	-	2.4
5.	Mustard	-	1.4	-	1.0
6.	Chickpea	13.7	3.0	-	0.7
7.	Chili	-	0.8	-	0.4
8.	Cotton-irrigated	-	131.3	-	71.0
9.	Summer sesame	-	-	-	2.2
10.	Summer groundnut	-	-	-	0.8
11.	Ber	-	0.9	-	0.6
12.	Acid lime	-	0.7	-	0.4
13.	Brinjal	-	1.7	-	1.2
14.	Okra	-	1.3	-	0.8
15.	Cluster bean	-	0.9	-	0.6
16.	Cucurbitaceous	-	0.8	-	0.5
17.	Onion	-	0.8	-	0.5
18.	Tomato	-	0.7	-	0.5
19.	Isabgul	-	0.6	-	0.4

Source: District Irrigation Plan, PMKSY, 2016

3. Sowing window information

Sr. No.	Soil type	Cropping system	Crop name	Optimum sowing window (Please mention along with week i.e., 2 nd week of Oct-4 th week of Nov/etc.)
1.	Medium black soils	Groundnut/pearl millet/sorghum and sesame based cropping system	Cumin	2 nd week of Nov. to 4 th week of Nov.
			Wheat	2 nd week of Nov. to 4 th week of Nov.
			Fennel	2 nd week of Oct. to 3 rd week of Oct.
			Coriander	2 nd week of Nov. to 4 th week of Nov.
			Mustard	1 st week of Oct. to 1 st week of Nov.
			Chickpea	2 nd week of Nov. to 4 th week of Nov.
			Onion	2 nd week of Nov. to 4 th week of Nov.
			Brinjal	2 nd week of Aug. to 2 nd week of Sept.
			Tomato	2 nd week of Aug. to 2 nd week of Sept.
			Okra(Summer)	2 nd week of Feb. to 2 nd week March
			Sesame(Summer)	3 rd week of Feb. to 4 th week of Feb.
			Groundnut(Summer)	3 rd week of Jan. to 2 nd week of Feb.
			Clusterbean-Summer	2 nd week of Feb. to 2 nd week March
			Isabgul-	2 nd week of Nov. to 4 th week of Nov.
Chilli-Summer	2 nd week of Dec. to 2 nd week Jan.			
2.	Sandy soils	Groundnut/pearl millet/sorghum and sesame based cropping system	Cumin	2 nd week of Nov. to 4 th week of Nov.
			Wheat	2 nd week of Nov. to 4 th week of Nov.
			Fennel	2 nd week of Oct. to 3 rd week of Oct.
			Mustard	1 st week of Oct. to 1 st week of Nov.
			Onion	2 nd week of Nov. to 4 th week of Nov.
			Brinjal	2 nd week of Aug. to 2 nd week of Sept.
			Tomato	2 nd week of Aug. to 2 nd week of Sept.
			Okra(Summer)	2 nd week of Feb. to 2 nd week March
			Sesame(Summer)	3 rd week of Feb. to 4 th week of Feb.
			Groundnut(Summer)	3 rd week of Jan. to 2 nd week of Feb.
			3.	Saline-alkali black soils (Heavy texture)
Wheat	2 nd week of Nov. to 4 th week of Nov.			
Coriander	2 nd week of Nov. to 4 th week of Nov.			
Mustard	1 st week of Oct. to 1 st week of Nov.			
Chickpea	2 nd week of Nov. to 4 th week of Nov.			

4. Contingency measures Field crops

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

(a) Excess residual moisture

Sr. No.	Soil type	Cropping system	Crop name	Sowing Window	Variety	Management practices
1.	Saline-alkali black boils (Heavy texture-Limbdi taluka)	Chickpea rainfed	Chickpea	2 nd week of Nov. to 4 th week of Nov.	GG-1,2, GJG-3	<ul style="list-style-type: none"> Adopt surface drainage or Delay sowing upto 1 week Sowing at optimum moisture
2.		Wheat durum rainfed	Wheat	2 nd week of Nov. to 4 th week of Nov.	GW-1,2 and Arnej-206	<ul style="list-style-type: none"> Adopt surface drainage or Delay sowing upto 1 week Sowing at optimum moisture

