Nanaji Deshmukh Krushi Sanjeevani Prakalp

Strategic Research & Extension Plan (SREP)
Climate Resilient Agriculture Supplement
of
District Nanded

Prepared by

Agricultural Technology Management Agency (ATMA), Nanded

and

Project Management Unit

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INTRODUCTION

The Project on Climate Resilient Agriculture in Maharashtra (PoCRA) is a project of Government of Maharashtra with Partnership of World Bank and the project is implemented in 5220 vulnerable villages in 16 districts of Marathwada, Vidarbha and North Maharashtra. The project development objectives (PDO) is 'to enhance climate resilience and profitability of smallholder farming system in selected districts of Maharashtra'. On the backdrop of frequent droughts affecting the agriculture in the state, the project is focused on enhancing climate resilience at farm level. Climate Resilient Agriculture involves sustainable agricultural practices that enhance productivity, mitigate risks, and reduce greenhouse gas emissions. The farmers can ensure food security in the face of extreme weather events and climate change by adopting climate-resilient agriculture practices. The extension functionary of the Department of Agriculture is mandated to disseminate knowledge and skills about resilient technologies to the farming community. The district-level authority of the Department of Agriculture prepares the strategy for need-based extension with the help of the Agriculture Universities and Krushi Vidnyan Kendras. In order to facilitate this process, the Government of India has directed the states to prepare a Strategic Research and Extension Plan (SREP) at the district level as an integral part of extension reforms under the Agriculture Technology Management Agency (ATMA) initiative.

SREPs are multi-year strategy documents for the dissemination of innovations and the coordinated interaction in the field between State Agricultural Universities (SAU), Regional Research Stations (KVK), district-level agricultural extension services (ATMA) and the farming community. SREPs are developed under the leadership of the Project Director (ATMA), whose responsibility is to bring together researchers, extensionists, farmers and other stakeholders to make, based on joint diagnostic studies, district extension plan and recommendations for expanded adaptive research to introduce innovations in technology dissemination to cater to local needs and situations. The project had taken a conscious decision to review and update the current SREPs to mainstream climate vulnerability and its impact on farming in project districts as well as to explore the potential for strengthening existing value chains with up-to-date market intelligence. This task is accomplished with preparation of climate resilient agriculture supplement as a supportive document to the current SREP of each project district. As per the project agreement between the Government of Maharashtra and the World Bank, the updation of SREPs is considered as one of the project assessment indicators. The document is prepared by the Project Director (ATMA) in consultation with the field functionary of the Department of Agriculture, State Agriculture Universities (SAUs), Krushi Vigyan Kendras (KVKs), Farmers, Farmer Producer Organizations from the district. The SREP supplement contains an account of weather analysis, information about cropping pattern, impact of climate change on crop yields, coping mechanisms adopted by the farmers, adoption level of climate resilient technologies, constraints in marketing of agriculture produce and scope for value chain development. The SREP supplement ends with comprehensive template for Village Adaptation Plan which will act as guide for the Agriculture Assistants who are the cutting edge extension workers. It will be helpful to extension workers while carrying out extension of 'climate resilience technologies.

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Chapter 1: General Profile of the District

1.1 Geographical area and location of the district

Nanded is one of the historical places in Marathwada region of Maharashtra State. It is situated on the north bank of Godavari river. The district of Nanded has between 18^0 15' and 19^0 55' North latitude and 77^0 7'E to 78^0 15' East longitude. The district has a geographical area of 10528 Sq. Kms. The district of Nanded is surrounded in the North by Yeotmal District, in the West by Parbhani, Latur and Osmanabad districts, in the South by Bidur district of Karnataka State and in the East by Nizamabad and Adilabad districts of Telangana.

The district has a geographical area of 10,528 Sq. Km. which forms 3.41% of the total geographical area of Maharashtra State. The district is situated in the Deccan Plateau. The Southern part of the district has light and barren land. The North -Eastern part of Kinwat block is mountainous and largely barren. The remaining part of the district is mostly flat and has fertile black soil

1.2 Tehsils details

The district is divided into 16 tehsils, each encompassing a total of 1552 villages. Some of the notable tehsils in Nanded district include Nanded, Ardhapur, Mudkhed, Kandhar, Loha, Degloor, Mukhed, Biloli, Naigaon, Dharmabad, Kinwat, Mahur, Hadgaon, Himayatnagar, Bhokar, and Umri.

1.3 Demographic Information

A total population of 3,361,292 as per the 2011 Census. Out of this, 17,30,075 were male, while 1,631,217 were female, resulting in a sex ratio of 943 females for every 1000 males. The urban population accounted for 27.2% of the total, amounting to 913,898, while the remaining 72.8% were residents of rural areas, totalling 2,447,394. The district exhibited a population density of 319 individuals per sq. Km. Regarding literacy rates, Nanded displayed an overall literacy rate of 75.45%. The male literacy rate was notably higher at 84.27% compared to the female literacy rate of 66.15%. The district was administratively divided into 8 sub-divisions and comprised a total of 16 t tehsils.

1.4 Annual Average rainfall & Temperature

The district of Nanded, Maharashtra, India, experiences varying levels of annual average rainfall across its tehsil Kinwat received the highest recorded rainfall at 2081 mm, whereas Nanded registered the lowest at 794 mm.

During summer the district experiences extreme heat with the mercury touching 44oC while in the winter the temperature drops to 22.35oC. In tehsil Kandhar record highest temperature 45.63oC and tehsil Achalpur recorded lowest 19.54oC.

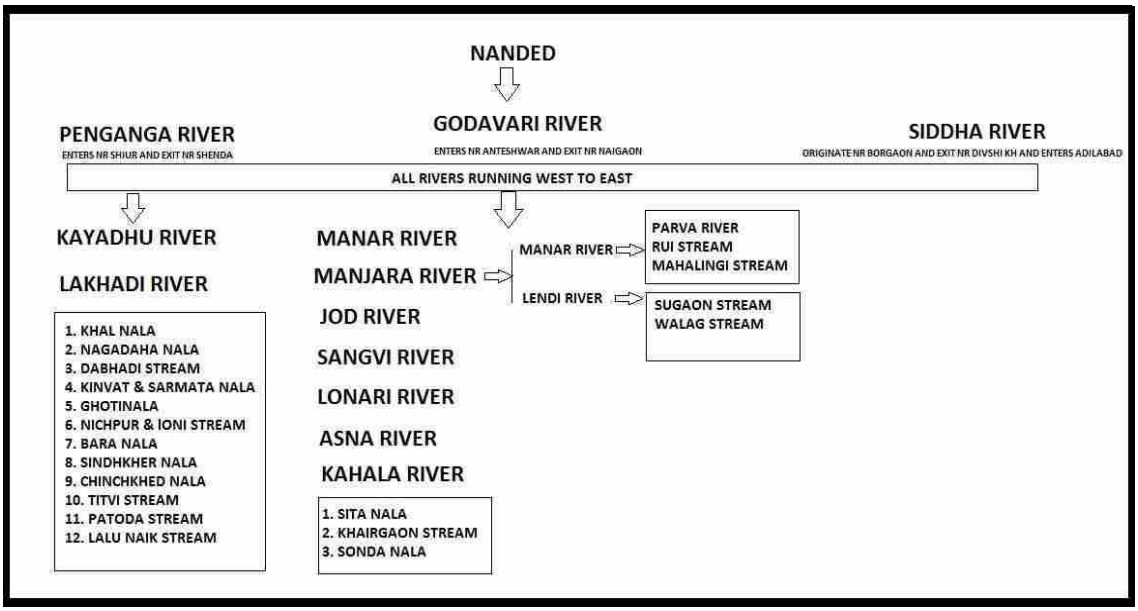
(Source: District survey report, Nanded)

1.5 River Network in the District

The district is situated on plateau's having plain terrain with undulations. The main trend from hills is northwest to southwest. There are three distinct traces of elevation 350 to 570 masl, 570 to 600 masl, and >600 masl. The principal rivers of the district are the Godavari, the Penganga, the Manjara and the Mansar. The river Godavari runs 140 kms and it has three tributaries Asna, Sita, and Siddha in the district. The river Manjara forms the district boundary on south east side for 40 km and has two tributaries viz. Mannar and Lendi. The Penganga river forms northern boundary of the district and flows west to east with a big "S" shape curve. A waterfall of 10-12 m named as a "Sahastrakunda Fall" is situated near Islapur village in Kinwat

taluka and it has two tributaries viz., Kayadhu and Tamsa nala.

Based on geomorphic setting and drainage pattern the basin of the district are divided into 49 watersheds and out of these three watersheds fall in runoff zone , Recharge zone and discharge zone respectively.



1.6 Irrigation Potential of the district

The district has 3 major irrigation projects. They are

(a) Purna Project - covering an area of 20,000 hectares,

(b) Manor Project - covering an area of 23,310 hectares, and

(c) Vishnupuri Project - covering an area of 28,340 hectares.

In addition, there are 10 medium projects and 394 minor irrigation projects and 6620 bore- wells used for irrigation. The total irrigated area in the district is 47,000 hectares, which forms to just 6% of the total cultivated area. This is far below the State's figure of 15.41%. Out of the total irrigated area, 48% of the land was used for cultivation of food grains and 27% for sugarcane.

Irrigation	Area (ha)
Net cultivated area	711.0
Net Irrigated area	121223
Gross irrigated area	125.64
Rainfed area	599

(Source: Perspective plan of Agriculture and Horticulture 2016-17 dist. Nanded)

1.7 Soil formation in the district and type of soil

Major Soils	**Area ('000 ha)**	**Percent (%) of total**
1. Deep black soils	394. 65	36.81
2. Medium deep black soils	101.12	9.43
3. Shallow black soils	576.26	53.75

(Source: NBSS and LUP, Nagpur)

1.8 Agro-Ecological Situations

Sr. No.	**Agro-Ecological Situations (AES)**	**Characteristics of the zone**	**Tehsils Covered**
1	SRZ-I Scarcity Rainfall Zone	Scarce to low rainfall, light to medium black soils, hilly area Rainfed cultivation	Kandhar, Loha, Mukhed, Parts of Degloor Blocks
2	MRZ-II Moderate Rainfall Zone	Moderate Assured to rainfall, medium to heavy black soils, flat & command area	Ardhapur, Mudkhed, Biloli, Naigaon, Dharmabad, Umri Part of Degloor & Bhokar parts of Hadgaon & Himayatnagar
3	MRZ-III Moderately high Rainfall zone	Moderately high Rainfall, light Soils, hilly area	Mahur, Parts of Hadgaon Bhokar, Himayatnagar

(Source: ATMA, SREP 2020-2021 data, Nanded)

Chapter 2: Agriculture Profile of District

2.1 Land use classification of the district

Area in hectare

Tehsils	Area Under Forest	Land not available for Cultivation			Uncultivable Land Other Than Barren Land(ha)	Pasture	Fallow Land		
		Non Agricultural Land (ha)	Barren Uncultivable Land(ha)	Total			Current Fallow	Other Fallow	Total Fallow
1	3	4	5	6	7	8	9	10	11
Mahoor	588	0	717	717	860		3415	100	3515
Kinwat	52872	5338	5803	11141	5546	938	2479	226	2705
Himayatnagar	3529	950	2417	3367	338	938	3141	236	3377
Hadgaon	7499	2020	5136	7156	718	280	6238	459	6697
Ardhapur	542	444	1007	1451	1121	318	2428	224	2652
Nanded	691	567	1280	1847	1431	69	6235	542	6777
Mudkhed	635	521	1181	1702	1314		5149	144	5293
Bhokar	7244	1661	1569	3230	923	1004	4714	214	4928
Umri	5927	1062	1003	2065	590	515	2999	478	3477
Dharmabad	317	349	899	1248	2250	105	6396	549	6945
Biloli	1524	576	1485	2061	3718	669	2948	358	3306
Naigaon (Khairgaon)	1537	591	1524	2115	3815	32	5254	647	5901
Loha	2254	4073	2728	6801	5777	2864	8647	982	9629
Kandhar	2806	2683	2809	5492	1200	1982	5216	874	6090
Mukhed	2852	2243	1875	4118	1631		8059	322	8381
Deglur	931	1263	2210	3473	1229	1358	5269	305	5574
Total	91748	24341	33643	57984	32461	11072	78587	6660	85247

(Source: https://mahasdb.maharashtra.gov.in/SDB_Reports/Nanded/HTML/2010-11_Nanded_DSA_5_1.html)

Net area sown, area sown more than once, gross cropped area and cultivable area

Tehsils	Net Area Sown (ha)	Area Sown More than Once (ha)	Gross Cropped Area (ha)	Cultivable Area (ha)
Mahoor	14159	3146	17305	18165
Kinwat	98967	15855	114822	120368
Himayatnagar	35238	6725	41963	42301
Hadgaon	77531	9530	87061	87779
Ardhapur	22433	4819	27252	28373
Nanded	25449	6242	31691	33122
Mudkhed	24769	4126	28895	30209
Bhokar	46345	6434	52779	53702
Umri	27775	3152	30927	31517
Dharmabad	22544	5170	27714	29964
Biloli	44954	2007	46961	50679
Naigaon (Khairgaon)	42601	7541	50142	53957
Loha	53891	11622	65513	71290
Kandhar	59150	8442	67592	68792
Mukhed	68938	15537	84475	86106
Deglur	54313	7186	61499	62728
Total	719057	117534	836591	869052

(https://mahasdb.maharashtra.gov.in/SDB_Reports/Nanded/HTML/2010-11_Nanded_DSA_5_1.html & SREP ATMA, Nanded)

2.2 Agriculture land holdings

Distribution according to size

Sr. No.	Land holding area (ha)	No. of land holders
1	Marginal (Less than 1 ha)	63947
2	Small (1 to 2 ha)	199838
3	Small Medium (2 to 4 ha)	351648
4	Large (More than 4 to 10 ha)	145837
5	Large (More than 10 ha)	37233
	Total Land Holding	778317

(Source –ATMA, SREP, 2020-202, Nanded)

2.3 Different types of irrigation facilities/water resources available in the district

Area under Different types of Irrigation facilities/water sources available in the district

Sr. No	Sources of Irrigation	Area (Ha.)
1	Well	28552
2	Bore wells	5642
3	Canals	97029
4	Minor Irrigation Area	21950
5	Medium irrigated area	17858
6	Large irrigation area	57221
7	Drip	27480
8	Sprinkler	18850

(Source- DSAO office statistical data, 2022)

2.4 Types of crops grown, cropping pattern

The crops are taken in three seasons in a year i.e. Kharif, Rabbi and Summer. The crops grown are cotton (24%), cereals (3%), Pulses (15%) and oil seeds (58%), sugarcane (3%) through the average area of oil seed is low but the area under soybean is 353312 hectare and the fruit crops, banana, mosambi, mango, sapota and other dryland fruit crops are growing in the district. The mango plantation is increasing day by day because the district comes under mango and mosambi export zone. The forest percentage is 8.30%, out of which the northern part (Kinwat, Mahur, Hadgaon, Himayatnagar) of the district has maximum forest are and rest of the district is low area. The Kinwat taluka occupies 52% of forest out of the total forest area in the district. The forest produce includes Mahua flowers, Tendupatta, Gums, Charoli, Marking nut

2.5 Year wise area, production and productivity of major crops for last 5 Year

A- Area (Ha.), P- Production (M.T.), Py- Productivity (Kg/Ha.)

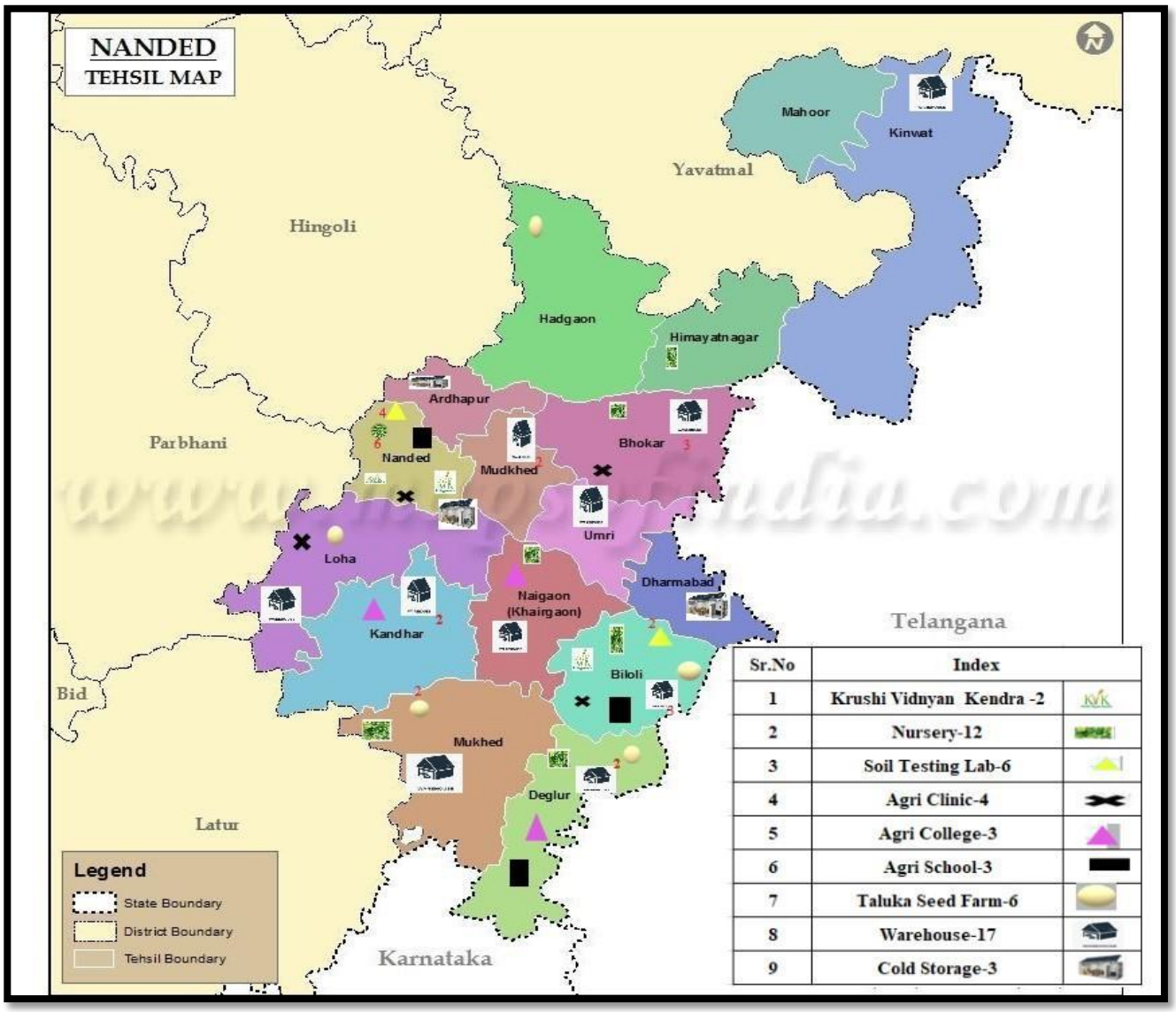
Crop	2016-17			2017-18			2018-19			2019-20			2020-21			Average		
	A	P	Py	A	P	Py	A	P	Py	A	P	Py	A	P	Py	A	P	Py
Tur	70711	1123	79390	63436	931	59073	59713	1137	67879	71188	802	57067	72063	094	78845	337111	5086	342254
Mug	32787	514	16838	28351	294	8346	26451	486	12860	23239	555	12898	26136	430	11233	136964	2279	62175
Udid	34823	277	9634	33429	340	11363	29520	551	16265	22983	602	13825	27371	649	17760	148126	2418	68847
Kharip Jowar	62222	388	24152	61498	859	52809	32845	700	22998	35699	490	17492	31439	546	17172	223703	2983	134624
Soybean	311799	332	103589	317957	796	253196	379331	1584	600860	370372	1434	531253	387103	362	527376	1766562	5509	2016274
Cotton	252547	218	55074	269779	211	56908	239853	316	75889	231110	213	49207	212420	325	68935	1205709	1283	306013
Wheat	8494	529	4489	1810.4	1897	3435	603	1471	887	20956	1584	33186	39591	665	65918	71454.4	7145	107915
Gram	47393	339	16080	7150.1	1355	9691	119127	1249	148755	118959	1149	136646	173300	425	247026	465929	5517	558198

