CONTINGENCY PLANS FOR RABI AND SUMMER CROPS

District: Porbandar Gujarat State

1. Rainfall Information(Average of 10 year-2004-5 to 2015-16)

		Oct – Dec	Jan – Mar
(a)	Normal rainfall during *Rabi* season:(mm)	0	0
(b)	Number of rainy days :Nos.	0	0

2. Rabi and summer crops cultivated

2a Area Production statistics (2011-12 to 2014-15)

S. No	Cropping System	Crop name	Area '000 ha	Production '000 t	Productivity Kg/ha
1	Groundnut based cropping system	Wheat	20.7	64.7	3119
		Sesame-summer	2.4	1.2	493
		Cumin	17.5	12.1	693
		Coriander	15.5	25.3	1630
		Green gram	2.9	1.3	452
		Onion	0.2	5.4	27000
		Brinjal	0.25	4.3	17400
2	Rainfed system	Chickpea	10.6	13.7	1289
		Sorghum	9.0	9.6	1067
3	Horticulture -fruit & plantation crops	Mango	0.28	2.17	7740
		Coconut	0.69	5900 ('000 nuts)	8550 nuts

(Source: Reports of Porbandar District Panchayat, Department of Agriculture and Horticulture, Government of Gujarat 2016)

Note: Other horticultural crops (vegetable & spices) showing last three years data and fruit crops shows the data of 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	Wheat	-	20.7	-	-
2	Cumin	-	17.5	-	-
3	Coriander	-	15.5	-	-
4	Chickpea	10.6	-	-	-
5	Sorghum	9.0	-	-	-
6	Sesame	-	2.4	-	-
7	Green gram	-	2.9	-	-
8	Onion	-	0.2	-	-
9	Brinjal	-	0.25	-	-

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

3. Sowing window information

S. No.	Soil type	Cropping system	Crop name	Optimum sowing window (Please mention along with week i.e., 2nd week of Oct to 4th week of Nov/etc.)
1	Shallow to medium black	Groundnut based cropping system	Wheat	2nd week of Nov to 4th week of Nov
			Cumin	2nd week of Nov to 4th week of Nov
			Coriander	2nd week of Nov to 4th week of Nov
			Sesame	2nd week of Feb to 4th week of Feb
			Green gram	2nd week of Feb to 4th week of Feb
			Onion	Nov.2ndweek to Nov.4thweek
			Brinjal	Aug. 1st week to Sep. 2nd week
		Cotton based cropping system	Sesame	2nd week of Feb to 4th week of Feb
2	Deep black soil	Chickpea/Sorghum on conserved moisture	Chickpea	2nd week of Nov to 4th week of Nov
			Sorghum	2nd week of Sep to 2nd week of Oct

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	Deep black (Ghed)	Sorghum	Sorghum	Sep. 2nd week to Oct. 2nd week	Gundhari, GFS-3, GAFS-11, CSV-21F	• Recommended package of practices
		Chickpea rainfed	Chickpea	Nov.2nd week to Nov.4th week	GG-1,2, GJG-3	• 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 time	Variety	Management practices
1	Deep black (Ghed)	Sorghum	Sorghum	Sep. 2nd week to Oct. 2nd week	Gundhari, GFS-3, GAFS-11, CSV-21F	• Plant thinning • Adopt organic mulch/crop residue.
		Chickpea	Chickpea	Oct.3rd week to Nov.1st week	GG-2	• Inter culturing with blade harrow • Spray 1 % N through urea.

(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 time	Variety	Management practices
	Deep black soil (*Ghed*)	Sorghum Fodder rainfed	Sorghum Fodder	Sep.2nd week to Oct.2nd week	Gundhari, GFS-3, GAFS-11, CSV-21F	• Adopt organic mulch/crop residue. • Plant thinning • Don't feed as green fodder. • Weeding & optimum plant stand