(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.	Saline-alkali black soils (Heavy texture-Limbdi taluka)	Chickpea rainfed	Chickpea	1 st week of Nov. to 2 nd week of Nov.	GG-1,2, GJG-3	<ul style="list-style-type: none"> Adopt organic mulch/crop residues Weeding & optimum plant stand
		Wheat durum	Wheat	1 st week of Nov. to 2 nd week of Nov.	GW-1,2 and Arnej-206	<ul style="list-style-type: none"> Adopt organic mulch/crop residue Weeding & optimum plant stand
		Sorghum Fodder rainfed	Sorghum Fodder	1 st week of Nov. to 2 nd week of Nov.	Gundhari, GFS-3, GAFS-11, CSV-21F	<ul style="list-style-type: none"> Adopt organic mulch/crop residue. Weeding & optimum plant stand

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

Sr.No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
1	Saline-alkali black boils (Heavy texture-Limbdi taluka)	Chickpea rainfed	Chickpea	1 st week of Nov. to 2 nd week of Nov.	GG-1, 2, GJG-3	<ul style="list-style-type: none"> Should not be sown. Adopt sorghum in place of chickpea as fodder crop.
		Wheat durum rainfed	Wheat	1 st week of Nov. to 2 nd week of Nov.	GW-1, 2 and Arnej-206	<ul style="list-style-type: none"> Should not be sown. Adopt Sorghum in place of durum wheat as fodder crop
		Sorghum Fodder rainfed	Sorghum Fodder	Sep. 2 nd week to Oct. 2 nd week	Gundhari, GFS-3, GAFS-11, CSV-21F, S-1049	<ul style="list-style-type: none"> Adopt organic mulch/crop residue. Don't feed as green fodder. Weeding & optimum plant stand

4.2 For crops grown with groundwater

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

Note: Harvesting of excess rainfall water to be carried out during monsoon for *rabi* season

Sr. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
1.	Medium black soils	Groundnut/pearl millet/ sorghum/ sesame based cropping system	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.
			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.
			Fennel	2 nd week of Oct. to 3 rd week of Oct.	Guj. Fennel 1 & 2	<ul style="list-style-type: none"> Adopt recommended agronomic and irrigation practices Earthening up at knee height to provide support Do not over irrigate and also do not use over dose of fertilizer to prevent oozing of sticky gum like liquid.
			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.
			Mustard	1 st week of Oct. to 3 rd week of Oct.	Guj. Mustard-1, 2,3,4	<ul style="list-style-type: none"> Adopt recommended agronomic practices Sowing after presowing irrigation at appropriate vapsa condition for better germination Spray imidacloprid 17.8 % EC (5 ml /10lit. water) and hexaconazole 5 % EC (10 ml/10 lit. water) for control of aphid and to prevent PM disease infestation.
			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).

Sr. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
			Sorghum	1 st week of Oct. to 3 rd week of Nov.	Gundhari, S-1049, CSV-15, CSV21F, GFS-3	<ul style="list-style-type: none"> Adopt recommended agronomic practices Spray imidacloprid 17.8 % EC (5 ml /10lit. water) to prevent shoot fly damage
			Sesame (Summer)	3 rd week of Feb. to 4 th week of Feb.	GT-2,3,4,5	<ul style="list-style-type: none"> Adopt recommended agronomic practices
			Groundnut (Summer)	3 rd week of Jan. to 2 nd week of Feb.	GG-2, GJG-31, GG-6, TAG-24, TG-37 A	<ul style="list-style-type: none"> Adopt recommended agronomic practices
			Pearl millet (Summer)	3 rd week of Jan. to 2 nd week of Feb.	GHB-538, 732, and Govt. approved Hybrids	<ul style="list-style-type: none"> Adopt recommended agronomic practices
2.	Sandy soils	Groundnut/pearl millet/ sorghum/ sesame based cropping system	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 g/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.
			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.
			Coriander	1 st week of Nov. to 4 th week of Nov.	Guj. Coriander-1, 2 and 3	<ul style="list-style-type: none"> Adopt recommended agronomic practices and apply control irrigation Spray profenofos 20 % EC 10 ml and mexaconazole 5 % EC (10 ml/10 lit. water) for control of thrips and to prevent PM disease infestation.