(Source: District Superintendent of Agriculture Office data)

2.6 other facilities

- Agriculture service centres (ASCs), KVK, Agri-clinic agri-business training centres (ACABC), Cold storages and Warehouses, Soil/fertiliser/leaves/water testing labs, Automatic weather Stations, Seed processing centres, nurseries (private and government) of fruit crops, forestry crops, vegetables, sugarcane (Show number of facilities in each taluka on district map)

- Farmer producer companies/SHGs and their businesses, Regulated markets, agriculture credit flow and related institutes, Agriculture education institutes



Chapter 3: Weather trend of district

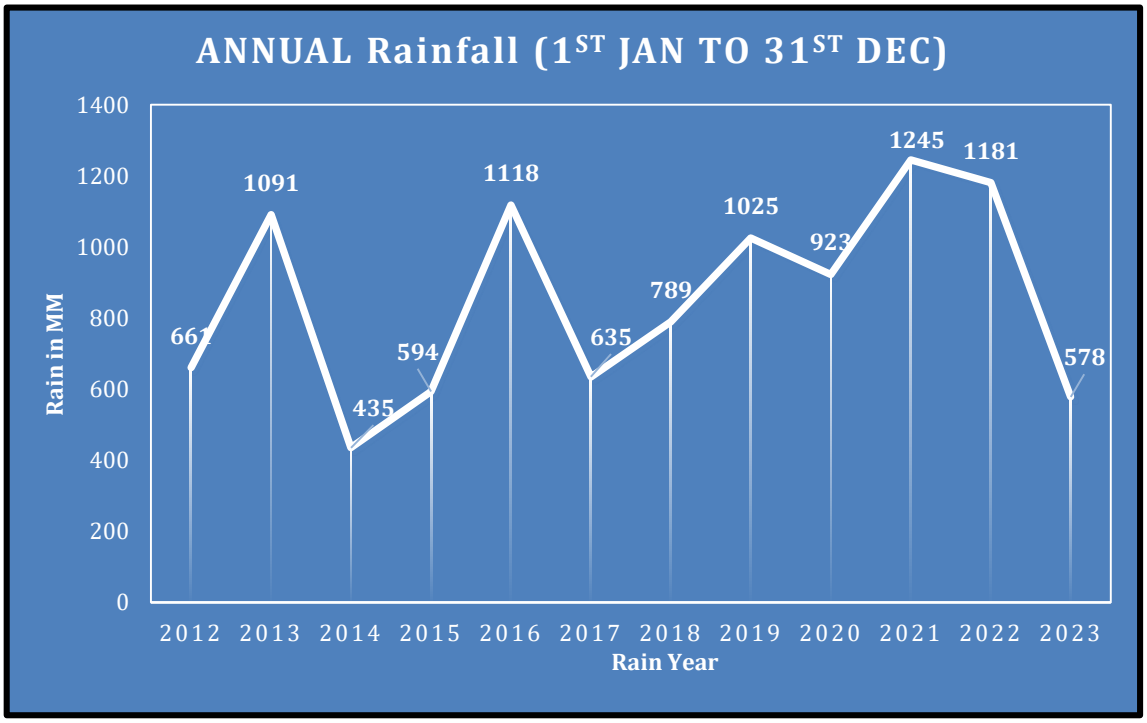
Introduction

Mahavedh project is operationalised by the Government of Maharashtra (GoM) through Public Private Partnership with M/S Skymet Weather Services pvt.ltd. At present 2127 Automatic Weather Stations (AWS) have been installed at circle level in Maharashtra. Weather data fetched from these Automatic Weather Stations (AWS) is useful for implementation of Public Welfare and Development schemes, Research and Development, Disaster management and Allied services.

PoCRA seamlessly combines forecast data from IMD and historical weather data from Mahavedh through APIs, integrating and storing the information in a database. This consolidated data is utilized to generate tailored weather-based advisories for farmers. Leveraging AICRPAM's crop calendars, PoCRA's automated systems craft pest and disease advisories to enhance agricultural decision-making.

3.1 Annual average rainfall of last twelve years

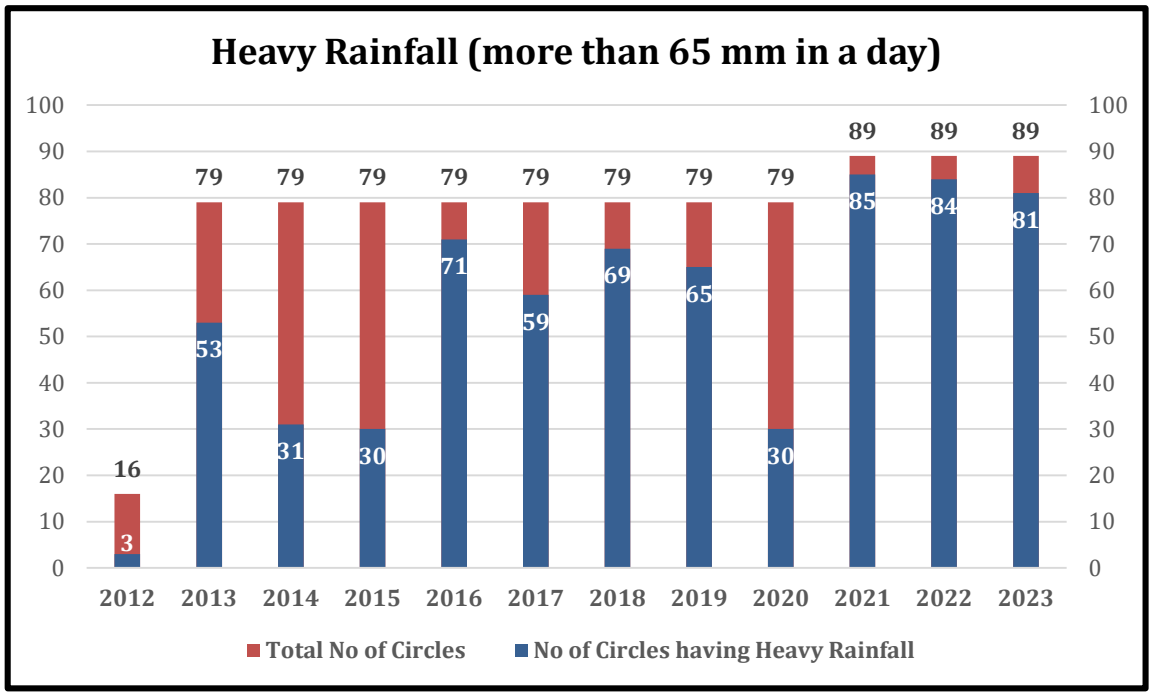
Normal or average rainfall is the amount of precipitation that we expect per year (in a given area). It is obtained and set by calculating the average (mean) of precipitation recorded in an area. Annual rainfall or precipitation is the sum of daily rainfall in a year.



The graph 3.1 presents annual rainfall data of Nanded district from 2012 to 2023, highlighting fluctuations in precipitation. Notably, the lowest recorded rainfall was in year 2014 at 435 mm, while the highest occurred in year 2021 with a total of 1245 mm annual average rainfall.

3.2 Heavy rainfall

Heavy rainfall is defined as rainfall that exceeds 65 mm in 24 hours.



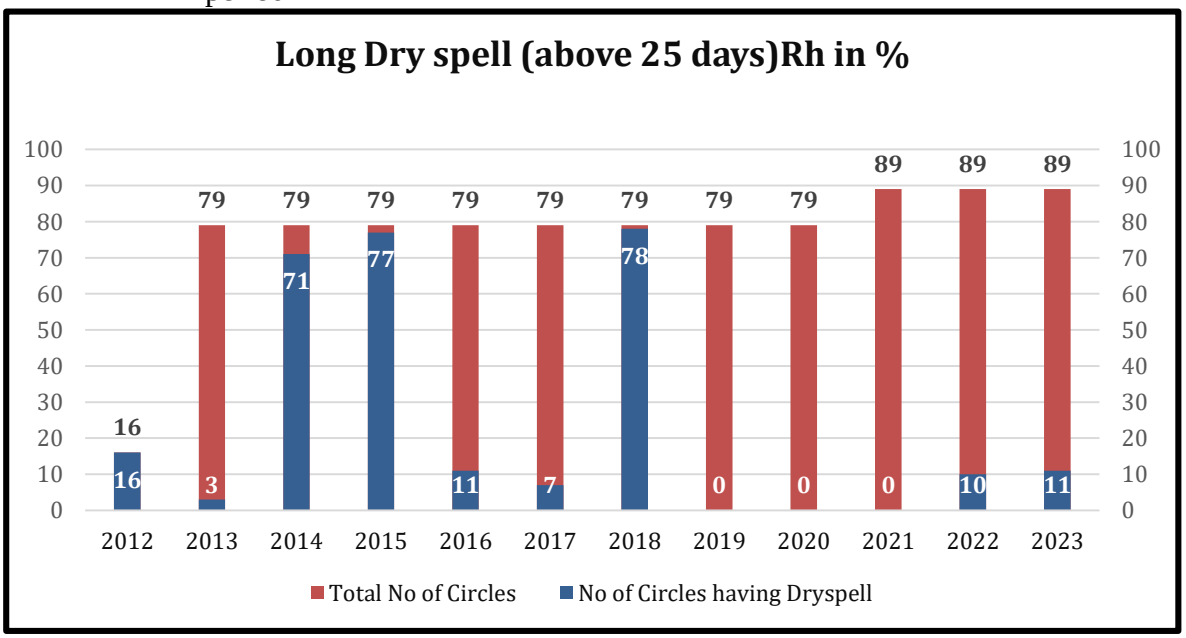
The provided graph 3.2 illustrates occurrences of heavy rainfall in circles within the Nanded district from year 2012 to 2023. Notably, in year 2021, heavy rainfall affected the maximum number of circles, with 85 circles out of the 89 circles experiencing such conditions. Conversely, the year 2015 and 2020 recorded a lower incidence of heavy rainfall, with only 30 circles out of the 79 circles being affected in Nanded District.

3.3 Dry spells

A dry day is when rainfall is below 2.5 mm, and consecutive dry days form a dry spell in monsoon period. Longer dry spells impact crop growth. Categories include very short (up to 7 days), short (7-14 days), medium (14-25 days), and long (more than 25 days) dry spells, each influencing crop development differently.

3.3.1 Long Dry spell

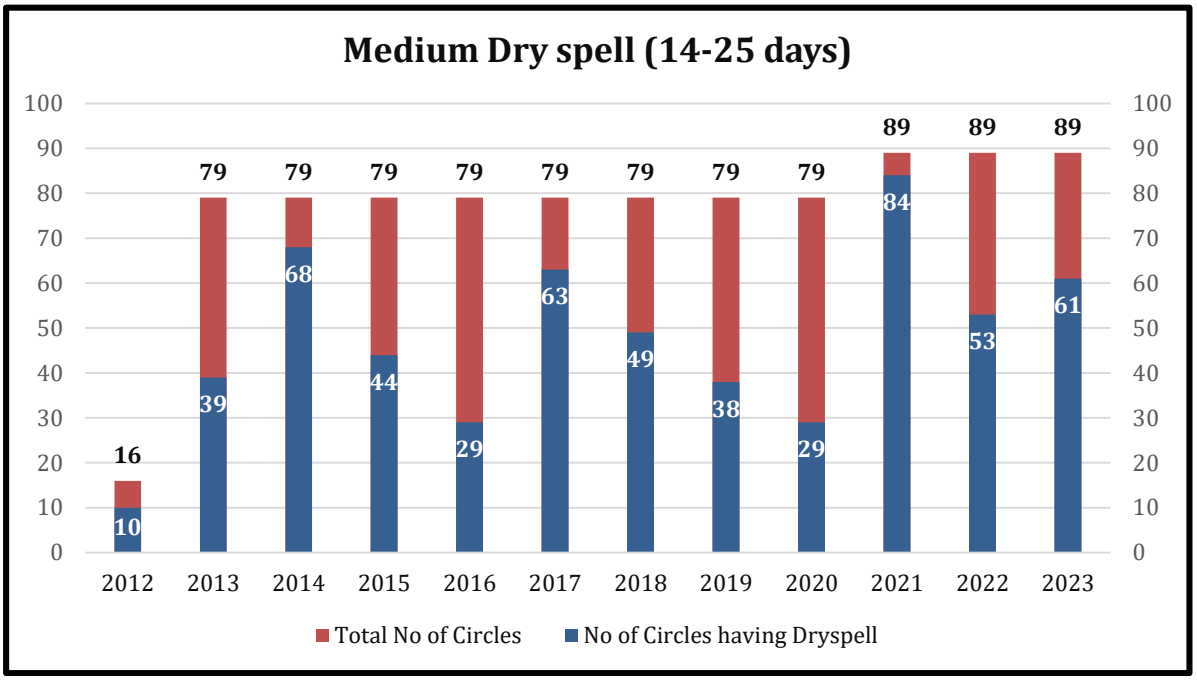
Long Dry spell is a prolonged period above 25 days of dry days in monsoon period



A graph (Graph 3.3.1) that shows the trend of long dry spells observed in a Nanded district. The data covers the total number of circles and the circles that affected long dry spell (more than 25 days) from the year 2012 to 2023. The graph shows that in year 2018, 78 circles out of 78 circles in the district experienced long dry spells. Conversely, in year 2019, 2020 and 2021, there was no long dry spell, across all circles in the district.

3.3.2 Medium Dry spell

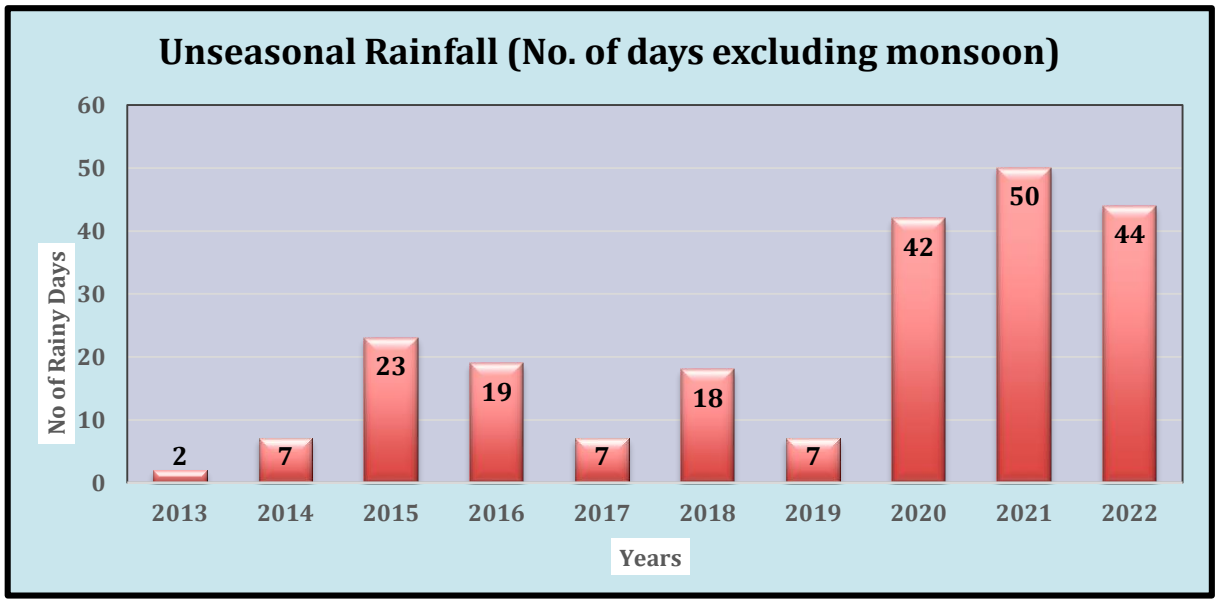
Medium Dry spell a period of 14-25 days of dry weather.



A graph (Graph 3.3.2) that shows the trend of medium dry spells observed in a Nanded district. The data covers the total number of circles and the circles that affected medium dry spell (14 to 25 days) in Nanded district from the year 2012 to 2023. The graph shows that in year 2021, 84 circles out of 89 circles in the district experienced medium dry spells. Conversely, in year 2016 and 2020, there was only 29 circles out of 79 circles experienced medium dry spell in the district.

3.4 Unseasonal rainfall.

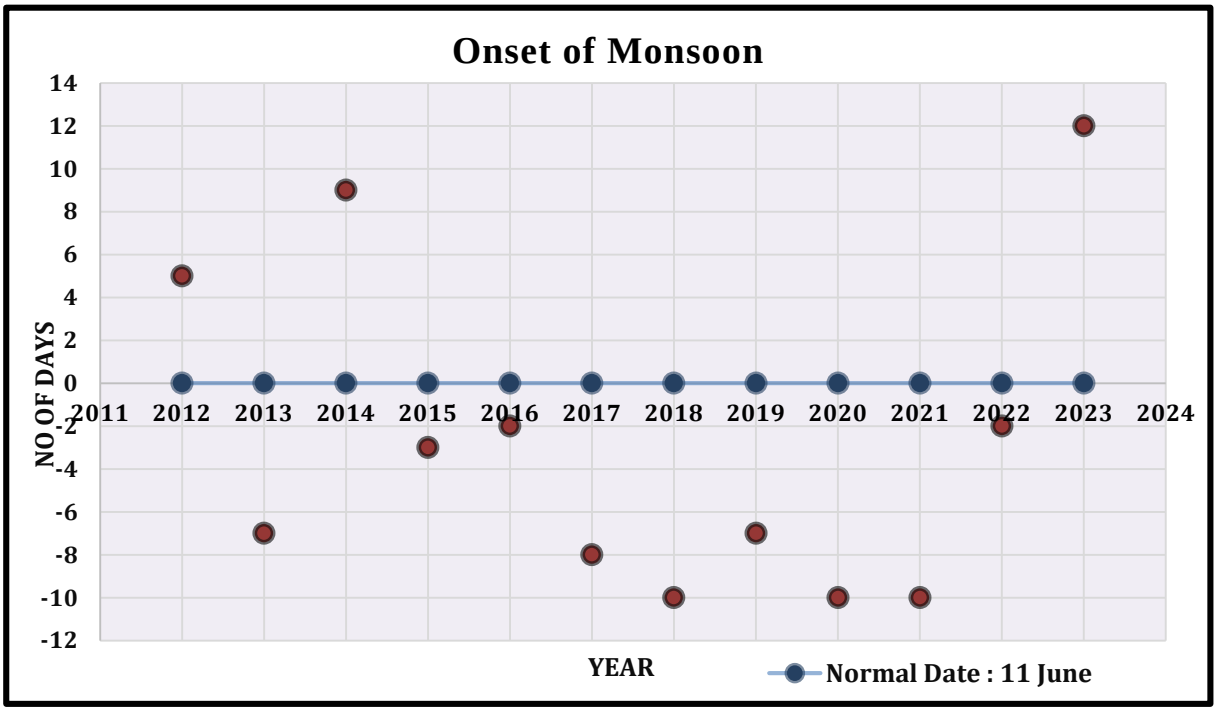
Rainfall received during non mosoon days is treated as unseasonal rainfall. Unseasonal rains-when there is a sudden change in atmospheric pressure, it can result in precipitation, even during non-monsoon seasons.