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	Shallow to medium black	Groundnut based cropping system	Wheat	2nd week of Nov-4th week of Nov	GW-451,GJW-463, GW-496, GW-366 Lok-1	• 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	Nov.2nd week to Nov.4th week	GC-2,3	• 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.
			Cumin	Nov.2nd week to Nov.4th week	GC-3, GC-4	• 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.
			Sesame (Summer)	Feb.3rd week to Feb.4th week	GT-2, 3,5	Adopt recommended package practices
			Green gram	Feb.3rd week to Feb.4th week	GM-4	Adopt recommended package of practices
		Cotton based cropping system	Sesame	2nd week of Feb-4th week of Feb	GT-2, 3, 5	Adopt recommended package of practices
2	Deep black (Ghed)	Chickpea/Sorghum on conserved moisture	Chickpea	Nov.2nd week to Nov.4th week	GG-2,3, GJG-5,	• 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	Sep. 2nd week to Oct. 2nd week	Gundhari,GFS-3, GAFS-11, CSV-21F	Adopt recommended package of practices

(b) Normal rainfall

S.No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
1	Shallow to medium black	Groundnut based cropping system	Wheat	2nd week of Nov-4th week of Nov	GW-451,GJW-463, GW-496, GW-366, Lok-1	• 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	Nov.2nd week to Nov.4th week	GC-2,3	• 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, respectively at 10-12 days interval.
			Cumin	Nov.2nd week to Nov.4th week	GC-3, GC-4	• 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, respectively 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.
			Sesame (Summer)	Feb.3rd week to Feb.4th week	GT-2, 3,5	Adopt recommended package practices
			Green gram	Feb.3rd week to Feb.4th week	GM-4	Adopt recommended package of practices
		Cotton based cropping system	Sesame	2nd week of Feb-4th week of Feb	GT-2, 3, 5	Adopt recommended package of practices
2	Deep black (Ghed)	Chickpea/Sorghum on conserved moisture	Chickpea	Nov.2nd week to Nov.4th week	GG-2,3, GJG-5,	• 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	Sep. 2nd week to Oct. 2nd week	Gundhari, GFS-3, GAFS-11, CSV-21F	Adopt recommended package of practices

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

S. No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
1	Shallow to medium black	Groundnut based cropping system	Wheat	Nov.2nd week to Nov.3rd week	GW-451,GJW-463, GW-496, GW-366, Lok-1, KRL-19	• Adopt management practices as given in point 4.4(a) plus following practices. • Use MIS irrigation system • Irrigate during critical stages only. • Give irrigation during night time to reduce transpiration
			Coriander	Nov.2nd week to Nov.3rd week	GC-2, 3	• Adopt management practices as given in point 4.4(a) plus following practices. • Adopt MIS with organic mulching • Irrigate during critical stages only. • Give irrigation during night time to reduce transpiration
			Cumin	Nov.2ndweek to Nov.3rd week	GC-3, GC-4	• Adopt management practices as given in point 4.4(a) plus following practices. • Use MIS irrigation system and irrigate upto flowering stage only. • Give irrigation during night time to reduce transpiration
			Sesame (Summer)	-	-	• Avoid summer crop sowing
			Green gram	-	-	• Avoid summer crop sowing
		Cotton based cropping system	Sesame	-	-	• Avoid summer crop sowing
2	Deep black (Ghed)	Chickpea/Sorghum on conserved moisture	Chickpea	Nov.2nd week to Nov.4th week	GG-2,3, GJG-5,	• 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	Sep. 2nd week to Oct. 2nd week	Gundhari, GFS-3, GAFS-11, CSV-21F	Adopt recommended package of practices

(d) Scanty rainfall in *Kharif* season

S.No.	Soil type	Cropping system	Crop name	Sowing time	Variety	Management practices
1	Shallow to medium black	Groundnut based cropping system	Coriander	Nov.2nd week to Nov.3rd week	GC-2, 3	• Adopt management practices as given in point 4.4(a) plus following practices. • Thinning of plants and sell as green coriander • Use of Drip irrigation system • Irrigation during critical stages. • Give irrigation during night time to reduce transpiration
			Cumin	Nov.2nd week to Nov.3rd week	GC-3, 4	• Adopt management practices as given in point 4.4(a) plus following practices. • Use drip irrigation system and irrigate upto flowering stage only. • Give irrigation during night time to reduce transpiration
			Chickpea	Nov.2nd week to Nov.3rd week	GG-1, GJG-3	• Adopt management practices as given in point 4.4(a) plus following practices. • Irrigate at branching stage. • If two irrigations are possible, irrigate during branching and pod development stages only. • Give irrigation during night time to reduce transpiration
			Sesame (Summer)	-	-	• Avoid summer crop sowing
			Green gram	-	-	• Avoid summer crop sowing
		Cotton based cropping system	Sesame	-	-	• Avoid summer crop sowing
2	Deep black (Ghed)	Chickpea/Sorghum on conserved moisture	Chickpea	Nov.2nd week to Nov.4th week	GG-2,3, GJG-5,	• 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	Sep. 2nd week to Oct. 2nd week	Gundhari, GFS-3, GAFS-11, CSV-21F	Adopt recommended package of practices