Sr. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
			Mustard	1 st week of Oct. to 3 rd week of Oct.	Guj. Mustard-1, 2,3,4	<ul style="list-style-type: none"> • Sowing after presowing irrigation at appropriate vapsa condition for better germination • Spray imidacloprid 17.8 % EC (5 ml /10 lit. water) and hexaconazole 5 % EC (10 ml/10 lit. water) for control of aphid and to prevent PM disease infestation.
			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).
			Sorghum	1 st week of Oct. to 3 rd week of Nov.	Gundhari, S-1049 CSV-15, CSV 21F, GFS-3	<ul style="list-style-type: none"> • Adopt recommended agronomic practices • Spray imidacloprid 17.8 % EC (5 ml /10 lit. water) to prevent shoot fly damage
			Sesame (Summer)	3 rd week of Feb. to 4 th week of Feb.	GT-2,3,4,5	<ul style="list-style-type: none"> • Adopt recommended agronomic practices
			Groundnut (Summer)	3 rd week of Jan. to 2 nd week of Feb.	GG-2, GJG-31, GG-6, TAG-24, TG-37 A	<ul style="list-style-type: none"> • Adopt recommended agronomic practices
			Pearl millet (Summer)	3 rd week of Jan. to 2 nd week of Feb.	GHB-538, 732, and Govt. approved Hybrids	<ul style="list-style-type: none"> • Adopt recommended agronomic practices

(b) Normal rainfall:

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
1.	Medium black soils	Groundnut/Pearl millet/ Sorghum/ sesame based cropping	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.
			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.
			Fennel	2 nd week of Oct. to 4 th week of Oct.	Guj. Fennel 1 & 2	<ul style="list-style-type: none"> Adopt recommended agronomic and irrigation practices Earthening up at knee height to provide support Do not over irrigate and also do not use over dose of fertilizer to prevent oozing of sticky gum like liquid.
			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.
			Mustard	1 st week of Oct. to 3 rd week of Oct.	Guj. Mustard-1, 2,3,4	<ul style="list-style-type: none"> Adopt recommended agronomic practices Sowing after presowing irrigation at appropriate vapsa condition for better germination Spray imidacloprid 17.8 % EC (5 ml /10 lit. water) and hexaconazole 5 % EC (10 ml/10 lit. water) for control of aphid and to prevent PM disease infestation.
			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).
			Sorghum	1 st week of Oct. to 3 rd week of Nov.	Gundhari, S-1049 CSV-15, CSV 21F, GFS-3	<ul style="list-style-type: none"> Adopt recommended agronomic practices Spray imidacloprid 17.8 % EC (5 ml /10lit. water) to prevent shoot fly damage

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
			Sesame (Summer)	3 rd week of Feb. to 4 th week of Feb.	GT-2,3,4,5	• Adopt recommended agronomic practices
			Groundnut (Summer)	3 rd week of Jan. to 2 nd week of Feb.	GG-2,GJG-31, GG-6,TAG-24, TG-37A	• Adopt recommended agronomic practices
			Pearl millet (Summer)	3 rd week of Jan. to 2 nd week of Feb.	GHB-538, 732, and Govt. approved Hybrids	• Adopt recommended agronomic practices
2.	Sandy soils	Groundnut/ Pearl millet/ Sorghum/ sesame based cropping	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 g/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.
			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.
			Coriander	2 nd week of Nov. to 4 th week of Nov.	Guj. Coriander- 1, 2 and 3	<ul style="list-style-type: none"> • Adopt recommended agronomic practices and apply control irrigation • Spray profenofos 20 % EC 10 ml and mexaconazole 5 % EC (10 ml/10 lit. water) for control of thrips and to prevent PM disease infestation.
			Mustard	1 st week of Oct. to 3 rd week of Oct.	Guj. Mustard-1, 2,3,4	<ul style="list-style-type: none"> • Sowing after presowing irrigation at appropriate vapsa condition for better germination • Spray imidacloprid 17.8 % EC (5 ml /10 lit. water) and hexaconazole 5 % EC (10 ml/10 lit. water) for control of aphid and to prevent PM disease infestation.