The graph 3.4 illustrates the annual occurrences of unseasonal rainfall in the Nanded district from year 2013 to 2022. The data reveals a variation ranging from 2 days to 50 days of unseasonal rainfall.

3.5 Monsoon onset delay

The onset of the southwest monsoon refers to the time when the southwest monsoon winds begin to establish over a region, bringing widespread rainfall. The onset of the monsoon in Maharashtra typically occurs around early June. However, the exact timing can vary slightly from year to year. According to the document published by IMD dated 15th May, 2020 (CRS research report), Normal monsoon onset date is 11th June in Nanded district.

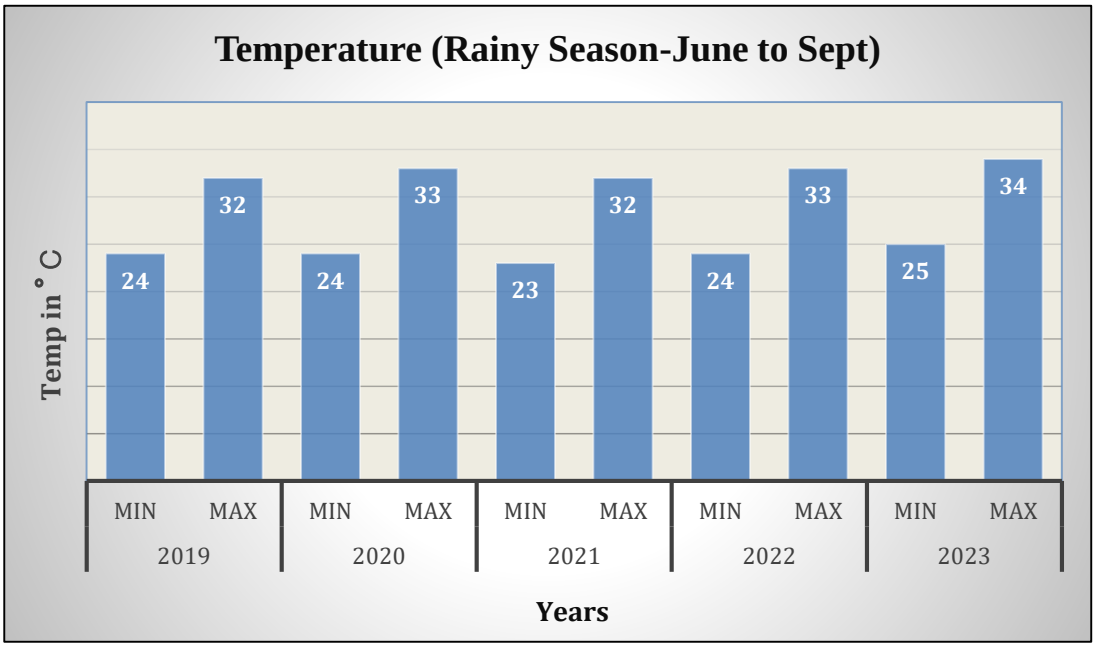


The graph 3.5 depicts the annual onset of the monsoon. The blue line represents the normal day of onset of monsoon. The onset days show variations ranging from -10 to 12 days. Notably, in year 2012, 2014 and 2023 the monsoon arrived delayed than the normal onset date. However, in remaining years the monsoon was notably arrived earlier.

3.6 Temperature.

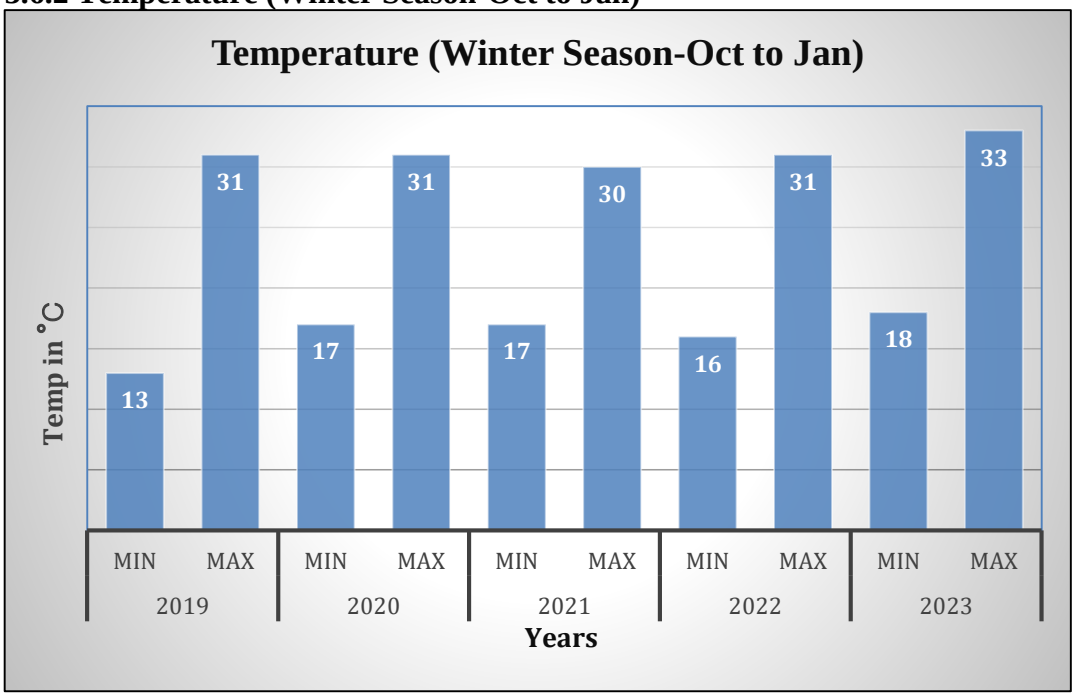
Temperature is a physical quantity that quantitatively expresses the attribute of hotness or coldness. The average temperature is 28.5°C, with a minimum of 18°C and a maximum of 39°C. On the coldest nights, the temperature usually drops to around 13°C. On the warmest days, the temperature usually reaches around 41°C.

3.6.1 Temperature (Rainy Season-June to Sept)



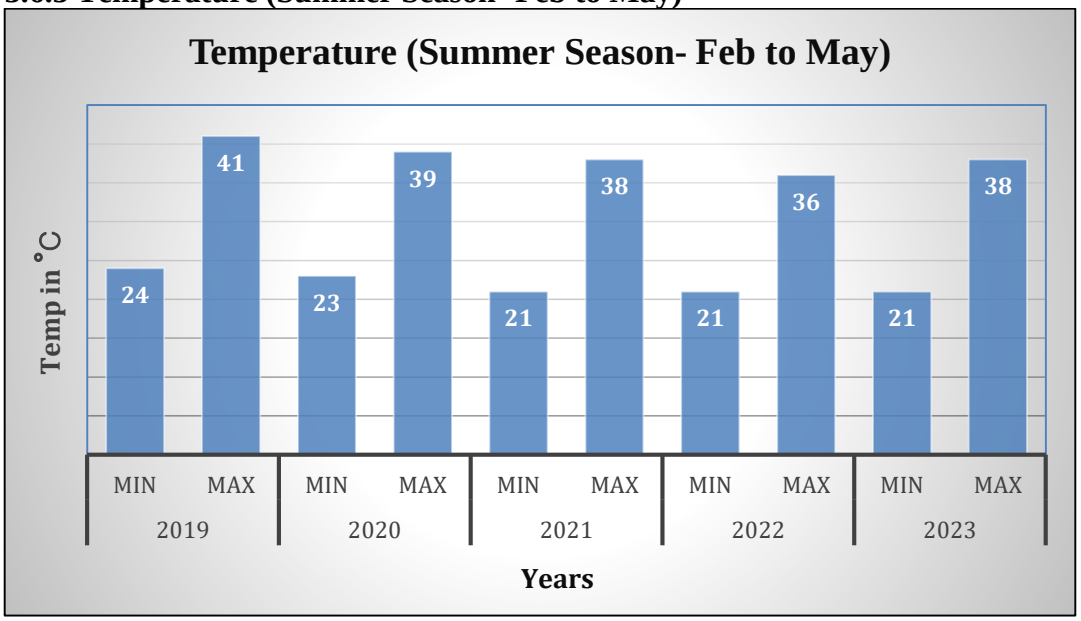
The graph 3.6.1 presents the temperature in the Nanded district during the rainy season from year 2019 to 2023 exhibited a consistent range, with minimum temperatures fluctuating between 23-25 °C and maximum temperatures ranging from 32-34 °C.

3.6.2 Temperature (Winter Season-Oct to Jan)



The graph 3.6.2 presents the temperature in the Nanded district during the winter season from year 2019 to 2023 exhibited a consistent range, with minimum temperatures fluctuating between 13-18 °C and maximum temperatures ranging from 30-33 °C.

3.6.3 Temperature (Summer Season- Feb to May)

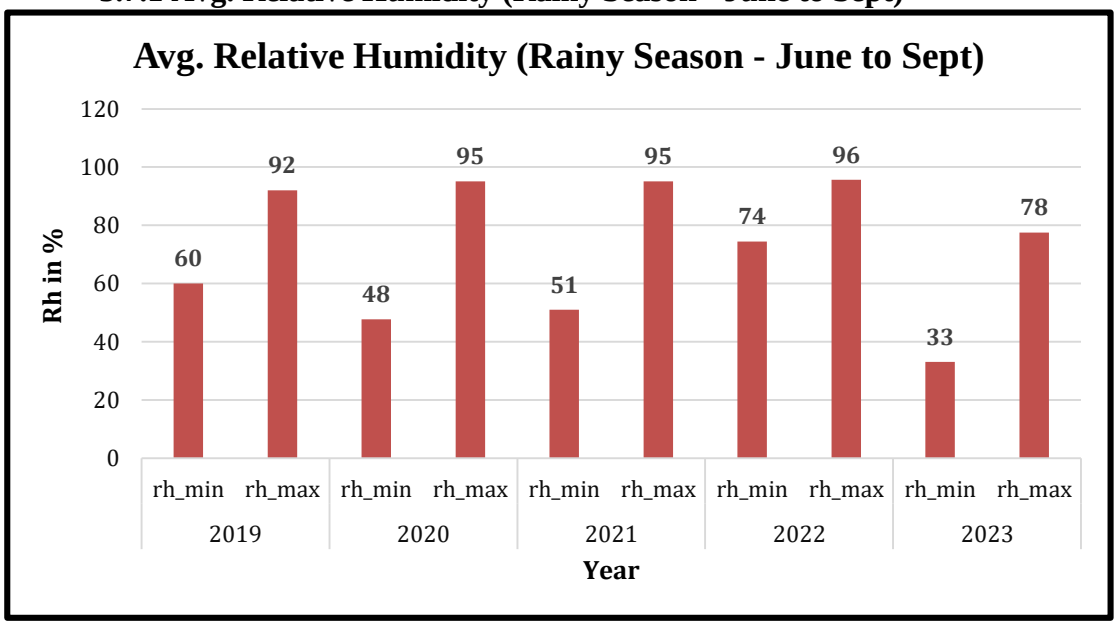


The graph 3.6.3 presents the temperature in the Nanded district during the summer season from 2019 to 2023 exhibited a consistent range, with minimum temperatures fluctuating between 21-24 °C and maximum temperatures ranging from 36-41 °C.

3.7 Relative Humidity

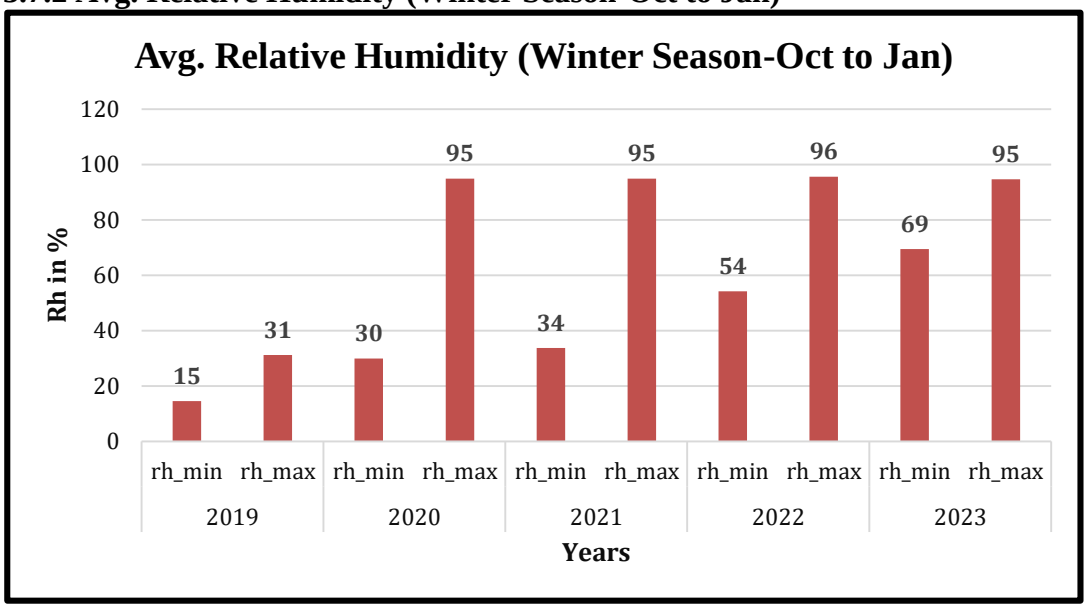
Relative Humidity is the ratio of the actual quantity of moisture at a certain temperature and pressure to the maximum it can hold at the same temperature and pressure. It is usually multiplied by 100 and expressed in percent.

3.7.1 Avg. Relative Humidity (Rainy Season - June to Sept)



The graph 3.7.1 illustrates humidity levels during the rainy season in the Nanded district, revealing a variation in minimum humidity from 33% to 74% and maximum humidity ranging between 78% and 96%.

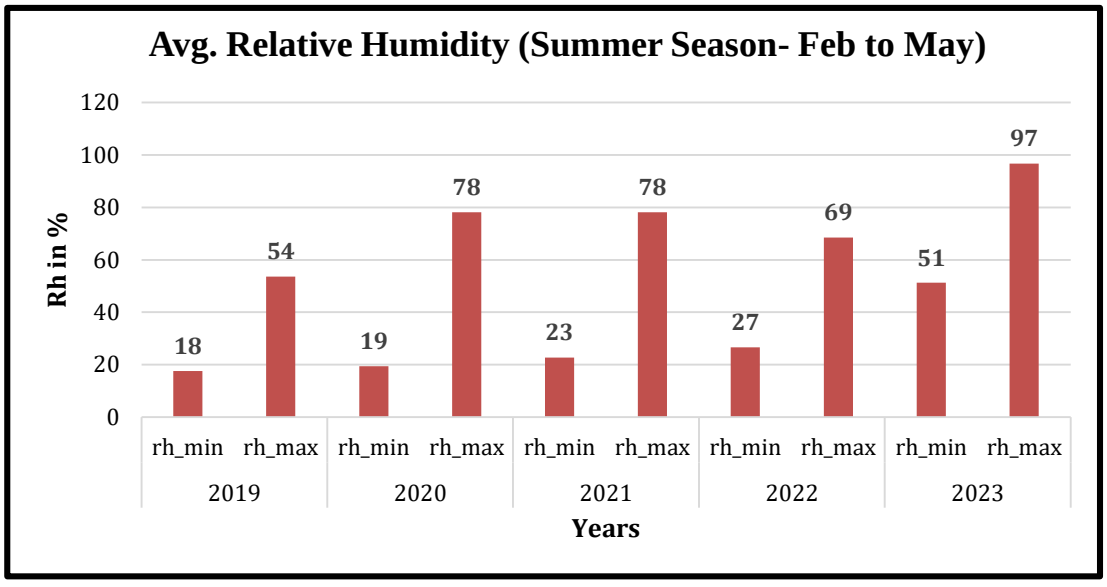
3.7.2 Avg. Relative Humidity (Winter Season-Oct to Jan)



The graph 3.7.2 illustrates humidity levels during the winter season in the Nanded district, revealing a variation in minimum humidity from 15% to 69% and maximum humidity ranging between 31% and 96%.

3.7.3 Avg. Relative Humidity (Summer Season- Feb to May)

The relative humidity during the summer season, typically averaged from Feb to May.



The graph 3.7.3 illustrates humidity levels during the summer season in the Nanded district, revealing a variation in minimum humidity from 18% to 51% and maximum humidity ranging between 54% and 97%.

Chapter 4: Impact of climate variability on agriculture production

Sr. No.	Climate Variability	Cotton	Soybean	Pigeonpea	Chickpea
4.1	Impact of temperature				
1	Crop growth and yield	Ideal temp required for germination is < 39 °C High temperature after sowing reduce germination			Low temperature (<10 °C) after sowing reduce germination
		Extreme high (>40 °C) and low temperature (<18 °C) after seed germination stunted growth of plant			
		hot temperatures (>40 °C) often cut short the boll-setting period, decreasing late- set bolls that tend to have lower micronaire.	Reduction in yield with an increase in temperature (>40 °C) through reductions of pod and seed numbers	increase in temperature (>40 °C) was found to have a negative impact on the yield of crop	High temperature (>40 °C) during the reproductive stage is a major cause of yield loss due to partial or complete pollen sterility.
2	Water availability	Water stress during flowering to boll development reduces yield by 30-40%	Soybean crop water stress during flowering to pod filling reduces the yield by 30-40 %	Water stress during flowering to pod development reduces yield by 30-40 %	water stress during flowering to pod development reduces yield by 20-30 % .
3	Pests and diseases infestation	Increase in population of sucking pests like aphids and white flies and viral diseases	Increase in population of sucking pests like white flies and viral diseases	Decrease in temperature and increase in cloudy weather and humidity increase the population of pod borer.	Decrease in temperature and increase in cloudy weather and humidity increase the population of pod borer.