e) Management practices for unseasonal rains

Condition	Management practices to be adopted			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post-harvest**
Wheat	-	-	• Surface drainage (for management of water logging, lodging crop and black point in grain. spray mancozeb 0.2% (27g/ 10 lit. water)	• Protect product with plastic sheet (100µ 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	Surface drainage (For management of water logging condition)	Surface drainage for management of water logging	• Surface drainage (for management of water logging crop • Spray 0.2%% (30g/ 10 lit. water) wettablesulpher for protection against powdery mildew disease	• 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	Surface drainage (For management of water logging condition)	Surface drainage for management of water logging	• Surface drainage (for management of water logging crop • To control cumin blight)spray mancozeb 0.2%% (27g/ 10 lit. water) • Spray 0.2% % (30g/ 10 lit. water)wettablesulpher for protection against powdery mildew disease	• 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)	-	-	• Quick surface drainage, open channel around field.	• Protect product with plastic sheet (100 µ UV stabilized colour plastic) or shift produces to farm shed • Protection against pest/disease damage in storage • Preparation for quick drying technique • Separate good and bad lot.

Condition	Management practices to be adopted			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post-harvest**
Chickpea	-	-	• Provide drainage, harvest immediately after drying	• 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.
Sorghum	-	-	Provide drainage Harvest immediately after drying	• 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 window	Variety	Management practices
NA						

b. Delayed release of water: NA

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	Mango	**Excess rainfall**		
		• Provide surface drainage • Add gypsum 1-2 kg per plant	June to September	
		• Spray 0.2% (30 g/10 litre water) wettable sulphur or 0.005 % (10 ml/10 litre water) hexaconazole for protection against powdery mildew	December to January	
		Deficient/scanty rainfall		
		• Use of MIS • Use mulching • Use subsurface drip irrigation if possible • Apply of Maurram in soil	December to May Oct. to May	
3	Coconut	**Excess rainfall**		
		-	-	
		Deficient/scanty rainfall		
		• 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	Mango	**Excess rainfall**		
		• 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	
		Deficient/scanty rainfall		
		Adopt drip irrigation system for planting, mulching	-	Apply irrigation through drip with mulch or subsurface drip irrigation in case of last monsoon below normal

Sr. No.	Crop Name	Specific management practices to be taken up following excess/deficient/scanty rainfall	Time of intervention	Remarks
2	Coconut	**Excess rainfall**		
		• Add gypsum 1-2 kg per plant • Drenching of carbendazim @ 1 g/lit. • Forking the soil	-	
		Deficient/scanty rainfall		
		• Use of drip irrigation system • Use mulching • Use subsurface drip irrigation if possible.	-	

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	**Excess rainfall**		
		• Provide drainage • Delay in sowing	June to September	• Raise nursery on raised bed or broad bed and furrow • Manage soil for good drainage
		Deficient/scanty rainfall		
		• Use micro irrigation with plastic mulch	November to February	• Apply irrigation through MIS • Use plastic mulch • Give irrigation during night time to reduce transpiration • Soil amendments, and/or reduced tillage.
2	Brinjal	**Excess rainfall**		
		• Provide drainage • Delay in nursery raising	July to August	• Use surface drainage system • Raise nursery on raised bed or broad bed and furrow
		Deficient/scanty rainfall		
		• Use micro irrigation with plastic mulch and /or place the drip system to subsurface • Alternate furrow irrigation	September to March	• 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