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).
			Sorghum	1 st week of Oct. to 3 rd week of Nov.	Gundhari, S-1049 CSV-15, CSV 21F, GFS-3	<ul style="list-style-type: none"> • Adopt recommended agronomic practices • Spray imidacloprid 17.8 % EC (5 ml /10 lit. water) to prevent shoot fly damage
			Sesame (Summer)	3 rd week of Feb. to 4 th week of Feb.	GT-2,3,4,5	<ul style="list-style-type: none"> • Adopt recommended agronomic practices
			Groundnut (Summer)	3 rd week of Jan. to 2 nd week of Feb.	GG-2, GJG-31, GG-6, TAG-24, TG-37 A	<ul style="list-style-type: none"> • Adopt recommended agronomic practices
			Pearl millet (Summer)	3 rd week of Jan. to 2 nd week of Feb.	GHB-538, 732, and Govt. approved Hybrids	<ul style="list-style-type: none"> • Adopt recommended agronomic 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/pearl millet/ sorghum/ sesame based cropping	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
			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

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
			Fennel	3 rd of week of Oct. to 2 nd week of Oct.	Guj. Fennel 1 & 2	<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 • Earthening up at knee height to provide support • Do not over irrigate and also do not use over dose of fertilizer to prevent oozing sticky gum like liquid.
			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
			Mustard	1 st week of Oct. to 3 rd week of Oct.	Guj. Mustard- 1,2,3,4	<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 • Irrigate at critical stages only. • Give irrigation during night time to reduce transpiration
			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 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
			Sorghum	1 st week of Oct. to 3 rd week of Nov.	Gundhari, S-1049 CSV-15, CSV 21F, GFS-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.

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
		By canal	Sesame (Summer)	3 rd week of Feb. to 4 th week of Feb.	GT-2,3,4,5	<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.
			Groundnut (Summer)	3 rd week of Jan. to 2 nd week of Feb.	GG-2, GJG-31, GG-6, TAG-24, TG-37A	<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.
			Pearl millet (Summer)	3 rd week of Jan. to 2 nd week of Feb.	GHB-538, 732, and Govt. approved Hybrids	<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.
2.	Sandy soils	Groundnut/Pearl millet/ Sorghum/ sesame based cropping	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
			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
			Coriander	1 st week of Nov. to 2 nd week of Nov.	Guj. Coriander- 1, 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. • Give irrigation during night time to reduce transpiration
			Sorghum	1 st week of Oct. to 3 rd week of Nov.	Gundhari, S-1049 CSV-15, CSV 21F, GFS-3	<ul style="list-style-type: none"> • Adopt management practices as given in point 4.4(a) plus following practices

(d) Scanty rainfall in *Kharif* season

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
1.	Medium black soils	Groundnut, Pearl millet, Sorghum and sesame based cropping system	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
			Mustard	1 st week of Oct. to 3 rd week of Oct.	Guj. Mustard-1, 2,3,4	<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 • Irrigate at critical stages only. • Thinning of plants • Remove weeds • Irrigate during night • Sowing after pre-sowing irrigation at appropriate vapsa condition for better germination
			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 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

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
			Sorghum	1 st week of Oct. to 3 rd week of Nov.	Gundhari, S-1049 CSV-15, CSV 21F, GFS-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. • Remove weeds • Irrigate during night to reduce transpiration
2.	Sandy soils	Groundnut, Pearl millet, Sorghum and sesame based cropping system	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 • Remove weeds • Irrigate during night to reduce transpiration
			Coriander	1 st week of Nov. to 2 nd week of Nov.	Guj. Coriander-1, 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
			Sorghum	1 st week of Oct. to 3 rd week of Nov.	Gundhari, S-1049 CSV-15, CSV 21F, GFS-3	<ul style="list-style-type: none"> • Adopt management practices as given in point 4.4(a) plus following practices • Remove weeds • Irrigate during night to reduce transpiration

(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.
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/ Coriander	Surface drainage (For management of water logging condition)	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.

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				
Perl millet (semi rabi)	-	-	<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.

4.3 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/ Pearl millet/ Sorghum/ sesame based cropping system	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
			Mustard	1 st week of Oct. to 3 rd week of Oct.	Guj. Mustard-1, 2,3, 4	<ul style="list-style-type: none"> Canal water should be released to irrigate during critical stages only and if the groundwater is available, it should be utilized during later stages.
			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.
			Sorghum	1 st week of Oct. to 3 rd week of Nov.	Gundhari, S-1049 CSV-15, CSV 21F, GFS-3	<ul style="list-style-type: none"> Reduce plant stand use for dry fodder Canal water should be released to irrigate during critical stages only and if the groundwater is available, it should be utilized during later stages.