Sr. No.	Climate Variability	Cotton	Soybean	Pigeonpea	Chickpea
4.2	**Impact of rainfall**				
1	Crop growth and yield	High rainfall could result in over saturation and water logging which had adverse effect on cotton growth and development	Quality of the produce also gets affected with the high rainfall during harvest season.	Rainfall had a favourable impact on the yield of crop	Significant reduction of seed yield due to untimely rain.
2	Irrigation supply, Drought, flood.	Significant impact of drought and water stress on cotton production have resulted in a reduction in yield.	The productivity of soybean is also decreased consequent to poor germination and plant stand, less podding during drought condition	The number of rainy days was found to have a significant negative relationship with yield.	Higher grain yields of chickpea are expected when the crop is irrigated. Terminal drought stress due to decreased rainfall causes yield losses.
3	Pests and diseases infestation and its management	Sucking pests are killed or removed from crops by heavy rains,	Sucking pests are killed or removed from crops by heavy rains,	Heavy rains during October - November often result in outbreaks of H. armigera	Sucking pests are killed or removed from crops by heavy rains,
4	Soil erosion and nutrient loss	Heavy rainfall causes huge soil erosion. Rainfall causes nutrition losses due to leaching effects			
5	Harvest and storage.	High rainfall during harvesting causes reduction in quality fibre and huge yield losses	High rainfall during harvesting causes huge yield losses		
4.3	**Impact of other calamities (cyclones and hailstorms etc.)**				
1	Crop damage or losses	Cyclones and hailstorms causes huge yield losses due to flower, pod and fruit droppings			

Chapter 5: Measures to cope with climatic variability

Sr. No.	Climate Variability	Cotton	Soybean	Pigeon pea	Chickpea
5.1	**Rainfall condition**				
1	Heavy rainfall	Seed treatment before sowing (Trichoderma + Azotobacter + PSB + KMB)	Seed treatment before sowing (Trichoderma + Rhizobium + PSB + KMB)	Seed treatment before sowing (Trichoderma + Rhizobium + PSB + KMB)	Seed treatment before sowing (Trichoderma + Rhizobium + PSB + KMB)
		Sowing on bed	BBF technology for sowing	Sowing on bed	BBF technology for sowing
2	Low rainfall	Sowing on bed helps to moisture conservation	Use BBF technology for water conservation	Sowing on bed helps to moisture conservation	Use BBF technology for water conservation
3	Dry spells/water stress	Sowing of climate resilient crops like Sorghum in kharif and Safflower in Rabi optimal irrigation during sensitive crop stages			
4	Terminal drought	Spray Micronutrient or water soluble fertilizers			
5	Late onset of monsoon	Use optimal irrigation during sensitive crop stages			
5.2	**Temperature condition**				
1	High temperature	Chose climate resilient crops like Sorghum in kharif and Safflower in Rabi			
2	Cold waves/low temperature.	Smoking the field to minimize disease incidence			
5.3	**Hailstorms**	Cultivation of wind breaks around the field			
5.4	**Soil degradation**	Ridges and furrows across the slop	Sowing across the slop	Ridges and furrows across the slop	Sowing across the slop

Best practices developed by farmers in the district (Source- TAOs and KVK)

In the villages of Kandhar Loha and other tehsils in Nanded district, vegetable seed production has been underway for the past few years. This year, the seed production has increased threefold compared to the previous years. In the villages of Usmannagar, Lat (Khu), and Kandarewadi in Kandhar taluka, there are a total of 38 shednets for producing tomato, chilli, cucumber, and open-seed varieties bharta brinjal, among these, 26 are fixed shednets with an area of 10 gunta each, and 12 are on wooden bases. This industry in the village is referred to as the vegetable seed hub (cluster), and each farmer is producing between 15 kg to 60 kg of seeds. For processing the fruits into seeds, the village of Shiwar is equipped, and the seeds are directly sold through contracts with reputable seed companies. Companies like Mahiko and Syngenta produce seeds, and the price ranges from 3000 to 5000 per kg for pepper, and 13000 to 23000 per kg for tomato seeds, depending on the variety. It appears that a significant portion of the state's requirement for vegetable seeds is being met through seed production in this area. In the future, efforts will be made to produce foreign vegetable seeds. Furthermore, under the National Agricultural Development
Scheme, the Department of Agriculture provides a 50% subsidy for the construction of shed nets.

Vegetable seed production in shednet at Kandhar taluka

Chapter 6: Climate Resilient Technology (CRT) Interventions and its impact on yield of crops

6.1 CRTs Interventions

Climate Resilient Technologies promoted under PoCRA			
Technology	**Resilience Feature**	**Benefits**	**Suitable Crops**
1. Cultivation by broad bed furrow (BBF) method	Resilience to moisture stress, poor soil drainage, nutrient (fertilizer) loss	Ensures optimum moisture and aeration at root level, helps drain out water in excess rainy condition, saves seed, ensures proper fertilizer placement in root zone, helps develop optimum microclimate under crop canopy, helps in proper intercultural operations, reduces cost of cultivation.	All field crops both in Kharif and Rabi season
2. Intercropping	Resilience to risk due to crop failure, moisture stress, pest incidence	Ensures optimum use of soil moisture & nutrients, overcomes risk due to aberrant climatic variabilities, helps in effective pest management, and reduces financial risk in farming.	Cotton, soybean, pulses, sorghum & pearl millet
3. Use of climate resilient seed varieties	Resilience to moisture stress due to dry spell & drought, pest epidemic, infestation by wilt & soil borne pathogens	Higher yields than existing varieties, helps escape drought condition due to shorter durations, tolerance to moisture stress, resistance to pest & disease infestation fetches good price due to better consumer preference.	All crops
4. Seed treatment	Resilience to biotic stress	Protection from soil born pathogen and pests, enhances good root development.	All field crops
5. Integrated Nutrient Management	Resilience to abiotic stresses including soil salinity, nutrient deficiencies, susceptibility to pest & disease	Enhances crop health, higher yields, enhances quality of produce, resistance to biotic & abiotic stresses, enhances quality of produce, enhances consumer preference, helps to fetch better market price.	All crops
6. Integrated Pest Management	Resilience to pest & disease epidemic, environmental hazards	Protection from pest & disease attack, reduction in use of chemical pesticide, helps in production of residue free agriculture commodities, reduces environmental hazards, enhances quality of produce, enhances consumer preference in domestic and export market, helps to fetch better market price.	All crops
7. Furrow opening	Resilience to moisture stress,	Helps in conservation of moisture around root zone of crops during dry spell.	Cotton, soybean, pulses,

			sorghum & pearl millet
8. Foliar spray of 2% Urea at flowering and 2% DAP at boll development	resilience to poor nutrition & moisture stress		Cotton
9. Protective irrigation through farm pond	resilience to moisture stress during dry spell & drought condition	Overcomes moisture stress during critical stages, improves nutrient uptake, and enhances increase in yield.	All crops
10. Conservation tillage	Resilience to moisture stress, soil & nutrient loss	Enhances level of soil carbon, soil fertility & water holding capacity, better crop health and higher yields, enhances quality of produce, resistance to biotic & abiotic stresses, and enhances quality of produce.	All crops
11. Incorporation of biomass	Resilience to soil organic carbon (SOC) loss	Enhances level of soil carbon and soil fertility, enhances water holding capacity of soil, leading to better crop health and higher yields, tolerance to moisture stresses.	All crops
12. Canopy management in fruit crops	Resilience to stress management	Enhances fruit bearing capacity, enhances quality of fruits, and reduces cost of harvesting.	Mango, Pomegranate & Guava
13. Cultivation of citrus crops on broad ridges	Resilience to poor soil drainage & soil borne diseases	Enhances proper microclimate around root zone, helps in retaining optimum soil moisture, avoids contact of water with stem collar, and prevents infection by phytophthora & other soil borne pathogens.	Mandarin orange, Sweet orange and Kagzi Lime

6.2 Impact of CRT on crop yield based on FFS data.

FFS (Farmers' Field School) sessions have been implemented in the project village since 2018, focusing on soybean, cotton, pigeon pea and gram crops in the Nanded district. FFS aims to promote sustainable and efficient farming. It does this by introducing effective practices for selected crops, improving farmers' knowledge with concepts like IPM and INM, empowering them to make informed decisions and working towards reducing cultivation costs, restoring soil fertility and increasing productivity. In essence, the FFS focuses on sustainable farming and empowering farmers as decision-makers. The adoption of climate resilient technology (CRT) was promoted on the FFS plot during these sessions. A comparison of the crop yields between the FFS plot and the control plot is detailed below, as per the data captured in the FFS app.

Year wise crop yield (Kg/ha)

Year	Soybean		Cotton		Pigeon Pea		Gram	
	FFS Plot	Control Plot	FFS Plot	Control Plot	FFS Plot	Control Plot	FFS Plot	Control Plot
2019	1678	1522	874	683	373	330	700	600
2020	1544	1479	1284	1108	980	887	1604	1443
2021	1602	1432	1325	1109	727	617	1734	1581
2022	2427	2345	-	-	-	-	-	-
Average	**1812.75**	**1694.50**	**1161.00**	**966.67**	**693.33**	**611.33**	**1346.00**	**1208.00**

The FFS plot for soybean crops benefited from various CRT interventions, including seed treatment with fungicide and biofertilizer, sowing using the BBF method, intercropping, protective irrigation during dry spells and foliar spray of Neem seed kernel extract (NSKE). As a result, the yield of the FFS plot increased by 6.98% compared to the control plot.

The FFS plot for cotton crops benefited from various CRT interventions, including seed treatment with biofertilizer, intercropping, protective irrigation during dry spells, foliar spray of Neem seed kernel extract (NSKE), nipping of bud and use of traps (pheromone traps, sticky traps). As a result, the yield of the FFS plot increased by 20.10% compared to the control plot.

The FFS plot for Pigeon pea crops benefited from various CRT interventions, including as Seed treatment with fungicide and biofertilizer, protective irrigation in dry spell, foliar spray of Neem seed kernel extract (NSKE), topping. As a result, the yield of the FFS plot increased by 13.41% compared to the control plot.

The FFS plot for Gram crops benefited from various CRT interventions, including as Seed treatment with fungicide and biofertilizer, sowing by BBF method, protective irrigation, NSKE, and use of pheromone traps. As a result, the yield of the FFS plot increased by 11.42% compared to the control plot.

6.3 Impact of BBF on yield crops (District data)

Under the Nanaji Deshmukh Krishi Sanjivani Project, farmers field school (FFS) based on Climate Resilient Technology were implemented from the year 2018-19 in 420 villages of Nanded district on actual farmer's fields.

In this, due to the spread of BBF technology and widespread adoption by the farmers, in the district have planted soybean, cotton, pigeon pea, cereals, pulses vegetables crops etc. on an area of about five thousand hectares. After taking the crops, the following results were as…

- Savings in seed cultivation by farmers resulted savings in production.
- The Crops was not affected and due to heavy volume of rain and excessive rainfall.
- Incidence pests and diseases reduced.
- 5 to 6 quintal production increased per hectare.
- Crop management became easier for farmers.
- Farmers were saved in the cost of intercropping.

With above mentioned results, BBF technology has become very beneficial for farmers.

BBF Technology in Soybean

SRT Cotton third year at Bothi Ta. Umari

6.4 Impact of zero tillage on yield crops

Under the Nanaji Deshmukh Krushi Sanjivani Project training of SRT (zero tillage) given to all field staff, officers of all three subdivisions in Nanded district under the project made it easier to guide the farmers in this Zero Tillage method increased the adoption of SRT (zero tillage) by farmers. Also, it was found that the production cost of the farmers was saved and crop productivity increased.

Advantages:-

- There was huge saving in cost of intercultivation.
- Saving in labour costs.
- Crop productivity increased.
- Increased the organic Carbon content in soil increases soil productivity.
- Attack of pests and diseases on crops reduced.
- 6 to 7 quintal production increased per hectare.
- There was a huge saving in seed cost of planting.
- Chemical fertilizers, pesticides savings usage Costs.

Adoption of the (SRT) Zero Tillage technology by farmers has help to raise the standard of living of many farmers in the district and become profitable.

6.5 Impact of Neem based extracts on yield crops

Farmers in all three sub-divisions of the district their own Neem seed extracts on their field and applied it to the crop, thereby saving in the cost of chemical pesticides spraying.

As a result Soybean, Cotton, pigeon pea, Turmeric, Cereals, Pulses, vegetables etc. with increased use on the crops. Control of sap-sucking insects became easier, saving production costs, and increasing crop yields.

Advantages:-

- It is very simple method, farmers could prepare Neem extracts at a low cost.
- Reduced use of chemical pesticides resulted in cost savings.
- The attack of sap -sucking pests on the crop was reduced.
- Huge savings in production costs due to use of Neem extracts.

- Biodiversity was also maintained by reducing natural enemy pests crops and increasing natural friendly pests, resulting in increased crop yields.
- Pests ·

Due to all the above benefits, the preparation and use of Neem extracts has become beneficial in terms of crop production and reduction of production costs.

Preparation of neem leaves and seed extract on farm.

6.6 Impact of on farm biofertilizers production on crop yield

By making and using biofertilizers on their fields at very low cost, farmers have avoided the cost of chemical fertilisers, micronutrients, plant growth regulators (PGR) and increased productivity.

As soil bacteria increases, soil texture, structure and fertility increased and farmers tended towards organic farming and with the increase in market demand for quality organic produce there was a huge increase in crop production like olericulture, pomology, grains, pulses cereals etc.

Due to saving in production cost, farmers are preparing various bacterial fertilisers themselves on the farm.

(Source: District data)

Chapter 7: Plan to cope with weather related contingencies of Nanded District

(Source- http://www.icar-crida.res.in/)

7.1 Drought

7.1.1 Rainfed situation

7.1.1.1. Early season drought (delayed onset)

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/Cropping system**	**Change in Crop/Cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 week (Specify month) * **June 4th week**	Medium deep to deep and black soils with assured and high rainfall	Cotton	No change	No change	Linkage with MAU, MSSC and NSC for seed. Linkage with MAIDCfor implements. Linkage with MAU,KVK for agro techniques
		Sorghum	No change	No change	
		Soybean	No change	No change	
		Black gram	No change	No change	
		Pigeon pea	No change	No change	
		Green gram	No change	No change	
	Shallow black soils with assured and high rainfall	Cotton	No change	No change	
		Sorghum	No change	No change	
		Soybean	No change	No change	
		Black gram	No change	No change	
		Pigeon pea	No change	No change	
		Green gram	No change	No change	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/Cropping system**	**Change in Crop/Cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 week (Specify month) * **July 2nd week**	Medium deep to deep black soils with assured and high rainfall	Cotton	Cotton + Pigeon pea 6:2(BSMR 736, 853)	Normal package of practices recommended by MAU, Parbhani or adopt 15-20% more seed rate than recommended and reduce Fertilizer dose by 25 per cent.	Linkage with MAU, MSSC and NSC for seed. Linkage with MAIDC for implements. Linkage with MAU,KVK for agro techniques
		Sorghum	Sorghum + Pigeon pea 4 : 2 (CSH-9, 11, 14, 16 PVK-401, 809) + (BSMR 736, 853)		

		Soybean	No change / Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81) + (BSMR 736, 853)	Normal package of practices recommended by MAU, Parbhani	
		Black gram	Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736,853)		
		Pigeon pea	NO change / Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736,853)		
		Green gram	Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736,853)		
	Shallow black soils with assured and high rainfall	Cotton	Cotton + Pigeon pea 6:2 (BSMR 736, 853, BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani or adopt 15-20% more seed rate than recommended and reduce fertilizer dose by 25 per cent.	
		Sorghum	Sorghum + Pigeon pea 4 : 2 (CSH-9, 11, 14, 16 PVK-401, 809) + (BSMR 736, 853, BDN 708, 711)		
		Soybean	Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81) + (BSMR 736, 853, BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani	
		Black gram	Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736, 853, BDN 708, 711)		
		Pigeon pea	NO change / Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736, 853, BDN 708, 711)		
		Green gram	Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736, 853, BDN 708, 711)		

Condition			Suggested Contingency measures		
Early season drought(delayed onset)	**Major Farming situation**	**Normal Crop/Cropping system**	**Change in Crop/Cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 week (Specify month) * **July 4th week**	Medium deepto deep black soils with assured and high rainfall	Cotton	Cotton + Pigeon pea 6:2 (BSMR 736, 853, BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani or adopt 15-20% more seed rate than recommended andreduce fertilizer dose by 25 %	Linkage with MAU, MSSC and NSC for seed. Linkage with MAIDCfor implements. Linkage with MAU, KVK for agro techniques
		Sorghum	Sorghum + Pigeon pea 4 : 2 (CSH-9, 11, 14, 16 PVK-401, 809) + (BSMR 736, 853, BDN 708, 711) /Maize/Sunflower		
		Soybean	No change / Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81) + (BSMR 736, 853, BDN 708, 711)	Opening of furrows in alternaterows with Balram plough	
		Black gram	Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736, 853, BDN 708, 711)	Interculture for in-situ moistureconservation	
		Pigeon pea	NO change / Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736, 853, BDN 708, 711)	Seed Hardening Adopt closer spacing (60X30cm)Frequent interculture for in-situ moisture conservation and for weed free condition	
		Green gram	Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736, 853, BDN 708, 711)	Interculture for in-situ moistureconservation	
	Shallow black soils with assured and high rainfall	Cotton	Cotton + Pigeon pea 6:2(BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani or adopt 15-20% more seed rate than recommended andreduce fertilizer dose by 25 %	
		Sorghum	Sorghum + Pigeon pea 4 : 2 (CSH-9, 11, 14, 16 PVK-401, 809) + (BDN 708, 711) /maize/fodder maize (African tall)		
		Soybean	Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81) + (BDN 708, 711)	Opening of furrows in alternate rows with Balram plough	
		Black gram	Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) + (BDN 708, 711)	Interculture for in-situ moisture conservation	
		Pigeon pea	NO change / Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) + (BDN 708, 711)	Seed Hardening Adopt closer spacing (60X30cm). Frequent interculture for in-situ. moisture conservation and for weed free condition	
		Green gram	Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) + (BDN 708, 711) / Sunflower (Morden, EC-68414, SS- 56, LSH-35)	Interculture for in-situ moisture conservation	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/Cropping system**	**Change in Crop/Cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 week (Specify month) * **August 2nd week**	Medium deep to deep black soils with assured and high rainfall	Cotton	Pigeon pea (BDN 708, 711)	Seed Hardening Adopt closer spacing(60X30cm) and 15-20% more seed ratethan recommended. Frequent interculture for in-situmoisture conservation and for weed free condition	Linkage with MAU,MSSC and NSC for seed. Linkage withMAIDC for implements. Linkage with MAU, KVK for agrotechniques
		Sorghum	Pearl millet + Pigeon pea 4 : 2 (Shradha, Saburi, Shanti, AIMP-92901) + (BDN 708, 711) /Maize/Sunflower		
		Soybean	Pigeon pea/Sunflower/Sesamum	-	
		Black gram	Pigeon pea/ Maize/ pearl millet / Sunflower **OR** Plan for early rabbi crops like sorghum, Chickpea and Safflower	Prepare land for rabbi Season	
		Pigeon pea		Seed Hardening Adopt closer spacing(60X30cm) Frequent interculture for in-situmoisture conservation and for weed free condition	
		Green gram	Pigeon pea/ Maize/ pearl millet / Sunflower **OR** Plan for early rabbi crops like sorghum, Chickpea and Safflower	Interculture for in-situ moisture conservation	
	Shallow black soils with assured and high rainfall	Cotton	Pigeon pea (BDN 708, 711)	Normal package of practices recommended by MAU, Parbhani or adopt 15-20% more seed rate than recommended and reduce fertilizer dose by 25 per cent.	
		Sorghum	Pearl millet + Pigeon pea 4 : 2 (Shradha, Saburi, Shanti, AIMP-92901) + (BDN 708, 711) /Maize/Sunflower		
		Soybean	Pigeon pea/Sunflower/Sesamum/Castor	-	
		Black gram	Pigeon pea/ Maize/ pearl millet / Sunflower **OR** Plan for early rabbi crops like sorghum, Chickpea and Safflower	Interculture for in-situ moisture conservation	
		Pigeon pea	Pigeon pea/ Maize/ pearl millet / Sunflower **OR** Plan for early rabbi cropslike sorghum, Chickpea and Safflower	Seed Hardening Adopt closer spacing (60X30cm) Frequent interculture for in-situmoisture conservation and for weed free condition	
		Green gram		Interculture for in-situ moisture conservation	

7.1.1.2 Early season drought(Normal onset)

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	**Major Farming situation**	**Normal Crop/Croppingsystem**	**Crop management**	**Soil nutrient and moistureconservation practices**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination / crop stand etc.	Medium deep to deep black soils with assured and high rainfall	Cotton	Gap filling 7-10 days after sowing by pot watering within the rows with same cultivar or pigeon pea to maintain at least75% plant population. Raise cotton seedlings in polythene bagsand transplant when sufficient soil moisture is available. Give protective irrigation whereverpossible	Making of conservation furrows for moisture conservation When the crop is 2 weeks old take up Interculture with harrow.Spray 2 % urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition	Linkage with MAU, MSSC and NSC for seed. Linkage with MAIDC for implements. Linkage with MAU, KVK for agro techniques Linkage with DSAO for
		Sorghum	Gap filling with pigeon pea	When the crop is 2 weeks old take up Interculture with hoe	farm ponds and micro irrigation system through RKVY
		Soybean	Gap filling within the rows with same orshort duration cultivar to maintain at least 75% plant population or if the plantpopulation is less than 50% re sow the crop	Avoid applying fertilizers tillsufficient soil. moisture is available	
		Black gram	If the plant population is less than 75% of optimum, go for re sowing of the alternate crops like sunflower / pigeon pea. If possible give protective irrigation with sprinkler.		
		Pigeon pea	Gap filling within the rows with same orshort duration cultivar to maintain at least 75% plant population	When the crop is 2 weeks oldtake up Interculture with hoe	
		Green gram	If the plant population is less than 75% of optimum, go for resowing of the alternate crops like sunflower / pigeon pea. If possible give protective irrigation with sprinkler.		
	Shallow black soils with assured and high rainfall	Cotton	Gap filling within the rows with same cultivar or Pigeon pea to maintain at least75% plant population. Raise cotton seedlings in polythene bagsand transplant when sufficient soil moisture is available. Give protective irrigation wherever possible	Avoid applying fertilizers tillsufficient soil. moisture is available Making of conservation furrowsfor moisture conservation Interculture with harrows	
		Sorghum	Gap filling with pigeon pea	Interculture with hoe	

		Soybean	Gap filling within the rows with same orshort duration cultivar to maintain at least 75% plant population		
		Black gram	If the plant population is less than 75% of optimum, go for resowing of the alternate crops like sunflower/Pigeon pea. If possible give protective irrigation withsprinkler If possible give protective irrigation with sprinkler.		
		Pigeon pea	Gap filling within the rows with same or short duration cultivar to maintain atleast 75% plant population	When the crop is 2 weeks oldtake up Interculture with hoe	
		Green gram	If the plant population is less than 75% of optimum, go for resowing of the alternate crops like sunflower / pigeon pea. If possible give protective irrigation with sprinkler.		