SN	Crop name	Stage of crop growth	Threshold temperature	Suggested management practices
1	2	3	4	5
1	Cotton	Flowering and boll formation	>32 ^{0}C	• Micro irrigation • Straw mulching • Give frequent irrigation.
		Boll maturity	>38 ^{0}C	• Use drip irrigation • Straw mulching • Give frequent irrigation.
2	Wheat	Germination	>25 ^{0}C	• Delay sowing up to optimum temp(20-25 ^{0}C)
		Anthesis	>22 ^{0}C	• Light and frequent irrigation
		Milking stage	>26 ^{0}C	• Light and frequent irrigation
		Dough stage	7-18 ^{0}C suitable 5 to 15 days	• Light and frequent irrigation
		Grain filling	>30 ^{0}C not suitable	• Light and frequent irrigation • Use early sowing variety Lok-1 and prefer early maturing variety GW-173 & GW 11 in late sowing to avoid of high temp.
3	Coriander	Germination	>25^{0}C	• Light and frequent Irrigation • Delay sowing.
4	Cumin	Germination	>22 ^{0}C	• Light and frequent irrigation • Delay sowing.
5	Sesame summer	Germination	< 15 ^{0}C not suitable for germination	• Delay sowing.
		Growth and develop.	>30 ^{0}C	• Light and frequent irrigation.
		Flower dropping and pollination	>35^{0}C	• Light and frequent irrigation
6	Chickpea	Germination	>24^{0}C	• Delay sowing to get optimum temp(15-20 ^{0}C)
		Flowering	>30^{0}C	• Give irrigation • External application of ABA* can protect plant against heat stress
		Pod development	>30^{0}C	• Give irrigation • External application of ABA* can protect plant against heat stress

SN	Crop name	Stage of crop growth	Threshold temperature	Suggested management practices
		Seed development	>30^{0}C	• Give irrigation • External application of ABA can protect plant against heat stress
7	Mango	Flowering & fruit setting	< 15 ^{0}C Night & > 25 ^{0}C Day during 5 days	• 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 ^{0}C with higher day-night fluctuation during week or more.	• Nutrients & Irrigation. • Spray NAA** 20 ppm + 2% urea • Mulching • Shelter belts/Wind breaks
		Maturity stage	35-40 ^{0}C during week or more causing sun burning mostly on western side fruits	• Give frequent irrigation • Mulching • Sod*** culture • Shelter belts/Wind breaks
8	Coconut	Tree growth	>35°C	• Application of lime solution on the trunk up to a height of 2-3 m at the start of the summer season
		Flowering & Fruit setting	<20 ^{0} C & >35°C	• Regular irrigation is recommended during low or high temperature.

Note: 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-Abscisic acid

**NAA-Naphthalene acetic acid

***Sod culture-Green cover on soil by growing fodder or green manure crop to reduce soil temperature

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	Deep black soil	Fodder Crop	Sorghum	Gundhari, GFS-3, GAFS-11, 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	Crop name	Variety	Management practices
1	Deep black soil	Fodder Crop	Sorghum	Gundhari, GFS-3, GAFS-11, CSV-21F	• 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	Deep black soil	Fodder Crop	Sorghum	Gundhari, GFS-3, GAFS-11, CSV-21F	• 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	Deep black soil	Fodder crop	Sorghum	Gundhari, GFS-3, GAFS-11, CSV-21F	• 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