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
2.	Sandy Soils	Groundnut/ Pearl millet/ Sorghum/ sesame based cropping system	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	1 st 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 or groundwater should be utilized during later stages
			Mustard	1 st week of Oct. to 3 rd week of Oct.	Guj. Mustard-1, 2,3, 4	<ul style="list-style-type: none"> Canal water should be released to irrigate during critical stages only and if the groundwater is available, it should be utilized during later stages.
			Chickpea	1 st week of Oct. to 4 th 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.
			Sorghum	1 st week of Oct. to 3 rd week of Nov.	Gundhari, S-1049 CSV-15, CSV 21F, GFS-3	<ul style="list-style-type: none"> Reduce plant stand use for dry fodder Canal water should be released to irrigate during critical stages only and if the groundwater is available, it should be utilized during later stages.

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 upto 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 upto 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 upto 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 upto 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)

Sr. No.	Crop Name	Specific management practices to be taken up following excess/deficient/scanty rainfall	Time of intervention	Remarks
Existing plantations				
1	Ber	Excess rainfall <ul style="list-style-type: none"> • Use surface drainage system • Spray 0.2% (30 g/10 litre water) wettable sulphur or 0.005 % (10 ml/10 litre water) hexaconazole for protection against powdery mildew • Add gypsum @ 1-2 kg/plant 	June to September November to January June to September	<ul style="list-style-type: none"> • Adopt surface drainage in case of excess rainfall.
		Deficient/scanty rainfall: <ul style="list-style-type: none"> • Use of MIS • Use mulching • Use subsurface drip irrigation if possible 	December to February	
2	Acid lime	Excess rainfall <ul style="list-style-type: none"> • Use surface drainage system • Spray 0.2% (30 g/10 litre water) wettable sulphur or 0.005 % (10 ml/10 litre water) hexaconazole for protection against powdery mildew • Add gypsum @ 1-2 kg/plant 	June to September November to January June to September	<ul style="list-style-type: none"> • Adopt surface drainage in case of excess rainfall.
		Deficient/scanty rainfall: <ul style="list-style-type: none"> • Use of MIS and Use mulching • Use subsurface drip irrigation if possible 	October to May	
3	Pomegranate	Excess rainfall <ul style="list-style-type: none"> • use surface drainage system • Spray 0.2% (30 g/10 litre water) wettable sulphur or 0.005 % (10 ml/10 litre water) hexaconazole for protection against powdery mildew • Add gypsum @ 1-2 kg/plant 	June to September November to January June to September	<ul style="list-style-type: none"> • Adopt surface drainage in case of excess rainfall.
		Deficient/scanty rainfall: <ul style="list-style-type: none"> • Use of MIS • Use mulching • Use subsurface drip irrigation if possible 	October to May	

Sr. No.	Crop Name	Specific management practices to be taken up following excess/deficient/scanty rainfall	Time of intervention	Remarks
New plantations				
	Ber (Umran, Gola, Sev, Ajmeri)	Excess rainfall: <ul style="list-style-type: none"> • Provide proper drainage, • Provide staking • Earthing up near stem • Add gypsum @ 1-2 kg/plant • Drenching of carbendazim (10 g/10 lit. water) • Forking the soil 	June to September	• Adopt surface drainage in case of excess rainfall.
		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	-
	Acid lime (kagzi, Rangpur)	Excess rainfall: <ul style="list-style-type: none"> • Provide proper drainage, • Provide staking • Earthing up near stem • Add gypsum @ 1-2 kg/plant • Drenching of carbendazim (10 g/10 lit. water) • Forking the soil 	June to September	• Adopt surface drainage in case of excess rainfall.
		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	-
	Pomegranate (Ganesh, Bhagva, Sinduri, Rubi, Mrudula)	Excess rainfall: <ul style="list-style-type: none"> • Provide proper drainage, • Provide staking • Earthing up near stem • Add gypsum @ 1-2 kg/plant • Drenching of carbendazim (10 g/10 lit. water) • Forking the soil 	June to September	• Adopt surface drainage in case of excess rainfall.
		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	-