Condition			**Suggested Contingency measures**		
Early season drought (Normal onset)	**Major Farming situation**	**Normal Crop/Cropping system**	**Crop management**	**Soil nutrient and moistureconservation practices**	**Remarks on Implementation**
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period) **At vegetative stage**	Medium deep to deep black soils with assured and high rainfall	Cotton	Give protective irrigation whereverpossible Maintain weed free conditions	Avoid applying fertilizers tillsufficient soil moisture is available. Making of conservation furrowsfor moisture conservation. Interculture with harrows Two sprays of 2% MgSO4, Zn, and Boron at weekly interval when the crop is encountered reddeningsymptoms. Spray 2 % urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition.	Linkage with MAU,MSSC and NSC for seed. Linkage with MAIDCfor implements. Linkage with MAU, KVK for agro techniques Linkage with DSAO forfarm ponds and microirrigation system through RKVY
		Sorghum	Avoid top dressing of fertilizers till sufficient soil moisture is available. Intra row thinning Protective irrigation if possible	Opening of alternate furrows withBalaram plough. Interculture with harrows for weeding	
		Soybean	Interculture for weeding and to create soil mulch. Give protective irrigation whereverpossible	Opening of alternate furrows withBalaram plough. Spraying of 2% urea and DAP	

		Black gram	Inter culture for weeding Protective irrigation if possible	Spraying of 2% urea and DAP	
		Pigeon pea	Inter culture for weeding Protective irrigation if possible		
		Green gram	Inter culture for weeding Protective irrigation if possible		
	Shallow black soils with assured and high rainfall	Cotton	Give protective irrigation whereverpossible Maintain weed free conditions	Avoid applying fertilizers tillsufficient soil moisture is available Making of conservation furrowsfor moisture conservation Interculture with harrows Two sprays of 2% MgSO4, Zn, Boron at weekly interval when the crop is encountered reddeningsymptoms Spray 2 % urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition.	
		Sorghum	Avoid top dressing of fertilizers till sufficient soil moisture is available. Protective irrigation if possible Intra row thinning	Interculture for weeding and tocreate soil mulch to conserve moisture.	
		Soybean	Give protective irrigation wherever possible	Spraying of 2% urea and DAP	
		Black gram	Inter culture for weeding Protective irrigation if possible		
		Pigeon pea	Inter culture for weeding Protective irrigation if possible		
		Green gram	Inter culture for weeding Protective irrigation if possible		

7.1.1.3 Mid-season drought (long dry spell)

Condition	Major Farming situation	Normal Crop/Cropping system	Suggested Contingency measures		
Mid-season drought (long dry spell)			**Crop management**	**Soil nutrient and moisture conservationpractices**	**Remarks on Implementation**
At flowering / fruiting stage or At reproductive stage	Medium deep to deep black soils with assured and high rainfall	Cotton	Give protective irrigation wherever possible	Avoid applying fertilizers till sufficient soil moisture is available. Making of conservation furrows formoisture conservation. Interculture with harrows. Two sprays of 2% MgSO4, Zn, Boron atweekly interval when the crop is encountered reddening symptoms Spray 2 % urea solution or 1% water soluble fertilizers like 19-19-19, 20-20- 20, 21-21-21 to supplement nutrition.	Linkage with ongoinggovt. scheme to encourage adoption ofmicro irrigation for better water use efficiency (WUE) Linkage with MAUand KVK for agro techniques Linkage with DSAO for farm ponds and micro irrigation system through RKVY
		Sorghum	Protective irrigation if possible	--	
		Soybean	Give protective irrigationwherever possible	Opening of alternate furrows withBalaram plough. Spraying of 2% urea and DAP	
		Black gram	Protective irrigation if possible	--	
		Pigeon pea	Protective irrigation if possible	Opening of furrows with Balaram plough. Spraying of 2% urea and DAP	
		Green gram	Protective irrigation if possible	--	
	Shallow black soils with assured and high rainfall	Cotton	Give protective irrigation wherever possible	Avoid applying fertilizers till sufficientsoil moisture is available Making of conservation furrows formoisture conservation. Interculture with harrows. Two sprays of 2% MgSO4, Zn, Boron atweekly interval when the crop is encountered reddening symptoms Spray 2 % urea solution or 1% water soluble fertilizers like 19-19-19, 20-20- 20, 21-21-21 to supplement nutrition.	
		Sorghum	Protective irrigation if possible	--	
		Soybean	Give protective irrigationwherever possible	Opening of alternate furrows withBalaram plough. Spraying of 2% urea and DAP	
		Black gram	Protective irrigation if possible or in case of sever moisture stress use as fodder /green manuring	--	
		Pigeon pea	Protective irrigation ifpossible	Opening of furrows with Balaram plough. Spraying of 2% urea and DAP	
		Green gram	Protective irrigation if possible or in case of sever moisture stress use as fodder /green manuring	--	

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	**Major Farming situation**	**Normal Crop/Cropping system**	**Crop management**	**Rabbi crop planning**	**Remarks on Implementation**
Terminal drought	Medium deep to deep black soils with assured and high rainfall	Cotton	Give protective irrigation with drip Picking	If possible, adopt relay cropping of chickpea, safflower, rabbi sorghum	Linkage with MAIDC / DSAO for harvesting implements (thresher, harvester). Linkage with DSAO for farm ponds and micro irrigation system through RKVY Linkage with MAU, MSSC and NSC for seed. Linkage with MAU, KVK for agro techniques
		Sorghum	Life saving irrigation or harvest at physiological maturity or use as fodder	Plan for rabbi crops like chickpea and safflower	
		Soybean	Give life saving irrigation or harvest at physiological maturity	Sowing of rabbi crops like sorghum, chickpea, safflower immediately after harvest of soybean with minimum tillage	
		Black gram	Harvest at physiological maturity or in case of severe drought use as fodder/ green manuring	Plan for rabbi crops chickpea /safflower / rabbi sorghum / sunflower	
		Pigeon pea	Life saving irrigation Foliar spray of 2% KNO_3, urea and DAP	---	
		Green gram	Harvest at physiological maturity or in case of severe drought use as fodder/ green manuring	Plan for rabbi crops chickpea /safflower / rabbi sorghum / sunflower	
	Shallow black soils with assured and high rainfall	Cotton	Give protective irrigation with drip Picking	If possible, adopt relay cropping of chickpea, safflower, rabbi sorghum	
		Sorghum	Life saving irrigation or harvest at Physiological maturity or if no grain setting use as green fodder.	Plan for rabbi crops like chickpea and safflower	
		Soybean	Give life saving irrigation or harvest at physiological maturity	Sowing of rabbi crops like sorghum, chickpea, saffalower immediately after harvest of soybean with minimum tillage	
		Black gram	Harvest at physiological maturity or in case of severe drought use as fodder/ green manuring	Plan for rabbi crops chickpea / safflower / rabbi sorghum /sunflower	
		Pigeon pea	Life saving irrigation	Foliar spray of 2% KNO_3, urea and DAP	
		Green gram	Harvest at physiological maturity or in case of severe drought use as fodder/ green manuring	Plan for rabbi crops chickpea / safflower / rabbi sorghum /sunflower	

7.2 Unusual rains (untimely, unseasonal etc.) (For both rainfed and irrigated situations)

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity Stage**	**Post-harvest**
Cotton, Sorghum	• Drain excess water • Interculture at optimum soil moisture • Apply 25KgN/Ha to cotton	Drain excess water	Drain out excess water Timely harvest	Protect picked cotton from drenching and soiling Dry wet cotton and market
Soybean, Pigeon pea and short duration pulses	Drain out excess water	-do-	-do-	Shift to safer place Dry the produce
Horticulture				
Mango Sweet orange Banana Sapota	Opening of field channels todrain out excess water and avoid surface ponding, Interculture at optimum soil moisture	Opening of field channels to drain out excess water and avoid surface ponding, Interculture at optimum soil moisture	Collect fallen fruits, grade and market if feasible	Grading, cleaning and marketing of fruits
Heavy rainfall with high speed winds in a short span				
Cotton, Sorghum	Drain excess water, Interculture at optimum soilmoisture Apply 25KgN/Ha to cotton	Drain excess water	Drain out excess water Timely harvest	Protect picked cotton from drenching and soiling Dry wet cotton and marketing
Soybean, Pigeon pea, short duration pulses	Drain out excess water	-do-	-do-	Shift to safer placeDry the produce
Horticulture				
Mango, Sweet orange	-	Provide support to prevent lodgingand uprooting in young orchards	Apply multinutrient and hormonal spray to promote flowering	Shift produce to safer place
Banana, Sapota	-do-	Provide propping and staking	Propping and staking	-do-
Outbreak of pests and diseases due to unseasonal rains				

Cotton	Apply soil drench of carbendazim 0.1% or COC @ 3g/litre at base of plants to prevent wilt in low lying patches	Apply foliar spray of streptocycline sulphate @ 6g/60 litre + COC @ 25g/10 litre to prevent bacterial leaf blight Apply Sulphur 25g/10 litre (300mesh) to prevent grey mildew Apply MgSO4 25 kg/ha soil application or 1% MgSO4 foliarspray to prevent leaf reddening	Foliar spray of carbendazim 0.1% or Ditane M45 0.2% to prevent boll rot	-
Sorghum			Apply Dithane M 45 0.2% on ear heads immediately after cessation of rains	
bean	Manually remove infested plants or plant parts from below the girdles Protect against semilooper when density reaches >4 larvae per meter row with foliar spray of NSKE 5% or dimethoate 30 EC 1 ml/litre	-		
Horticulture				
Mango	Spray imidacloprid 0.3 ml or dimethoate 1 ml/liter to control hopper Drench the seedlings with COC 0.25% against root rot	Protect against hopper	Spray Dithane M 45 3g/litre or carbendazim 1g/liter against anthracnose Spray sulphur 0.5% to control powdery mildew	Maintain aeration in storage toprevent fungal infection and blackening or fruits
Banana	Soil drenching with COC 3g/litre to avoid rhizome rot	Spray Dithane M 45 3g/liter or propiconazole 1 ml/liter 2-3 timesagainst Cercospora leaf spot		
Sweet orange	Protect against Citrus Psylla with foliar spray of malathion 50 EC 10 ml or quinalphos 25 EC 10 ml or cypermethrin 25EC 4 ml per 10 liters	Protect against Citrus Psylla with foliar spray of malathion 50 EC 10 ml or quinalphos 25 EC 10 ml or cypermethrin 25EC 4 ml per 10 liters	-	-

7.3 Extreme events: Heat wave / Cold wave/Hailstorm

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave				
		Horticulture		
Banana	Frequent irrigation Plant wind break trees	Frequent irrigation	Frequent irrigation	-
Sweet orange	Frequent irrigation Shade temporary shade net Mulching	Irrigation and pruning of affected branches / twigs	Irrigation and pruning of affected branches / twigs Apply 1% Bordeaux paste to cut ends	Immediate harvesting, grading and marketing
Cold wave				
Sweet orange, Banana	Protect with polythene sheet	Smoking, frequent and light irrigation during evening hours, basin mulching, apply supplementary dose of fertilizers	Smoking, frequent and light irrigation during evening hours, basin mulching, apply supplementary dose of fertilizers	-

Chapter 8: Agro meteorological Advisory

8.1 Agro-meteorogical advisory

8.1.1 Importance/ Need of Agromet advisory

Agromet Advisory services for agriculture that is, the provision of accurate and locally-appropriate climate and weather information play a vital building block for increasing the resilience of communities to climate change, diseases, and disasters.

Among the various factors affecting the agricultural production, weather is the most important one. Every phase of growth and development in plant is affected by weather. Among the weather parameters, rainfall and its distribution fluctuates greatly than other parameters. Any variability in the rainfall during the crop season, such as delay in onset of monsoon, excessive rains and prolonged dry spells would affect the crop growth and finally the quality and quantity of the produce. Adoption of real time contingencies in crop management based on weather forecasts can minimize crop losses. Weather forecast and weather based agromet advisories help in increasing the economic benefit to the farmers with appropriate management practices.

8.1.2 Forecasts or advisories generated at district level

Weather forecast is normally issued at three levels viz., short range, medium range and long range. Long range weather forecasts provide guidelines for selection of crops best suited to the anticipated climatic conditions. The short and medium range weather forecasts help to advice the farmers on the actual and expected weather to make decision on day to day farming operations such as sowing, weeding, time of pesticides spray, irrigation scheduling, fertilizer application etc., in crop management. AAB is generated by using medium range weather forecasts.

8.1.3 DAMU information

DAMU units are being established in KVKs under ICAR network in a phased manner for rendering block level Agromet Advisory Services. District Agro-met Unit (DAMU), a project of Indian Meteorological Department is operational in 200 KVKs All over India. They provide block level AAB Based on medium range weather forecast, block-wise Agromet advisory bulletins are transmitted weekly twice to farmers, state department, IMD, NGOs and mass media.

8.1.4 Other sources of Agro-met advisory

Meghdoot : Meghdoot, a joint initiative of India Meteorological Department (IMD), Indian Institute of Tropical Meteorology (IITM) and Indian Council OF Agricultural Research (ICAR) aims to deliver critical information to farmers through a simple and easy to use mobile application. The mobile application was developed by the Digital Agriculture research theme at International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad in collaboration with IITM, Pune and IMD, Delhi. The app seamlessly aggregates contextualised district and crop wise advisories issued by Agro Met Field Units (AMFU) every Tuesday and Friday with the forecast

and historic weather information to the fingertips of the farmers. The advisories are also issued in vernacular wherever available.

https://play.google.com/store/apps/details?id=com.aas.meghdoot

VNMKV, Parbhani: AAB is also available on Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani website

https://university.vnmkv.ac.in/WeatherBulletinpdf/_AAB_Parbhani.pdf

VNMKV, Parbhani: AAB is also available on Blogger
https://www.blogger.com/blog/posts/5278960244914681835?bpli=1&pli=1
YouTube Channel of VNMKV, Parbhani
YouTube Channel of Agriculture Dept. Govt Maharashtra “"हवामानाचा अंदाज आणि कृषि तज्ञांचा सल्ला 2023""

8.1.5 Different apps/dashboard/channels/stations/means used to disseminate The information

Damini: Lightning Alert: Damini Lightning apps is developed by IITM-Pune and ESSO. The apps are monitoring all lightning activity which are happening in specifically for all India. If lightning is happening near you by GPS notification. Under 20 KM and 40 KM. Details description of instruction, precautions is provided in apps while in lightning prone area.

https://play.google.com/store/apps/details?id=com.lightening.live.damini

Meghdoot: Meghdoot, a joint initiative of India Meteorological Department (IMD), Indian Institute of Tropical Meteorology (IITM) and Indian Council OF Agricultural Research (ICAR) aims to deliver critical information to farmers through a simple and easy to use mobile application. The mobile application was developed by the Digital Agriculture research theme at International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad in collaboration with IITM, Pune and IMD, Delhi. The app seamlessly aggregates contextualised district and crop wise advisories issued by Agro Met Field Units (AMFU) every Tuesday and Friday with the forecast and historic weather information to the fingertips of the farmers. The advisories are also issued in vernacular wherever available.