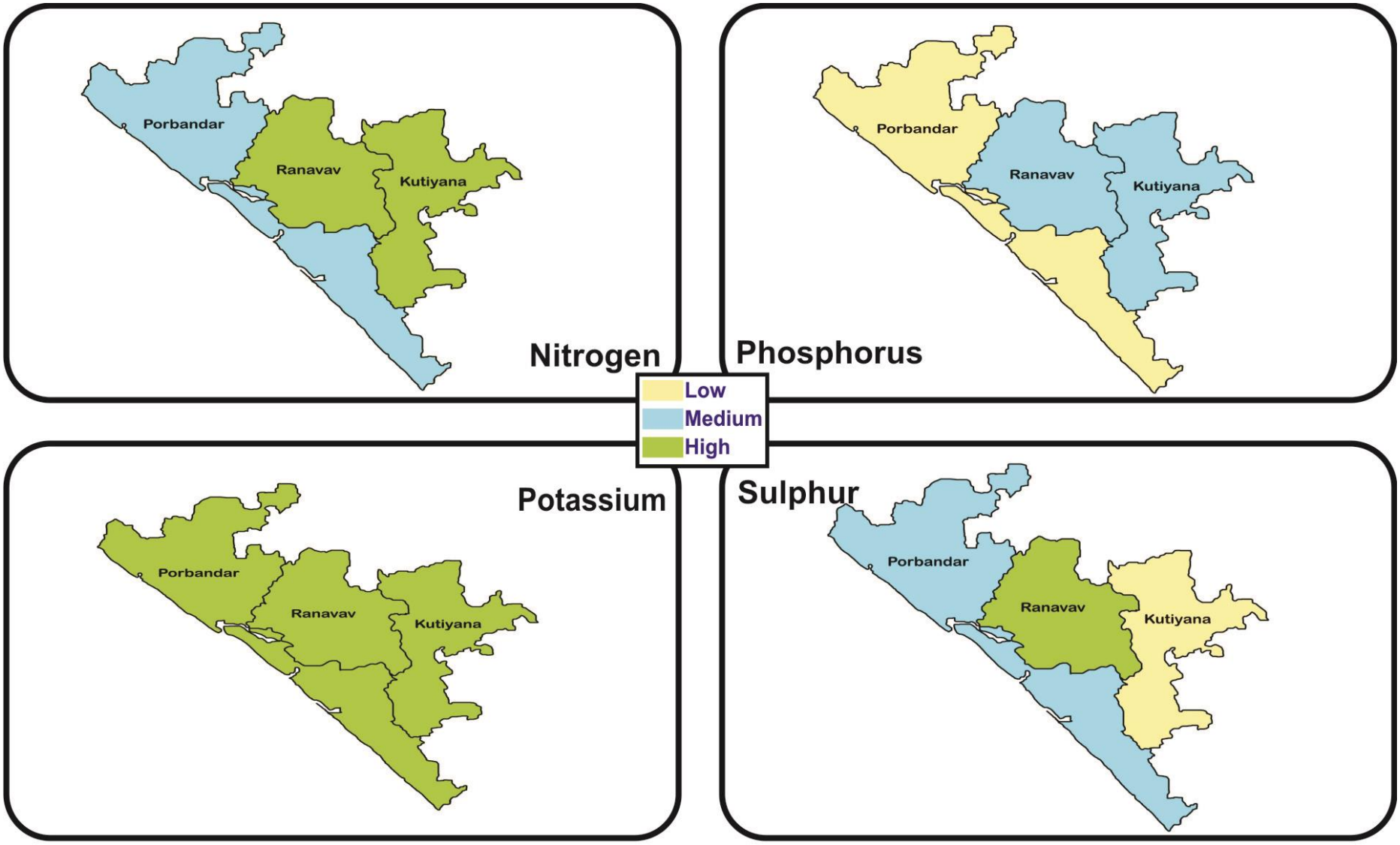
Sr.No.	Soil type	Fodder name	Variety	• Management practices
1	Medium to shallow black soils	Sorghum	Gundhari, GFS-3, GAFS-11, CSV-21F	• Adopt recommended package of agronomic practices
		Lucerne	Anand-2	• Adopt recommended package of agronomic practices
		Grass	Hybrid Napier- CO-3Jinjvo	• Adopt recommended package of agronomic practices
2	Deep black soil	Sorghum	Gundhari, GFS-3, GAFS-11, CSV-21F	• Adopt recommended package of agronomic practices
		Lucerne	Anand-2	• Adopt recommended package of agronomic practices
		Grass	Hybrid Napier- CO-3Jinjvo	• Adopt recommended package of agronomic practices

Livestock management during severe heat waves

Nutritional management	Shelter management	Health management	Miscellaneous, if any
• Feed 25 kg green fodder along withunconventional feed per animal. • Give jaggerywater with fenugreek powder. • High energy density and low protein diet are beneficial. • Increasing the grain/ forage ratio.	• 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).	• Spray them with cool water, especially on the legs and feet, or stand them in water • Lay wet towels over them. • Provide Vitamin C through syrup for heat stress management. • Vaccinate the animals against infectious diseases.	• 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

Livestock management during severe cold waves

Nutritional management	Shelter management	Health management	Miscellaneous, if any
• 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.	• Operate heaters protect shed by tying gunny bags around shed.	• 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.	• Operate heaters, protect shed by tying gunny bags around shed. • Protect animals from direct cold waves. • Cover animal under insurance



Status of major nutrients in soils of Porbandar District