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 	June 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.	Brinjal (JBGR-1, GLB-2, GJB-2,3, GJLB-4, GABH-3, 4)	Excess rainfall		
		<ul style="list-style-type: none"> • Provide drainage • Delay in nursery raising 	July to August	<ul style="list-style-type: none"> • Use surface drainage system • Raise nursery on raised bed or broad bed and furrow
		Deficient/scanty rainfall		
		<ul style="list-style-type: none"> • Use micro irrigation with plastic mulch and /or place the drip system to subsurface • Alternate furrow irrigation 	September to March	<ul style="list-style-type: none"> • Apply irrigation through MIS with mulch • Give irrigation during night time to reduce transpiration • Apply irrigation in alternate furrow with rotation • Soil amendments, and/or reduced tillage.
3.	Tomato (GT-1, 2, Anand Tomato -3, Junagadh Tomato-3, Pusha Rubi and Govt. approved hybrids)	Excess rainfall		
		<ul style="list-style-type: none"> • Provide drainage 	June to September	<ul style="list-style-type: none"> • Use raised bed or broad bed and furrow system • Manage soil for better 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 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
4.	Okra(GO-3, GJO-3, GJOH-2, 3, 4, GAO-5)	Excess rainfall		
		<ul style="list-style-type: none"> Provide drainage 	June 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 	January to May	<ul style="list-style-type: none"> Apply irrigation through MIS with mulch Give irrigation during night time to reduce transpiration Apply irrigation in alternate furrow with rotation Soil amendments, and/or reduced tillage.
5.	Cucurbits Gourd:- (Aanad-1) Cucumber: (Gujarat cucumber-1) Sponge Gourd: GSG-1, GJSG-2 Ridge gourd :(GARG-1, GJRGH-1)	Excess rainfall		
		<ul style="list-style-type: none"> Provide drainage Avoid planting low areas of the field where water may collect. 	June to September	<ul style="list-style-type: none"> Avoid planting in low land areas of the field where water may collect. Manage soil for good drainage, Use subsoiler or vertical tillage to break up compacted layers.
		Deficient/scanty rainfall		
		<ul style="list-style-type: none"> Adoption of MIS and mulching 	January to May	<ul style="list-style-type: none"> Apply irrigation through MIS with mulch Give irrigation during night time to reduce transpiration 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.	Groundnut Summer	Germination	< 17 ⁰ C	If temperature is below than 17 ⁰ C <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 loosen the soil surface.
		Vegetative	>35 ⁰ C	<ul style="list-style-type: none"> • Use sprinkler and drip irrigation
		Pegging	>30 ⁰ C	<ul style="list-style-type: none"> • Sprinkler and drip irrigation to reduce temperature • Give light and frequent irrigation
		Pod development	>34 ⁰ C	<ul style="list-style-type: none"> • Sprinkler and drip irrigation • Give light and frequent irrigation
2.	Cotton	Flowering and boll formation	>32 ⁰ C	<ul style="list-style-type: none"> • Drip irrigation • Straw mulching • Give frequent irrigation.
		Boll maturity	>38 ⁰ C	<ul style="list-style-type: none"> • Use drip irrigation • Straw mulching • Give frequent irrigation.
3.	Sesame summer	Germination	< 15 ⁰ C not suitable for germination	<ul style="list-style-type: none"> • Delay sowing.
		Growth and develop.	>30 ⁰ C	<ul style="list-style-type: none"> • Light and frequent irrigation.
		Flower dropping and pollination	>35 ⁰ C	<ul style="list-style-type: none"> • Light and frequent irrigation
4.	Pearl millet Semi rabi	Germination	<20 ⁰ C	<ul style="list-style-type: none"> • Early sowing (Second wk of Sept.)
		Crop growth	>33 ⁰ C	<ul style="list-style-type: none"> • Light and frequent irrigation
5.	Wheat	Germination	>25 ⁰ C	<ul style="list-style-type: none"> • Delay sowing up to optimum temp(20-25⁰C)
		Anthesis	>22 ⁰ C	<ul style="list-style-type: none"> • Light and frequent irrigation
		Milking stage	>26 ⁰ C	<ul style="list-style-type: none"> • Light and frequent irrigation
		Grain filling	>30 ⁰ C not suitable	<ul style="list-style-type: none"> • Light and frequent irrigation • Sow early variety Lok-1 and prefer early maturing variety GW-173