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VNMKV, Parbhani: AAB is also available on Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani website

https://university.vnmkv.ac.in/WeatherBulletinpdf/_AAB_Parbhani.pdf

VNMKV, Parbhani: AAB is also available on Blogger
https://www.blogger.com/blog/posts/5278960244914681835?bpli=1&pli=1
Dissemination of AAB through Whats app groups
Dissemination of AAB through All India Radio

AAB ON IMD WEBSITE:
https://www.imdagrimet.gov.in/AGDistrictBulletin
YouTube Channel of VNMKV, Parbhani
YouTube Channel of Agriculture Dept. Govt Maharashtra “"हवामानाचा अंदाज आणि कृषि तज्ञांचा सल्ला 2023"”

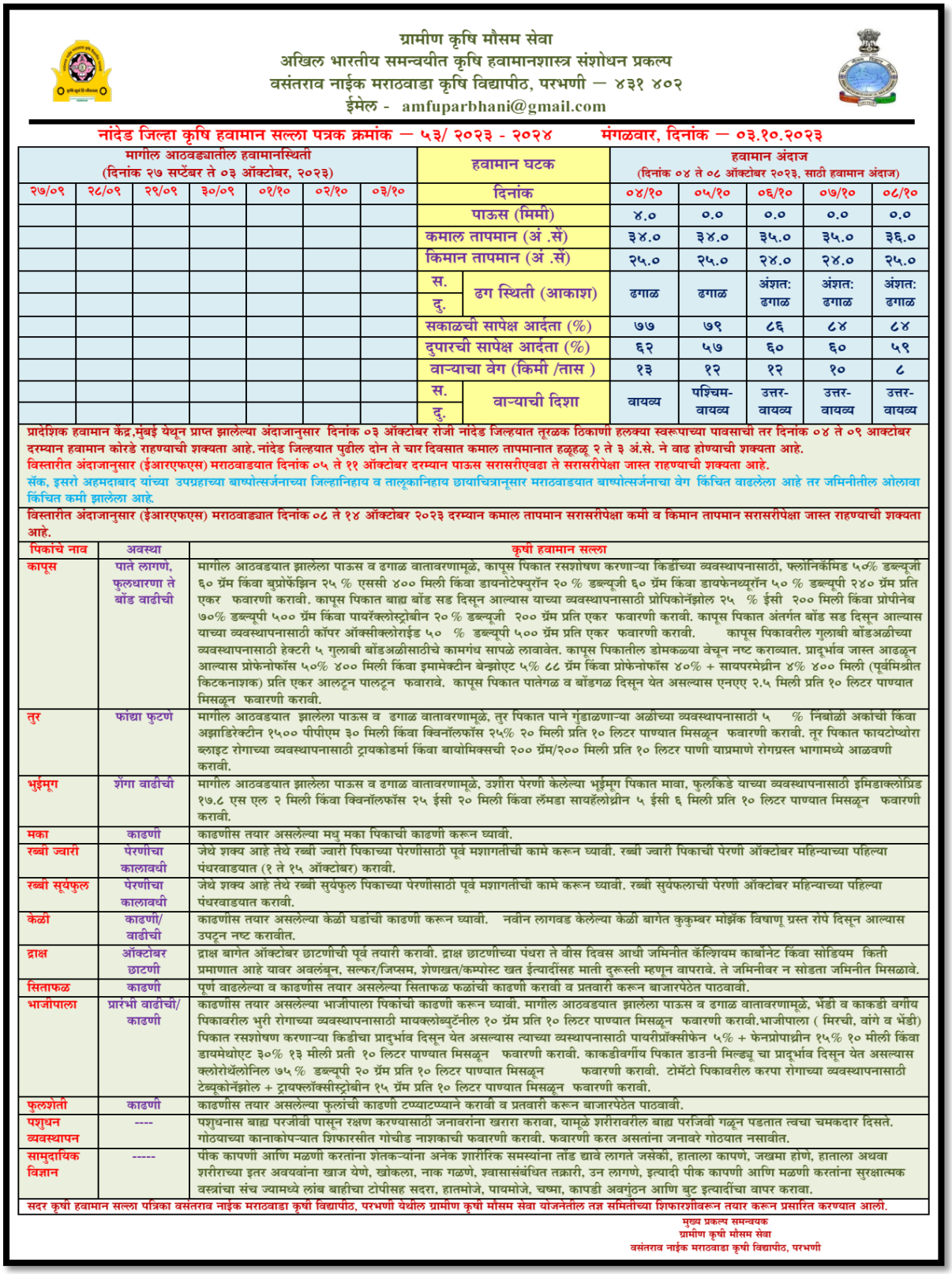
8.1.6 Utilization of Agro-met advisory by farmers in changing climatic condition

Farmers benefit from agro-meteorological (agro-met) advisories across various agricultural activities:

1. Sowing: Farmers receive guidance on optimal sowing times based on weather forecasts, ensuring better germination and crop establishment.
2. Inter-Cultivation Operations: Advisories help farmers plan inter-cultivation activities, such as weeding and hoeing, by considering weather conditions, leading to improved crop management.
3. Sprayings: Farmers can schedule pesticide and fertilizer applications more effectively, aligning with weather conditions to enhance the efficiency of these operations.
4. Harvesting: Timely advisories aid farmers in planning harvest activities, ensuring that crops are harvested before adverse weather conditions, such as heavy rainfall, which could lead to losses.
5. Storage: Weather forecasts assist farmers in deciding when to store harvested crops, considering factors like humidity and temperature to prevent spoilage and maintain crop quality.
6. Transport: Farmers can plan transportation activities, considering weather conditions to avoid disruptions and ensure the timely delivery of agricultural produce.
7. Calamities (e.g., Hailstorms or Cyclones): Advance warnings in advisories allow farmers to take preventive measures, such as covering crops before an expected hailstorm, minimizing damage to standing crops.

Accuracy of forecast is improving day by day and trust of farmers was building up during last few years. Farmers are using AAB for their day to day farm management. Due to which they are able to minimize their losses due to weather hazards.

Advisory released from Gramin Krushi Mousam Seva on 03.10.2023



ग्रामीण कृषि मौसम सेवा
अखिल भारतीय समन्वयीत कृषि हवामानशास्त्र संशोधन प्रकल्प
वसंतराव नाईक मराठवाडा कृषि विद्यापीठ, परभणी — ४३१ ४०२
ईमेल - amfuparbhani@gmail.com

नांदेड जिल्हा कृषि हवामान सल्ला पत्रक क्रमांक — ५३/ २०२३ - २०२४ मंगळवार, दिनांक — ०३.१०.२०२३

मागील आठवड्यातील हवामानस्थिती (दिनांक २७ सप्टेंबर ते ०३ ऑक्टोबर, २०२३)							हवामान घटक		हवामान अंदाज (दिनांक ०४ ते ०८ ऑक्टोबर २०२३, साठी हवामान अंदाज)				
२७/०९	२८/०९	२९/०९	३०/०९	०१/१०	०२/१०	०३/१०	दिनांक		०४/१०	०५/१०	०६/१०	०७/१०	०८/१०
							पाऊस (मिमी)		४.०	०.०	०.०	०.०	०.०
							कमाल तापमान (अं .सें)		३४.०	३४.०	३५.०	३५.०	३६.०
							किमान तापमान (अं .सें)		२५.०	२५.०	२४.०	२४.०	२५.०
							स.	ढग स्थिती (आकाश)	ढगाळ	ढगाळ	अंशत: ढगाळ	अंशत: ढगाळ	अंशत: ढगाळ
							दु.						
							सकाळची सापेक्ष आर्दता (%)		७७	७९	८६	८४	८४
							दुपारची सापेक्ष आर्दता (%)		६२	५७	६०	६०	५९
							वाऱ्याचा वेग (किमी /तास)		१३	१२	१२	१०	८
							स.	वाऱ्याची दिशा	वायव्य	पश्चिम-वायव्य	उत्तर-वायव्य	उत्तर-वायव्य	उत्तर-वायव्य
							दु.						

प्रादेशिक हवामान केंद्र,मुंबई येथून प्राप्त झालेल्या अंदाजानुसार दिनांक ०३ ऑक्टोबर रोजी नांदेड जिल्हयात तुरळक ठिकाणी हलक्या स्वरूपाच्या पावसाची तर दिनांक ०४ ते ०९ आक्टोबर दरम्यान हवामान कोरडे राहण्याची शक्यता आहे. नांदेड जिल्हयात पुढील दोन ते चार दिवसात कमाल तापमानात हळूहळू २ ते ३ अं.से. ने वाढ होण्याची शक्यता आहे.
विस्तारीत अंदाजानुसार (ईआरएफएस) मराठवाडयात दिनांक ०५ ते ११ ऑक्टोबर दरम्यान पाऊस सरासरीएवढा ते सरासरीपेक्षा जास्त राहण्याची शक्यता आहे.
सॅक, इसरो अहमदाबाद यांच्या उपग्रहाच्या बाष्पोत्सर्जनाच्या जिल्हानिहाय व तालूकानिहाय छायाचित्रानूसार मराठवाडयात बाष्पोत्सर्जनाचा वेग किंचित वाढलेला आहे तर जमिनीतील ओलावा किंचित कमी झालेला आहे.

विस्तारीत अंदाजानुसार (ईआरएफएस) मराठवाड्यात दिनांक ०८ ते १४ ऑक्टोबर २०२३ दरम्यान कमाल तापमान सरासरीपेक्षा कमी व किमान तापमान सरासरीपेक्षा जास्त राहण्याची शक्यता आहे.

पिकांचे नाव	अवस्था	कृषी हवामान सल्ला
कापूस	पाते लागणे, फुलधारणा ते बोंड वाढीची	मागील आठवडयात झालेला पाऊस व ढगाळ वातावरणामूळे, कापूस पिकात रसशोषण करणाऱ्या किडींच्या व्यवस्थापनासाठी, फ्लोनिकॅमिड ५०% डब्ल्यूजी ६० ग्रॅम किंवा बुप्रोफेझिन २५ % एससी ४०० मिली किंवा डायनोटेफ्युरॉन २० % डब्ल्यूजी ६० ग्रॅम किंवा डायफेनथ्यूरॉन ५० % डब्ल्यूपी २४० ग्रॅम प्रति एकर फवारणी करावी. कापूस पिकात बाह्य बॉंड सड दिसून आल्यास याच्या व्यवस्थापनासाठी प्रोपिकोनॅझोल २५ % ईसी २०० मिली किंवा प्रोपीनेब ७०% डब्ल्यूपी ५०० ग्रॅम किंवा पायरॅक्लोस्ट्रोबीन २० % डब्ल्यूजी २०० ग्रॅम प्रति एकर फवारणी करावी. कापूस पिकात अंतर्गत बोंड सड दिसून आल्यास याच्या व्यवस्थापनासाठी कॉपर ऑक्सीक्लोराईड ५० % डब्ल्यूपी ५०० ग्रॅम प्रति एकर फवारणी करावी. कापूस पिकावरील गुलाबी बोंडअळीच्या व्यवस्थापनासाठी हेक्टरी ५ गुलाबी बोंडअळीसाठीचे कामगंध सापळे लावावेत. कापूस पिकातील डोमकळया वेचून नष्ट कराव्यात. प्रादूर्भाव जास्त आढळून आल्यास प्रोफेनोफॉस ५०% ४०० मिली किंवा इमामेक्टीन बेन्झोएट ५% ८८ ग्रॅम किंवा प्रोफेनोफॉस ४०% + सायपरमेथ्रीन ४% ४०० मिली (पूर्वमिश्रीत किटकनाशक) प्रति एकर आलटून पालटून फवारावे. कापूस पिकात पातेगळ व बोंडगळ दिसून येत असल्यास एनएए २.५ मिली प्रति १० लिटर पाण्यात मिसळून फवारणी करावी.
तुर	फांद्या फुटणे	मागील आठवडयात झालेला पाऊस व ढगाळ वातावरणामूळे, तुर पिकात पाने गुंडाळणाऱ्या अळीच्या व्यवस्थापनासाठी ५ % निंबोळी अर्काची किंवा अझाडिरेक्टीन १५०० पीपीएम ३० मिली किंवा क्विनॉलफॉस २५% २० मिली प्रति १० लिटर पाण्यात मिसळून फवारणी करावी. तूर पिकात फायटोथ्होरा ब्लाइट रोगाच्या व्यवस्थापनासाठी ट्रायकोडर्मा किंवा बायोमिक्सची २०० ग्रॅम/२०० मिली प्रति १० लिटर पाणी याप्रमाणे रोगग्रस्त भागामध्ये आळवणी करावी.
भुईमूग	शेंगा वाढीची	मागील आठवडयात झालेला पाऊस व ढगाळ वातावरणामूळे, उशीरा पेरणी केलेल्या भुईमूग पिकात मावा, फुलकिडे याच्या व्यवस्थापनासाठी इमिडाक्लोप्रिड १७.८ एस एल २ मिली किंवा क्विनॉलफॉस २५ ईसी २० मिली किंवा लॅमडा सायहॅलोथ्रीन ५ ईसी ६ मिली प्रति १० लिटर पाण्यात मिसळून फवारणी करावी.
मका	काढणी	काढणीस तयार असलेल्या मधु मका पिकाची काढणी करून घ्यावी.
रब्बी ज्वारी	पेरणीचा कालावधी	जेथे शक्य आहे तेथे रब्बी ज्वारी पिकाच्या पेरणीसाठी पूर्व मशागतीची कामे करून घ्यावी. रब्बी ज्वारी पिकाची पेरणी ऑक्टोबर महिन्याच्या पहिल्या पंधरवाडयात (१ ते १५ ऑक्टोबर) करावी.
रब्बी सूर्यफुल	पेरणीचा कालावधी	जेथे शक्य आहे तेथे रब्बी सुर्यफुल पिकाच्या पेरणीसाठी पूर्व मशागतीची कामे करून घ्यावी. रब्बी सुर्यफलाची पेरणी ऑक्टोबर महिन्याच्या पहिल्या पंधरवाडयात करावी.
केळी	काढणी/ वाढीची	काढणीस तयार असलेल्या केळी घडांची काढणी करून घ्यावी. नवीन लागवड केलेल्या केळी बागेत कुकुम्बर मोझॅक विषाणू ग्रस्त रोपे दिसून आल्यास उपटून नष्ट करावीत.
द्राक्ष	ऑक्टोबर छाटणी	द्राक्ष बागेत ऑक्टोबर छाटणीची पूर्व तयारी करावी. द्राक्ष छाटणीच्या पंधरा ते वीस दिवस आधी जमिनीत कॅल्शियम कार्बोनेट किंवा सोडियम किती प्रमाणात आहे यावर अवलंबून, सल्फर/जिप्सम, शेणखत/कम्पोस्ट खत ईत्यादींसह माती दुरूस्ती म्हणून वापरावे. ते जमिनीवर न सोडता जमिनीत मिसळावे.
सिताफळ	काढणी	पूर्ण वाढलेल्या व काढणीस तयार असलेल्या सिताफळ फळांची काढणी करावी व प्रतवारी करून बाजारपेठेत पाठवावी.
भाजीपाला	प्रारंभी वाढीची/ काढणी	काढणीस तयार असलेल्या भाजीपाला पिकांची काढणी करून घ्यावी. मागील आठवडयात झालेला पाऊस व ढगाळ वातावरणामूळे, भेंडी व काकडी वर्गीय पिकावरील भुरी रोगाच्या व्यवस्थापनासाठी मायक्लोब्युटॅनील १० ग्रॅम प्रति १० लिटर पाण्यात मिसळून फवारणी करावी.भाजीपाला (मिरची, वांगे व भेंडी) पिकात रसशोषण करणाऱ्या किडीचा प्रादुर्भाव दिसून येत असल्यास त्याच्या व्यस्थापनासाठी पायरीप्रॉक्सीफेन ५% + फेनप्रोपाथ्रीन १५% १० मीली किंवा डायमेथोएट ३०% १३ मीली प्रती १० लिटर पाण्यात मिसळून फवारणी करावी. काकडीवर्गीय पिकात डाउनी मिल्ड्यू चा प्रादूर्भाव दिसून येत असल्यास क्लोरोथॅलोनिल ७५% डब्ल्यूपी २० ग्रॅम प्रति १० लिटर पाण्यात मिसळून फवारणी करावी. टोमॅटो पिकावरील करपा रोगाच्या व्यवस्थापनासाठी टेब्यूकोनॅझोल + ट्रायफ्लॉक्सीस्ट्रोबीन १५ ग्रॅम प्रति १० लिटर पाण्यात मिसळून फवारणी करावी.
फुलशेती	काढणी	काढणीस तयार असलेल्या फुलांची काढणी टप्प्याटप्प्याने करावी व प्रतवारी करून बाजारपेठेत पाठवावी.
पशुधन व्यवस्थापन	----	पशुधनास बाह्य परजीवी पासून रक्षण करण्यासाठी जनावरांना खरारा करावा, यामूळे शरीरावरील बाह्य परजिवी गळून पडतात त्वचा चमकदार दिसते. गोठ्याच्या कानाकोपऱ्यात शिफारसीत गोचीड नाशकाची फवारणी करावी. फवारणी करत असतांना जनावरे गोठ्यात नसावीत.
सामुदायिक विज्ञान	-----	पीक कापणी आणि मळणी करतांना शेतकऱ्यांना अनेक शारीरिक समस्यांना तोंड द्यावे लागते जसेकी, हाताला कापणे, जखमा होणे, हाताला अथवा शरीराच्या इतर अवयवांना खाज येणे, खोकला, नाक गळणे, श्वासासंबंधित तक्रारी, उन लागणे, इत्यादी पीक कापणी आणि मळणी करतांना सुरक्षात्मक वस्त्रांचा संच ज्यामध्ये लांब बाहीचा टोपीसह सदरा, हातमोजे, पायमोजे, चष्मा, कापडी अवगुंठन आणि बुट इत्यादींचा वापर करावा.

सदर कृषी हवामान सल्ला पत्रिका वसंतराव नाईक मराठवाडा कृषी विद्यापीठ, परभणी येथील ग्रामीण कृषी मौसम सेवा योजनेतील तज्ञ समितीच्या शिफारशीवरून तयार करून प्रसारित करण्यात आली.

मुख्य प्रकल्प समन्वयक
ग्रामीण कृषी मौसम सेवा
वसंतराव नाईक मराठवाडा कृषी विद्यापीठ, परभणी

(Source – District Data from VNMAU. Parbhani)

8.2 Advisory Base on Pest Surveillances Agriculture activity

8.2.1 Implementation Status of CROPSAP:

Software was developed and implemented for data feeding, interpretation, report generation, GIS based pest mapping and advisory dissemination. For regular pest surveillance agriculture assistants and agriculture supervisors are appointed as Pest Scouts for fixed plot. And for random plot survey other officials of agriculture department like Circle agriculture officer, Taluka agriculture officer, Sub divisional agriculture officer and District superintendent of agriculture office are appointed. Pre-seasonal trainings are imparted at SAUs. Presently, pest surveillance is carried out for rice, soybean, cotton and pigeon pea, maize, jowar and sugarcane crops in Kharif and gram in Rabi. Officials appointed for fixed and random plots collect pest data and fed it online in the software through their mobile. The data is processed and reports are generated. These reports are scientifically interpreted and necessary real time detail and short advisories are issued by the experts at State Agricultural University (SAUs). Talukawise advisories with hot spot locations are issued on-line to DSAOs on every Thursday and Monday. DSAOs transmit the messages in form of detail advisories through e-mail to Taluka Level offices. The advisories are displayed at Gram Panchayats in form of Jumbo Xerox, also published in local newspapers and other print and electronic media. Pest situation is discussed in farmers meetings at village conducted by field staff. Short advisories are sent through SMSs to registered farmers. Awareness is created among the farmers through various training programmes, rallies, village meetings etc. to identify pest, their nature of damage and management. Software has a facility to generate Taluka-wise GIS mapping system for soybean, cotton, paddy, tur, maize, jowar, sugarcane and gram pests. The maps generated through this system can be used for identifying epidemic area of particular pest. Wherever the pest population crosses Economic Threshold Level (ETL) subsidized pesticides are supplied in that area on priority through different programmes. Apart from this arranged visits of agriculture department with KVK and university scientists. In this way massive state wide campaign was organized and implemented in the state. Through this project Information and Communication Technology (ICT) is widely used in the field of plant protection for first time in the country.

8.2.2 Impact on Crop pests and diseases management

CROPSAP provided a larger canvas for pest management implementation in terms of technological use, number of stakeholders, number of crops, area covered, skill imparted and employment generated9. The pest affected areas across of soybean, cotton, rice, pigeon pea and chickpea are implemented with scientifically based pest management practices across Maharashtra.

Web Based : Quicker access to pest status and advisory for pest Management
Multi-stakeholders : Robust crop specific technical and financial support
Multi-crops : Five crops covered under surveillance
Area wide : Larger areas under scientific pest management
Education : Awareness on pests to extension functionaries and Farmers through trainings
Employability : Generated employment through engagement of pest Scouts, pest monitors, data entry operators, server supporters, young professionals and research associates

Chapter 9: Commodity wise status of climate Resilient Agriculture value chain

9.1 Existing marketing scenario in the district

Nanded district is primarily an agricultural region with a significant portion of its 75% population engaged in farming activities. The district is known for the production of crops like soybeans, pulses, cotton, sugarcane, and various fruits and vegetables.

Here are some key aspects of the agriculture marketing scenario in Nanded district:

1. Agricultural Produce Market Committees (APMCs): Nanded district has 19 APMCs which play a crucial role in the marketing of agricultural produce. These committees provide a platform for farmers to sell their produce and ensure that they receive fair prices.
2. Crop Diversity: The district has a diverse range of crops being cultivated, with a focus on food crops like cereals, pulses, oilseeds and sugarcane additionally, horticultural crops like guava, mango, sapota sweet lime are also grown.
3. Market Infrastructure: Nanded has several market places and mandis where farmers can bring their produce for sale. These markets are equipped with facilities for weighing, grading, and auctioning of agricultural commodities.
4. Technology Adoption: The adoption of modern agricultural practices and technology varies across the district. Some farmers have adopted techniques like drip irrigation, precision farming, and use of improved seeds, while others may still rely on traditional methods.
5. Market Linkages: Efforts are made to establish better market linkages for farmers, enabling them to access wider markets and fetch better prices for their produce.