Sr. No.	Crop name	Stage of crop growth	Threshold temperature	Suggested management practices
				and GW 11 in late sowing to avoid of high temp.
		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
6.	Onion	Bulb develop.	>32 °C	<ul style="list-style-type: none"> • MIS irrigation • Frequent light irrigation
7.	Tomato	Flowering	>32 °C	<ul style="list-style-type: none"> • Use of mulch and irrigate the crop with sprinkler
		Fruit set	>35 °C	<ul style="list-style-type: none"> • Use of mulch and irrigate the crop with mini/micro sprinkler
8.	Brinjal	Whole crop period	>35 °C	<ul style="list-style-type: none"> • Drip irrigation • Use of straw/ silver plastic mulch
9.	Chickpea	Germination	>24 °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
10.	Coriander	Germination	>25 °C	<ul style="list-style-type: none"> • Light and frequent Irrigation • Delay sowing.
11.	Cumin	Germination	>22 °C	<ul style="list-style-type: none"> • Light and frequent irrigation • Delay sowing.
12.	Ber	Flowering & fruit setting	< 15 °C Night & > 25 °C Day continuously during 5 days	<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
		Initial fruit development	> 35 °C with higher day-night fluctuation during week or more.	<ul style="list-style-type: none"> • Nutrients & Irrigation. • Mulching • Shelter belts/Wind breaks
13.	Acid lime	Pl. 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.

Sr. No.	Crop name	Stage of crop growth	Threshold temperature	Suggested management practices
				<ul style="list-style-type: none"> 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
		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
14.	Pomegranate	Pl. 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 high for one 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

*ABA-Abcisic acid, **NAA-Naphthalene acetic 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),

8.1 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 Saline alkali soil	Groundnut, sesame based cropping system	Sorghum	Gundari GFS-3, GAFS-11, , CSV-15, CSV-21F	Surface drainage (to control water logging condition)

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

S. No.	Soil type	Cropping system	Fodder name	Variety	Management practices
1.	Medium black and Saline alkali soil	Groundnut, sesame based cropping system	Sorghum	Gundari GFS-3, GAFS-11, , CSV-15, CSV-21F	Surface drainage (to control water logging condition)

(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
-	-	-	-	-	-

(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
-	-	-	-	-	-

8.2 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	Adopt recommended package of agronomic practices
		Lucerne	Anand-2, 3	Adopt recommended package of agronomic practices
		Maize	African tall	Adopt recommended package of agronomic practices
		Grass	Napier, Jinjvo	Adopt recommended package of agronomic practices
2.	Sandy soil	Sorghum	Gundari, GFS-4,5	Adopt recommended package of agronomic practices
		Lucerne	Anand-2, 3	Adopt recommended package of agronomic practices
		Maize	African tall	Adopt recommended package of agronomic practices
		Grass	Napier, Jinjvo	Adopt recommended package of agronomic practices

8.3 Livestock management during severe heat waves

Nutritional management	Shelter management	Health management	Miscellaneous, if any
<ul style="list-style-type: none"> • Feed 25 kg green fodder along with unconventional feed per animal. • Give jaggery water with fenugreek powder. • High energy, high density and low protein diet are beneficial. • Increasing the grain/forage ratio. 	<ul style="list-style-type: none"> • Covered the shelter roof with dry grass.. • 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). 	<ul style="list-style-type: none"> • Spray them with cool water, especially on the legs and feet, or stand them in water • Lay wet clothes over them. • Provide vitamin C through syrup for heat stress management. • Vaccinate animals against infectious diseases. 	<ul style="list-style-type: none"> • Cattle that are heat stressed will show increased respiration rates as they try to cool down themselves. • 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.

8.4 Livestock management during severe cold waves

Nutritional management	Shelter management	Health management	Miscellaneous, if any
<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Operate heaters protect shed by tying gunny bags around shed. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Operate heaters, protect shed by tying gunny bags around shed. • Protect animals from direct cold waves. • Cover animal under insurance.