9.1.1 Year wise marketable surplus of major crops.

Sr.no	Commodity	Avg. annual production (M.T.)	Consumption (M.T.)	Marketable Surplus (M.T)
1	Soybean	638000	76500	561500
2	Red Gram	86200	9442	76758
3	Black Gram	165000	19800	145200
4	Green Gram	140000	16100	123900
5	Jowar	120000	26400	93600
6	Gram	305000	27450	277550
7	Safflower	12000	2280	9720

(Source: District Marketing office, Nanded.)

9.1.2 Markets available in District with commodity handled.

1) APMC'S In District:-

Sr. No.	Block	Name of APMC	Commodity handled
1	Nanded	Nanded	Jowar, Wheat, Soybean, Turmeric, Gram, Red Gram
2	Dharmabad	Dharmabad	Jowar, Soybean, Gram, Red Gram, Black Gram, Green Gram
3	Degloor	Degloor	Jowar, Soybean, Gram, Red Gram, Black Gram, Green Gram
4	Degloor	Hanegaon	Jowar, Soybean, Gram, Red Gram, Black Gram, Green Gram
5	Naigaon	Naigaon	Jowar, Soybean, Gram, Red Gram, Black Gram, Green Gram
6	Naigaon	Kuntur	Jowar, Soybean, Gram, Red Gram, Black Gram, Green Gram
7	Mukhed	Mukhed	Jowar, Soybean, Gram, Red Gram, Black Gram, Green Gram
8	Biloli	Biloli	Jowar, Soybean, Gram, Red Gram, Black Gram, Green Gram
9	Biloli	Kundalwadi	Jowar, Soybean, Gram, Red Gram, Black Gram, Green Gram
10	Kinwat	Kinwat	Jowar, Soybean, Gram, Red Gram, Black Gram, Green Gram
11	Kinwat	Islapur	Jowar, Soybean, Gram, Red Gram, Black Gram, Green Gram
12	Kandhar	Kandhar	Jowar, Soybean, Gram, Red Gram, Black Gram, Green Gram
13	Loha	Loha	Jowar, Soybean, Gram, Red Gram, Black Gram, Green Gram
14	Hadgaon	Hadgaon	Jowar, Soybean, Gram, Red Gram, Turmeric
15	Umari	Umari	Jowar, Soybean, Gram, Red Gram, Black Gram, Green Gram
16	Mahur	Mahur	Jowar, Soybean, Gram, Red Gram, Black Gram, Green Gram
17	Mudkhed	Mudkhed	Jowar, Soybean, Gram, Red Gram, Black Gram, Green Gram
18	Himayatnagar	Himayatnagar	Jowar, Turmeric, Soybean, Gram, Red Gram,
19	Bhokar	Bhokar	Jowar, Soybean, Gram, Red Gram, Turmeric

(source:- www.msamb.com i.e. Maharashtra state agriculture marketing board)

2) e-NAM Mandis: -

Sr.No.	Mandi	Mandi postal address	commodity handled
1	Bhokar	APMC, at post Bhokar dist. Nanded PIN-431801 tel:-02467-222846	Turmeric, Soybean, Red gram, Banana, Jowar , Gram

(Source: enam.gov.in)

9.1.3 Year wise price variation of major crops

Year / Crops	Soybean (Rs.)	Cotton (Rs.)	Black gram(Rs.)	Green gram (Rs.)	Red gram (Rs.)	Gram (Rs.)	Jowar (Rs.)
2018	3260	5850	4190	6300	4100	4050	2200
2019	3480	5420	5890	6720	5150	3950	2420
2020	4100	6958	7900	6650	5500	5100	2600
2021	6150	6700	7000	7200	5950	4400	3275
2022	5200	6380	7012	7420	7820	4450	3600

(Source: APMC, Nanded)

9.2 Constraints in existing value chain

1. **Lack of Access to Credit:**
   Many small-scale farmers may face difficulties in obtaining loans or credit facilities, which hinders their ability to invest in modern farming techniques, purchase quality inputs, and expand their operations.
2. **Limited Access to Markets**: Some farmers may struggle to access larger markets due to inadequate transportation infrastructure, lack of market information, or challenges in meeting quality and quantity requirements of buyers.
3. **Inefficient Post-Harvest Handling:** Poor handling and storage practices can lead to significant post-harvest losses. This includes issues such as improper packaging. Inadequate storage facilities, and transportation delays.
4. **Limited Technological Adoption:** Some farmers may not have access to modern agricultural technologies or may lack the knowledge and skills required to effectively implement them.
5. **Inadequate Infrastructure**: This can include issues like poor roads, lack of cold storage facilities, and insufficient processing units. These constraints can lead to delays, quality degradation, and increased costs.

6. **Fragmented Supply Chains**: Fragmented supply chains can result in inefficiencies, as there may be multiple intermediaries involved, each taking a portion of the profit margin.
7. **Lack of Market Information**: Farmers may not have access to timely and accurate information about market prices, demand trends, and consumer preferences, which can lead to suboptimal decision-making.
8. **Price Volatility**: Fluctuating prices for agricultural commodities can make it difficult for farmers to plan and invest for the long term.
9. **Market Power Imbalances**: Large buyers or middlemen may have significant bargaining power over small-scale producers, leading to unfair pricing and distribution of benefits.

9.3 Potential for strengthening of commodity wise value chains

1. **Availability of Key Commodities: -** Understand the primary agricultural commodities for market. This may include crops like soybeans, pulses, cotton, sugarcane, and various fruits and vegetables.
2. **Supply Chain Mapping: -** By Mapping the existing supply chain for each commodity, from production to consumption. Identify key players, infrastructure, and any gaps or inefficiencies in the current value chain.
3. **Processing and Value Addition:-**Due to Availability of raw material there is scope for food processing, packaging, and other forms of value addition. Increase in processing means automatically strengthening of value chain.
4. **Quality Standards and Certification: -** Evaluate the quality standards required for the targeted commodities. Explore opportunities for implementing and adhering to quality certifications, which can enhance market access.
5. **Technology Adoption: -** Examine the potential for adopting technology and modern agricultural practices to improve productivity, reduce costs, and enhance efficiency along the value chain.
6. **Infrastructure and Logistics: -** Assess the existing infrastructure for transportation, storage, and processing. Identify areas where infrastructure development could improve the efficiency of the value chains.
7. **Access to Finance:-**Evaluate the availability of financial services for farmers and other stakeholders along the value chain. Explore opportunities for improving access to credit and investment.
8. **Capacity Building:-**Identify areas where capacity building is needed, including training programs for farmers, skill development for agri-entrepreneurs, and education on sustainable practices.

9.4 FPCs' contribution in value chain development

9.4.1 Status of FPCs in the district

In Nanded district 576 FPC's registered. Now a days FPC movement has emerged in district. Basically FPCs of distinct do collecting agriculture produce and selling them and provide services like custom hiring centres, cleaning and grading, godowns, etc. At present as FPCs starting small processing units with help of different schemes like PoCRA, SMART etc.

9.4.2 Assessment of FPCs in the district

9.4.2.1. Objectives of Evaluation

- The study is an attempt to assess the Farmer Producer Companies of project area and find whether these companies are performing and earning sufficient returns to sustain business. The report has also proposed a rating method to measure the performance of FPCs considering different 8 parameters. The reports analysed 101 Farmer Producer Companies with the help of parameters. The parameters were further assigned performance scores on the basis of efficiency and effectiveness with the help of Automatic Rating Meter.
- On the basis of assessment report, suggesting the measures for strengthening of FPCs e.g. capacity building, climate resilience adaptation.

Table no. 9.2.2.1.a. **Criteria for Evaluation of FPCs**

Criteria	Max. Score
Organization and Administration (Core foundation strength)	21
Governance (Control System in Place)	11
Management (Decision making processes)	8
Infrastructure (Assets and resources)	5
Finance (Financial Base and health)	25
Business and Market Linkages (Resource quality)	21
Capacity Building (Resource quality)	5
Climate Resilience (Adaptability to climate risk)	4
Final Score	**100**

Scoring Method of Evaluation

- The maximum score for the above mention parameter was 100. The FPC rating report was generated by calculating the obtained score for a FPC. From these scores the result boxes were generated in the report indicating areas where this particular FPC needs to be improved. Selected questions were grouped under every parameter and weightage was accorded to each question under each parameter. The final score was calculated by using formula:

$$\textbf{Score}=\frac{\boldsymbol{Maximum\ Obtained\ Score}}{\boldsymbol{Maximum\ Obtainable\ Score}}\times\mathbf{100}$$

9.4.2.2 Output of evaluation.

All the major parameter noted above can be classified on the basis of percentage and frequency. The total obtained percent score was use for categorization of the parameter. The parameter was categories into three categories i.e. below 50% marks, 50- 75% marks, and above 75% marks. And all the FPCs were categories in three categories which help to analysed the present situation of the FPCs present in the project area and will also help to given suggestion to them. This analysis can be useful for the project also for developed different strategies plan for the project area.

The main findings from the survey and the observations from the detailed interactions with the member or directors of the FPCs created insights in terms of how the FPCs operate today, where the members want it to go in the future, how the Directors perceive the plan of action for the future and in which focus areas the gaps between reality and expectation lie.

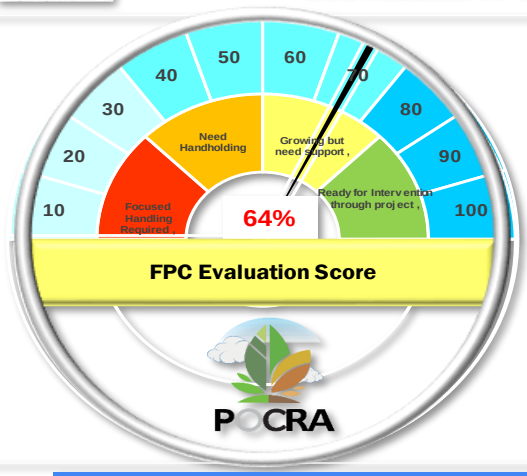
Customized Evaluation Report

Nanaji Deshmukh Krush Sanjivani Praklap

Maharashtra Project on Climate Resilient Agriculture

(Project of government of Maharashtra in partnership with World Bank)

CUSTOMIZED FPC EVALUATION REPORT



Name of FPC

Shetkari Mitra Farmers Producer Co.Ltd.

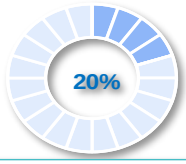
Address

At.Po.Malegaon , Tq.Ardhapur , Dist-Nanded , Pincode- 431715

Score Report

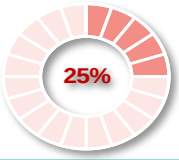
Criteria	Max. Score	Score Obtained
Organization & Adminstration (Core Foundation Strength)	21	18
Governance (Control Systems in Place)	11	7
Management (Decision making processes)	8	6
Infrastructure (Assets and resources)	5	3
Finance (Financial base and health)	25	14
Business & Market Linkages (Resource quality)	21	14
Capacity Building (Resource quality)	5	1
Climate Resilience (Adaptability to climate risk)	4	1
Final Score	100	64

What could improve your FPC?



Capacity Building

Training is required on various climate resilient crop production practices and other new technologies. BOD trainings required for business management and legal compliances. Awareness on climate change is required so that the FPC can adapt CR practices.



Climate Resilience

The FPC should promote various climate resilient agricultural technologies.

Finance

Regular auditing, regular share transfers to members, regular compliances to ROC will help in better financial management . Various financial resources maybe tapped to generate additional finances

For more Information contact us at Project Director, ATMA, Nanded

9.4.3 Information about FPC's supported by SMART/NDKSP/MAGNET

1) NDKSP Beneficiary List: -

Sr. No	Name of FPC
1	Shivsulbha Agro Producer Company Limited
2	Shambhunath Agro Producer Company Limited
3	Krishnamoti Farmers Producer Company Limited
4	Rare Rabit Farmers Producer Company Limited
5	Khadkeshwar Agrotech Farmer Producer Company Limited
6	Aradhyapur Farmers Producer Company Limited
7	Shingroba Farmers Producer Company Limited
8	Vishwajeet Farmers Producer Company Limited
9	Bhandare Farmer Producer Company Limited
10	Shirurkars Farmers Producer Company Limited

2) SMART Beneficiary List: -

Sr. No	Name of FPC
1	Shetkari Mitr Farmers Producer Company Limited
2	Godamai Rural Farmers Producer Company
3	Rupalishiv Farmers Producer Company
4	Asawari Farmers Producer Company
5	Shitladevi Farmers Producer Company

9.4.4 Details of services provided by FPC's.

Sr. No	Name Of FPC	Provided Service
1	Deshmukh Farmers Producer Company Limited	Custom Hiring Centers (CHC)
2	Sangareddy Agro Producer Company Limited	Custom Hiring Centers (CHC)
3	Telki Farmers Producer Co. Ltd.	Custom Hiring Centers (CHC)
4	Atmasamman Farmers Producer Company Limited	Custom Hiring Centers (CHC)
5	Panchmukhi Parmeshwar Farmer Producer Company Limited	Custom Hiring Centers (CHC)
6	Vitthalrao Patil Farmers Producer Company Limited	Custom Hiring Centers (CHC)
7	Yuvashree Agro Producer Company Limited	Custom Hiring Centers (CHC)
8	Hanmant Bapurao Farmer Producer Company Limited	Custom Hiring Centers (CHC)
9	Bhokar Rural Farmers Producer Company Limited	Custom Hiring Centers (CHC)
10	Krishnamoti Farmers Producer Company Limited	Godown
11	Shivastha Farmers Producer Company Limited	Godown
12	Shambhunath Farmers Producer Company	Pack House
13	Nayi Disha Farmers Producer Company Limited	Input Center
14	Shivling Badshaha Farmers Producer Company	Input Center

Sr. No.	Services provided by FPC's	No. of FPC's
1	Custom Hiring Centers	70
2	Godown	12
3	Cleaning and Grading	4
4	Input Centers	28
5	Pack house	2
6	Other	14

9.4.5 Details of commodity transacted by the FPC's.

Sr. No	Name of FPC	Commodity Handled
1	Raje Malharrao Holkar Agro Producer Company Ltd.	Soybean, Gram, Red Gram
2	Krishnamoti Farmers Producer Company Limited	Soybean, Gram
3	Shambunath Agro Producer Company Limited	Banana, Turmeric
4	Bhandare Farmers Producer Company Limited	Soybean, Gram , Red Gram
5	Sarkhani Farmers Producer Company Limited	Soybean, Gram
6	Tawde Farmers Producer Company Limited	Soybean, Gram
7	Shivastha Farmers Producer Company Limited	Soybean, Gram
8	Shevantamata Farmers Producer Company Limited	Soybean, Gram
9	Narayandari Farmers Producer Company Limited	Soybean, Gram
10	Shetkari Mitra Farmers Producer Comapany Limited	Turmeric, Soybean , Gram
11	Nandigram Farmers Producer Company Limited	Turmeric, Soybean , Gram

Chapter 10: Extension strategies for adaptation to climate change

I) Preparation of Village Adaptation Plan

- Need for participatory micro-planning and pre-season meetings
- Process for micro-planning and seasonal meetings- agenda, stakeholders, duration, material required, information needed etc.
- Role of Village Agriculture Development Committee of Gram panchayat
- Components of Village Adaptation Plan to be prepared for each village

❖ **Planning for water security**

a. Computation of water budget
b. Water conservation structures
c. Groundwater recharge structures (including recharge of wells)
d. Water harvesting structures
e. Micro-irrigation plan

❖ **Planning for soil health**

a. Soil health Card status of the village
b. Status of Organic Carbon content
c. Soil health based advisory- crop suitability
d. On-farm production of biofertilizers
e. Production of organic inputs
f. Regenerative agriculture plan
g. Soil erosion/ degradation arresting measures

❖ **Crop planning based on water budget and market demand**

a. Current cropping pattern
b. Available water balance (post monsoon)
c. Last year prices of crops
d. Crop diversification
e. Proposed cropping pattern (season and crops)

❖ **Planning for Carbon sequestration**

a. Agro-forestry plantation
b. Horticulture plantation
c. Forage/ Cover crop cultivation
d. Bamboo plantation
e. Live fencing plan

❖ **Planning for reduction of production cost**

a. Reducing cost on labour intensive operations (by mechanization)

b. Reducing use of chemical fertilizers (by enhancing use of bio/ organic fertilizers)

c. Reducing use of chemical pesticides (by enhancing use of bio/ natural pesticides)

d. Reducing tillage operations (by conservation agriculture)

e. Reducing excessive water usage (by micro-irrigation)

❖ **Planning for conservation and production of climate resilient variety seed**

a. Identification of CRV.

b. Production programme for Truthful/ Certified/ Foundation seeds- status

c. Conservation of indigenous seed having climate resilient characters- details of such seeds with location and characteristics

❖ **Adoption of climate resilient technologies**

a. Identification of CRT useful to the village and creating awareness

b. Plan of demonstration of CRT (FFS, Method/ Result Demonstrations)

c. Most prominently adopted technologies and their impact

d. Innovative technologies adopted

e. Validation of technologies developed by Progressive farmers

❖ **Integrated Pest Management Plan**

a. Identification of common pests on major crops based on *CROPSAP*

b. Plan of IPM technologies to be adopted

c. On-farm production of bio-pesticides, natural pesticides etc.

d. Skill training to reduce pesticide hazard

❖ **Integrated farming systems**

a. Potential for crop based and other livelihood activities

b. Households to be engaged in IFS

c. Plan for market linkage for IFS produce

❖ **Preparation of contingency plan**

a. Village level weather forecast mechanism

b. Preparedness for contingencies

c. Crop insurance promotion and status

d. Monitoring of contingencies

e. Assessment of losses due to natural calamities if any

❖ **Strengthening of commodity value chains**

a. Assessing existing commodity value chains

b. Identification of gaps in existing value chains

c. Assessing volume of commodity to be marketed

d. Assessing warehouse availability and available capacity

e. Assessing transportation facilities

f. Plan for infrastructure

g. Plan for market linkage of major commodities

h. Role of Women Self Help Groups, Farmer Groups, FPCs

II. Convergence of Govt. Programs with Extension Plan

A. ATMA (Agricultural Technology Management Agency):

In the year 2022-23, 32 farmer trainings have been completed under the ATMA in the district, including 6 trainings outside the state regarding silk industry and dairy business management, 16 trainings within the state regarding goat rearing and grain processing unit and 32 trainings within the district regarding fruit processing unit and hygiene, goat rearing and dairy business are completed. Farmers' trips farmers outside the state, 5 farmers and 14 farmer groups within the state, 185 farmers and 18 farmer groups within the district have completed their farmer trips. There are 49 Kisan Gosthi programs in which 751 farmers participated. 14 agricultural schools have been completed. 1392 crop demonstrations have been completed under ATMA Yojana.

B. Ranbhaji Mahotsav:

District Level Ranbhaji Mahotsav was organized during 09 to 15 August 2022 on behalf of Maharashtra State, Department of Agriculture on 09/08/2022 Project Director ATMA, and Nanded was organised. Which was inaugurated by Hon. collector Nanded Dr. Vipin Itankar. According to the suggestion of the Commissioner of Agriculture, according to the natural availability of wild vegetables at district level and taluka level. Total 70 stall holders participated in this Mahotsav for selling wild variety of vegetables and organic produce. During this Mahotsav ranbhaji cooking competition was organised with delightful arrangement of dishes. 2140 farmers participated in the vegetable festival organized at district and tehsil level.

C. Agriculture Sanjivani week:

from 25 th June to 1st July 2022, meetings were organized in 763 villages with the participation of 12769 farmers and guidance was given regarding preparation of Kharif season, importance of seed germination, seed treatment, soil testing, various schemes of agriculture department, precautions to be taken while handling/spraying chemical pesticides.

D. Pradhan Mantri Pik Bima Yojana:

Under this scheme 1057508 farmers insured for kharif season 2022-2023 by Rs.3247.22 cr. out of this 472.51 cr has been sanctioned

E. Vikel Te Pickel:

During the year 2021-22, the Sant Shiromani Sawta Mali Ryat Bazar Abhiyan " program, operating under the vikel te pikel policy, involved a total of 60 farmer groups or farmer producer companies in selling their agricultural produce in the area of the Collectorate. This special event took place in celebration of Republic Day and continued until January 29 in the collector office area. Additionally, as part of this initiative, a booklet featuring success stories of innovative activities carried out by various farmers in the district was released by the dignitaries who were present. This booklet likely served to showcase and inspire others

F. SMART:

In 2022-23, 38 proposals were received in the district under this scheme and submitted to the Commissionerate for preliminary approval. Out of these, 19 proposals have received final approval. Three detailed project reports of the proposals have been submitted to the Commissionerate level for approval. One project has been initiated, and the first tranche has been disbursed to seven (CBOs), with a total amount of 483 lakh.

G. NDKSP:

Till date 143282 farmers of the district have been registered on the online portal DBT PoCRA and a total of 151996 individual benefit applications have been registered. Out of which till date 25253 farmers have been given subsidy amounting to Rs.105.62 cr.

Also under the agribusiness component till date **124** farmer groups and farmer producer companies in the district have distributed subsidy amounting to Rs.**1328.04** cr.

(Source: related department wise data collected)

III. Monitoring mechanism for village adaptation progress

A. Monthly review of Taluka Agriculture Officers and Circle Agriculture Officers.
B. Monthly meetings with field functionaries of all agriculture schemes.
C. Through the field farm school to give the proper guidance for farmers regarding climate resilient technologies to create sustainable livelihood opportunities.
D. To inspire the farmer by effective communication to plan adaptation of new technology and schemes and to focus on adaptive climate resilient agriculture technologies for sustain.

E. To identify the needs and problems of farmers for effective implementation of various agriculture schemes. To train extension workers, government officials, and agricultural experts to provide guidance and support to farmers in adopting mechanization.
F. Provide easy access to information about the latest trends in mechanization and government support programs through online platforms and local agricultural extension offices.
G. Encourage the formation of farmer cooperatives to jointly invest in and share machinery. This can help small farmers access modern equipment.
H. Promote the use of mechanization methods that are environmentally sustainable, such as precision agriculture and reduced chemical usage.
I. Monitor the adoption of modern agricultural technologies and machinery, such as tractors, harvesters, irrigation systems, and precision agriculture tools.

IV. Strategy for revisiting the village adaptation plan

1. Revisiting a village adaptation plan is essential to ensure that it remains effective and relevant to the changing needs and circumstances of the communities it serves. Here's a strategy for revisiting and updating a village adaptation plan:
2. Stakeholder Engagement: Identify and engage with key stakeholders, including local government officials, community leaders, farmers, NGOs, and agricultural experts. Conduct meetings and workshops to gather input and feedback on the existing plan and to understand the evolving needs and challenges of the villages.
3. Assessment of Changing Climate Patterns: Consider the impact of changing climate patterns on agriculture and rural communities. Assess the need for climate-resilient strategies and adaptations.
4. Technology and Mechanization: Review the adoption of modern agricultural technologies and machinery in the villages. Evaluate the effectiveness of any support or subsidies provided for technology adoption.
5. Market and Value Chain Analysis: Analyse the local and regional markets for agricultural produce. Identify opportunities to strengthen value chains, improve market access, and increase farmers' income.
6. Resource Management: Evaluate the sustainable management of natural resources, including water, soil, and forests. Consider strategies for resource conservation and sustainable practices.
7. Climate-Smart Agriculture: Incorporate climate-smart agricultural practices and technologies to help farmers adapt to changing weather patterns. Promote techniques such as crop diversification and water management.
8. Capacity Building and Training: Review the effectiveness of training and capacity-building programs for farmers. Ensure that farmers have access to knowledge and skills needed for modern and sustainable farming practices.
9. Community Participation: Involve local communities in the planning and decision-making process. Encourage community-led initiatives and self-help groups.

ANNEXURES: I Village level micro plan

Government of Maharashtra – Agriculture Departures
Nanaji Deshmukh Krishi Sanjivani Yojana

Village Name:-Sakur	Census Code:- 544154
Board Of Revenue:-Wanola	Taluka :- Mahur
Subdivision :- Kinwat	District :- Nanded

Sr. No.	Village Name	Census Code	Sr. No.	Village Name (Marathi)	Census Code
1	Dahegaon (SA) (Navin)	544149	6	Pachunda	544152
2	Digdi (Mohapoor)	544156	7	Maandwa (Mahur)	544146
3	Dhanora (Digdi)	544155	8	Wanola	544147
4	Panola	544141	9	Khupti (Nahur)	544151
5	Wanola Tanda	544153	10	Borwadi	544148

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ANNEXURES:II **SAMPLE VILLAGE PROFILE**

नानाजी देशमुख कृषि संजीवनी प्रकल्प — सत्यमेव जयते — कृषी विभाग महाराष्ट्र शासन

अहवाल क्रमांक : **नादेकृसप्र/गामाप्र/544154/2024/129** दिनांक : 08/05/2024

ग्राम कृषी संजीवनी विकास दर्शिका

गावाचे नाव : साकूर	गावाचा सांकेतांक : 544154	ग्रामपंचायत: Sakur
गावाचा (प्रकल्प) टप्पा : 3	गाव खारपान मध्ये येते का ?: नाही	समूह कोड: 511_npg-14_02
तालुका : माहूर	उपविभाग : किनवट	जिल्हा : नांदेड

प्रकल्प कर्मचारी/अधिकारी

पदनाम	पूर्ण नाव	भ्रमणध्वनी क्रमांक
उपविभागीय कृषी अधिकारी	Ranveer R	9404087883
तालुका कृषी अधिकारी	munde B	9420688512
कृषी सहाय्यक	Sable Ganesh	9421759036
समूह सहाय्यक	Zampalwad Amar Anandrao	9860748350
शेतीशाळा प्रशिक्षक	NA	NA
कृषीमित्र	KARAHALE DEVIDAS RAMRAO	8275242641
कृषीताई	Todsam Sangita Kishor	9309937188

ग्राम कृषी संजीवनी समिती

पदनाम	पूर्ण नाव	भ्रमणध्वनी क्रमांक
सरपंच	Thambare Tukaram Maroti	7620323832
उपसरपंच	Kambale Kashep Narayan	8261027381
ग्रामपंचायत सदस्य	Bule Pushpabai Dilip	9529871182
ग्रामपंचायत सदस्य	Kusram Archana Pankaj	9359319498
प्रगतिशील शेतकरी	Murmure Devrao Nagorao	9579702716
प्रगतिशील शेतकरी	Bule Santosh Madhav	9022779756
महिला शेतकरी	Kamble Sindubai Narayan	9405767621
महिला शेतकरी	Dukare Sangita Datta	7494407164
महिला शेतकरी	Shinde Aruna Sahebrao	7972596532
शेतकरी उत्पादक कंपनी प्रतिनिधी	Sidam Shankar Manglu	8459363061
बचत गट महिला प्रतिनिधी	Ughdhe Satyabhama Digambar	7666831374
कृषि पूरक व्यावसायिक शेतकरी	Bharati Rudraksha Ganesh	9356284909
कृषि पूरक व्यावसायिक शेतकरी	Kusram Madhav Punjaram	9405971247

भौगोलिक तपशील

एकूण भौगोलिक क्षेत्र (हे.) - 961	वनक्षेत्र (हे) - 224.27
निव्वळ पेरणी क्षेत्र (हे.) - 475.06	बागायती क्षेत्र (हे.) - 443.06
एकूण लोकसंख्या - 383	एकूण कुटुंब संख्या - 149
शेतकरी संख्या - 278	शेतकरी (अनुसूचित जाती) - 237
अल्प व अत्यल्प भूधारक - 278	शेतकरी (अनुसूचित जमाती) - 391

हवामान अंदाज व पीक सल्ला

माहिती उपलब्ध नाही

वैयक्तिक लाभार्थी तपशील

नोंदणी केलेले शेतकरी - 159	अर्जांची एकूण संख्या - 380
पूर्वसंमती दिलेले अर्ज - 90	लाभ दिलेले अर्ज- 90
लाभार्थी संख्या - 74	लाभार्थी महिला शेतकरी - 18
अनुसूचित जाती लाभार्थी - 15	अनुसूचित जमाती लाभार्थी - 12
वितरीत अनुदान रक्कम - 2570416	बँकेसोबत आधार संलग्न नसलेले शेतकरी - 6

घटकनिहाय वितरित अनुदान

घटक/बाब	एकूण अर्ज	पूर्व समंती प्राप्त अर्ज	नाकारलेल्या अर्जांची संख्या	लाभार्थी शेतकरी	वितरीत केलेला निधी (रू)
Apiculture	1	0	1	0	0
Backyard Poultry	4	0	4	0	0
Compost (Vermicompost / NADEP / Organic input production unit)	5	0	5	0	0
Drip Irrigation	75	11	61	11	909552
Farm Mechanization	16	2	14	2	225000
Farm Pond (Individual)	25	1	18	0	0
Farm Pond Lining	3	0	1	0	0
FFS host farmer assistance / Promotion of BBF technology/ Zero Tillage Technology etc.	5	1	4	1	2800
Horticulture Plantation / Agroforestry	24	1	12	1	5367

Pipes	6	0	6	0	0
Polyhouse/ Poly tunnels	2	0	1	0	0
Recharge of open dug wells	18	1	9	1	11797
Saline and Sodic lands (Farm ponds/ Sprinklers / Water pump/ FFS)	2	1	1	1	17521
Sericulture	18	0	18	1	45000
Shadenet House	8	0	5	0	0
Sprinkler Irrigation	155	72	46	70	1353379
Water Pumps	4	0	4	0	0
Well	9	0	5	0	0
Total	380	90	215	88	2570416

कृषी व्यवसाय घटकाचा तपशील

नोंदणी केलेल्या FPC/SHG/Farmer Group ची संख्या - 0
एकूण अर्जांची संख्या - 0
पूर्वसंमती दिलेल्या अर्जांची संख्या - 0
कार्यारंभ आदेश दिलेल्या अर्जांची संख्या - 0
लाभ दिलेल्या FPC/SHG/Farmer Group ची संख्या - 0
अनुदान वितरीत रक्कम, रु. - 0

मृद व जलसंधारण तपशील

पावसाचे प्रमाण (मिमी) - 801.58
उपलब्ध अपधाव (TCM) - 0
अडवलेला अपधाव (TCM) - 0
शिल्लक अपधाव (TCM) - 0
प्रस्तावित क्षेत्र उपचार (हे.) - 361
प्रस्तावित नाला उपचार संख्या - 6
कामांची एकूण रक्कम - 81.5
तयार अंदाज पत्रकांची संख्या - 0
एकूण तांत्रिक मंजुरींची संख्या - 0
पूर्ण झालेल्या ई निविदा संख्या - 0
सुरु झालेल्या कामांची संख्या - 0
पूर्ण झालेल्या कामांची संख्या - 0
निधी वितरण केलेल्या कामांची संख्या - 0
खर्च झालेली एकूण रक्कम (रू) - 0

पिक पद्धतींचा तपशील

खरीप हंगामातील मुख्य पिके तपशील

पीक - सोयाबीन
जमीन (हे) - 311
पीक - कापूस
जमीन (हे) - 208
पीक - तूर
जमीन (हे) - 48
पीक - उडिद
जमीन (हे) - 4

बारमाही पिकांचा तपशील

पीक - ऊस जमीन (हे) - 16

भूमी उपयोगिता वर्गीकरण

गावाचे एकूण भौगोलिक क्षेत्र 961 हे असून निव्वळ पिकाखाली त्यापैकी 0% क्षेत्र आहे. गावाचे भूरूप ढोबळमानाने उंचसखल/ डोंगराळ/ सपाट प्रकारचे आहे. गावातील निव्वळ पिकाखालील क्षेत्रापैकी 0% क्षेत्राकरिता सिंचनसुविधा उपलब्ध आहे.

अ.क्र.	तपशील		क्षेत्र (हेक्टर)
1	एकूण भौगोलिक क्षेत्र (Total Geographical Area)		961
2	पिकाखालील निव्वळ क्षेत्र (Net Cropped Area)		NA
3	दुबार पिकाखालील क्षेत्र (Double Cropped Area)		NA
4	एकूण लागवडीखालील क्षेत्र (Gross cropped Area)		NA
5	एकुण सिंचित क्षेत्र (Irrigaterd Area)	हंगामी बागायत	NA
		बारमाही बागायत	NA
6	एकूण वन क्षेत्र (Total Forest Area)		NA
7	कायम पड क्षेत्र (Permanent Fallow Area)		NA
8	चालू पड क्षेत्र (Current Fallow Area)		NA
9	गवत पड व चराऊ कुरणे (Pasture Land)		NA
10	इतर पड क्षेत्र (Other Fallow Area)		NA
11	बिगर कृषि क्षेत्र (Area put to non-Agricultural use)		NA

पिकनिहाय क्षेत्र (क्षेत्र हेक्टर)

अ.क्र.	पिकाचा वर्ग	पिकाखालील क्षेत्र
1	तृणधान्य	0
2	कडधान्य	52
3	गळितधान्य	311
4	नगदी पिके (कापूस,ऊस)	224
5	भाजीपाला पिके	0
6	फळपिके	0
7	चारा पिके	0
8	इतर	0

एकूण	587

निरीक्षण विहिरींची पाण्याची पातळी

सूक्ष्म नियोजन आराखड्यानुसार गावतील सरासरी भुजल पातळी -- (खोली मी मध्ये) निरीक्षण साठी निवडलेल्या विहिरीचा तपशील

माहिती उपलब्ध नाही

शेतमाल निहाय घाऊक बाजारातील आवक व बाजार भाव बाबत माहीती

माहिती उपलब्ध नाही

नजिकचे गोदाम / वखारकेंद्रा बाबत माहीती

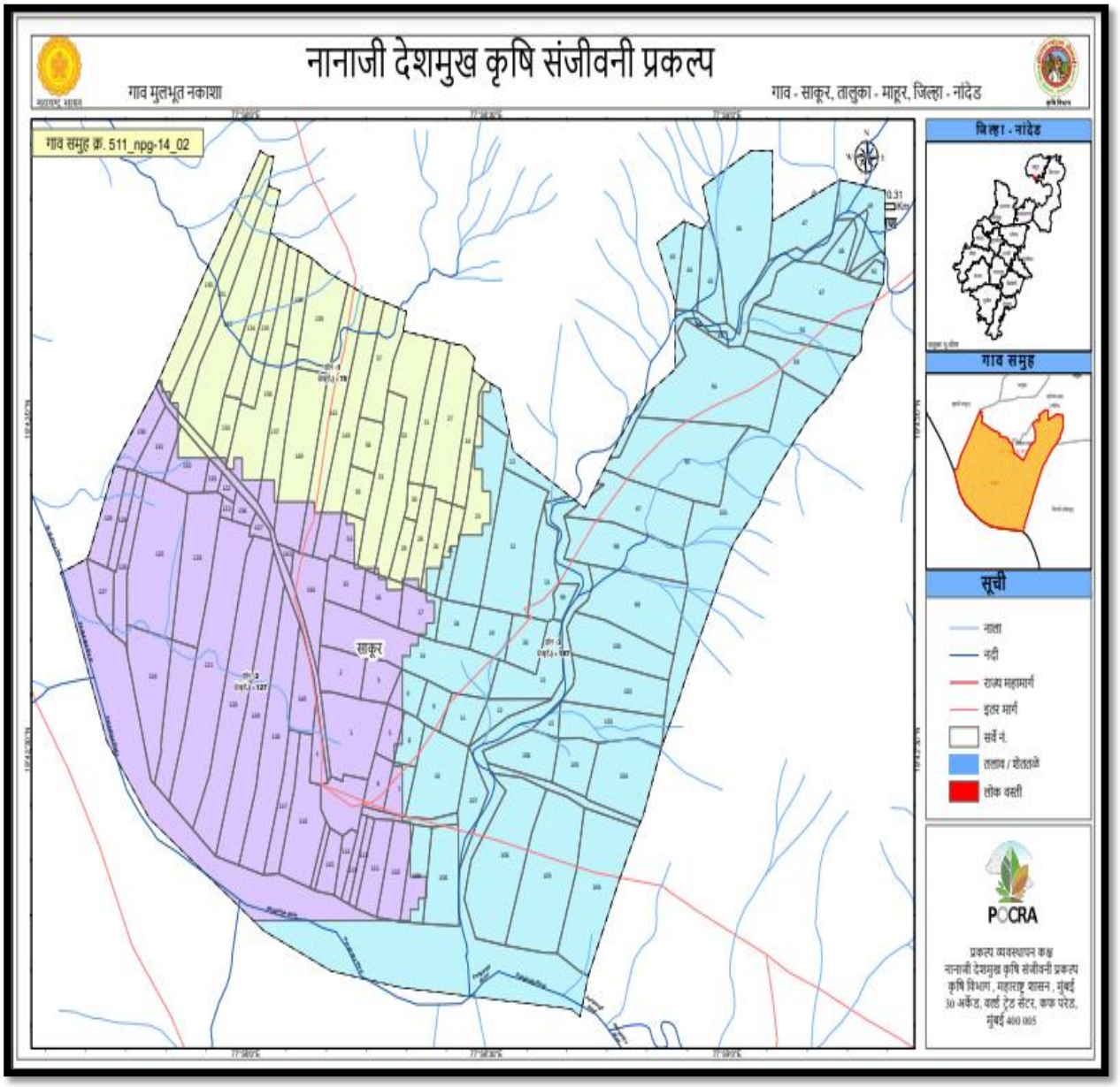
एकूण क्षमता (MT)	उपलब्ध क्षमता (MT)	तारीख
6020	582	30/11/2023
गोदाम नाव	**ईमेल**	**दूरध्वनी**
KINWAT	kinwat.wh@mswc.in	9130777957

गोदामाचा पत्ता -MSWC, MAHUR ROAD, KINWAT - 431804
गावापासून अंतर(कि.मी.) - 23.60

Sources of Information:

1. General Census 2011
2. Agriculture Census 2010
3. PoCRA DBT Portal
4. PoCRA MLP Application
5. PoCRA FFS Application
6. PoCRA Training Application
7. PoCRA SSO system

Annexure III Sample Village Map（गावाचा मुलभूत नकाशा）



Annexure IV Sample Agro-met Advisory
(तालुका निहाय हवामान अंदाज व कृषी सल्ला)

दिनांक	२१/१२/२०२३	२२/१२/२०२३	२३/१२/२०२३	२४/१२/२०२३	
पाऊस (मिमी)	०.०	०.०	०.०	०.०	०.०
कमाल तापमान (अं.से.)	२७.०	२७.८	२८.२	३०.१	२९.९
किमान तापमान (अं.से.)	१२.८	१४.०	१४.४	१४.९	१५.२
सकाळची सापेक्ष आर्द्रता (%)	३८	३१	३४	३८	४५
दुपारची सापेक्ष आर्द्रता (%)	२१	१५	१६	१७	२१
वा-याचा वेग (किमी / तास)	७	६	७	६	७
वा-याची दिशा	पूर्व - ईशान्य	पूर्व - ईशान्य	पूर्व - ईशान्य	पूर्व - ईशान्य	पूर्व - ईशान्य
ढग स्थिती (आकाश)	अंशत: ढगाळ	अंशत: ढगाळ	बहुतांश ढगाळ	अंशत: ढगाळ	अंशत: स्वच्छ