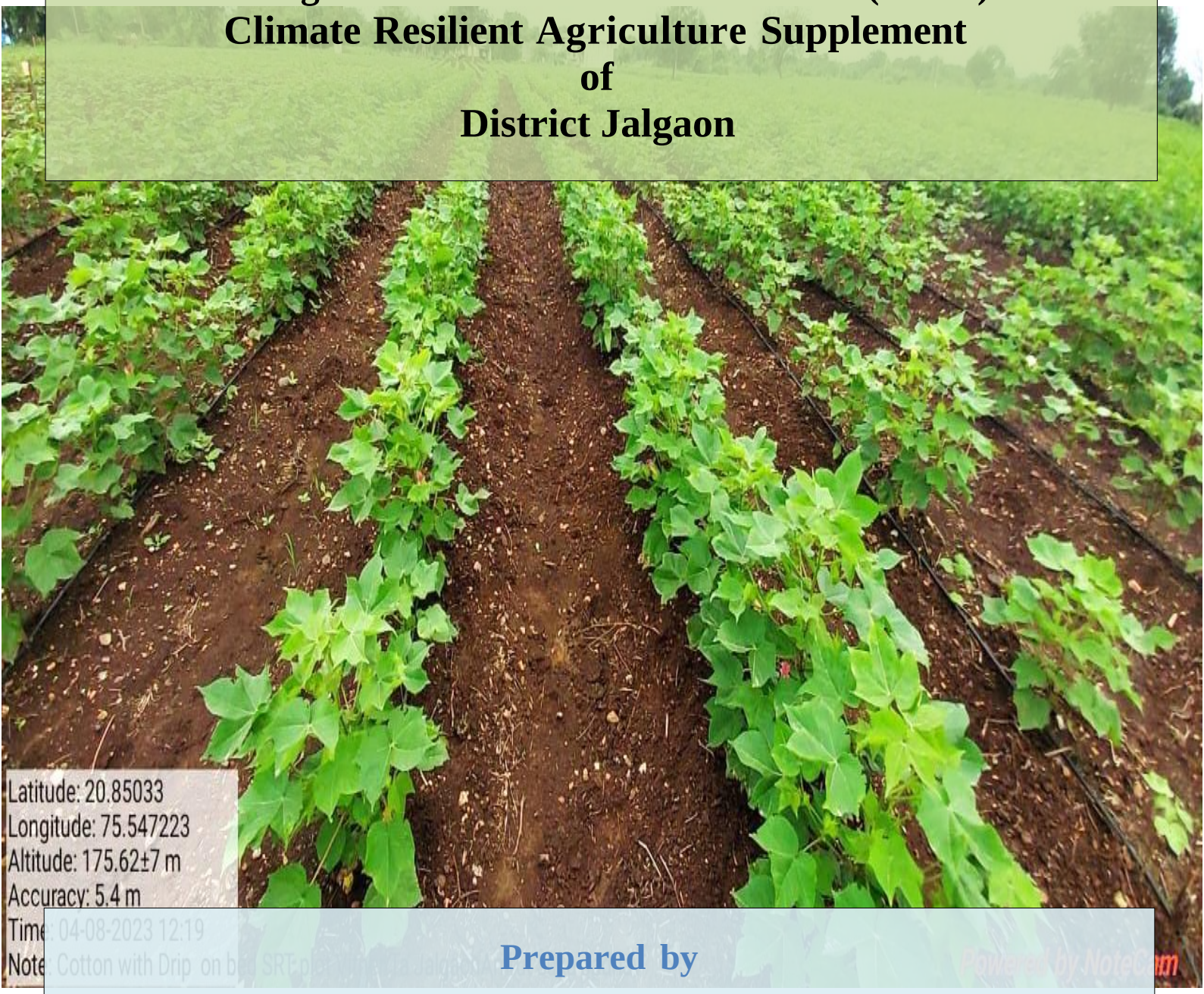
Nanaji Deshmukh Krushi Sanjeevani Prakalp

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



Prepared by

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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.

INDEX

Chapter 1: General Profile of the District

1.1 Geographical area and location of the district

Jalgaon district comes under Nasik division of the Maharashtra State. It was initially known as 'East Khandesh'. The district is situated in the Mid-basin of Tapi River & surrounded by the basins of Girana, Waghur, Arnawati, Bori, Anjani & Mor. The district is surrounded by Satpuda hills on the North side and Ajantha hills on the south & south-west side.

Jalgaon district comprising 15 tehsils and 1519 Villages, Total geographical area of the district is 11,63,900 ha. The tehsils are Jalgaon, Bhusawal, Yawal, Raver, Muktainagar, Bodwad, Jamner, Pachora, Bhagdaon, Chalisgaon, Parola, Amalner, Chopada, Dharangaon, Erandol. The district is located at 20.04 to 21.00 North Latitude & 74.550 to 76.280 East Longitude, with an Altitude of 175 to 325 mt. from mean sea level.

Jalgaon district is one of the parts of the Deccan plateau. It is glorified by numerous bio- diversity & forests. The district boundaries are marked by Buldhana, Aurangabad, and Nasik & Dhule District & Madhya Pradesh State.

Jalgaon is rich in volcanic soil which is well suited for cotton production. Agriculture is mainly dependent on monsoon rainfall. The average normal rainfall of the district is 690.00 to 725.00 mm.

In the district, Parola tehsil has the highest rainfall of 745.5 mm and Amalner tehsil has the lowest rainfall of 455.1 mm. The maximum temperature during summer goes up to 49°c while the minimum temperature during winter drops to 17°C. At present the irrigation potential by using all sources is 16.57 percent. The cultivable Lands come to be 7,81,000 ha. As per 2011 census total population was 42.29 lacks. *(Source: District SREP 2019, by ATMA, Jalgaon.)*

1.2 Tehsil Details with Number of Villages (Including area and administrative set up)

Area and Administrative setup

1.	**Geographical Area (Ha)**	**11,63,900 (ha)**
2.	**No. of Tehsils**	**15**
3.	**No. of Panchayat Samitis**	**15**
4.	**No. of Villages (inhabited)**	**1519**
5.	**No. of villages having supply of potable water**	**1485**
6.	**Gram Panchayat**	**1149**

(Source: District SREP 2019, by ATMA, Jalgaon.)

1.3 Demographic information.

Jalgaon district is divided into 7 subdivisions namely Jalgaon, Bhusawal, Pachora, Amalner, Erandol, Faizpur & Chalisgaon for revenue and administrative convenience. The district is again divided into fifteen tehsils for administrative purpose.

As per 2011 census there are 1487 villages & 1149 Gram Panchayats. The District Population is 42,24,442 out of which 68% Population lives in rural areas. Male to female ratio is 925. Literacy rate is 78.20%.

Sr. No.	Particular	Male (No.)	Female (No.)	Total (No.)
1	Rural	1498712	1382272	**2880984**
2	Urban	699123	644335	**1343458**
3	**Total**	**2197835**	**2026607**	**4224442**

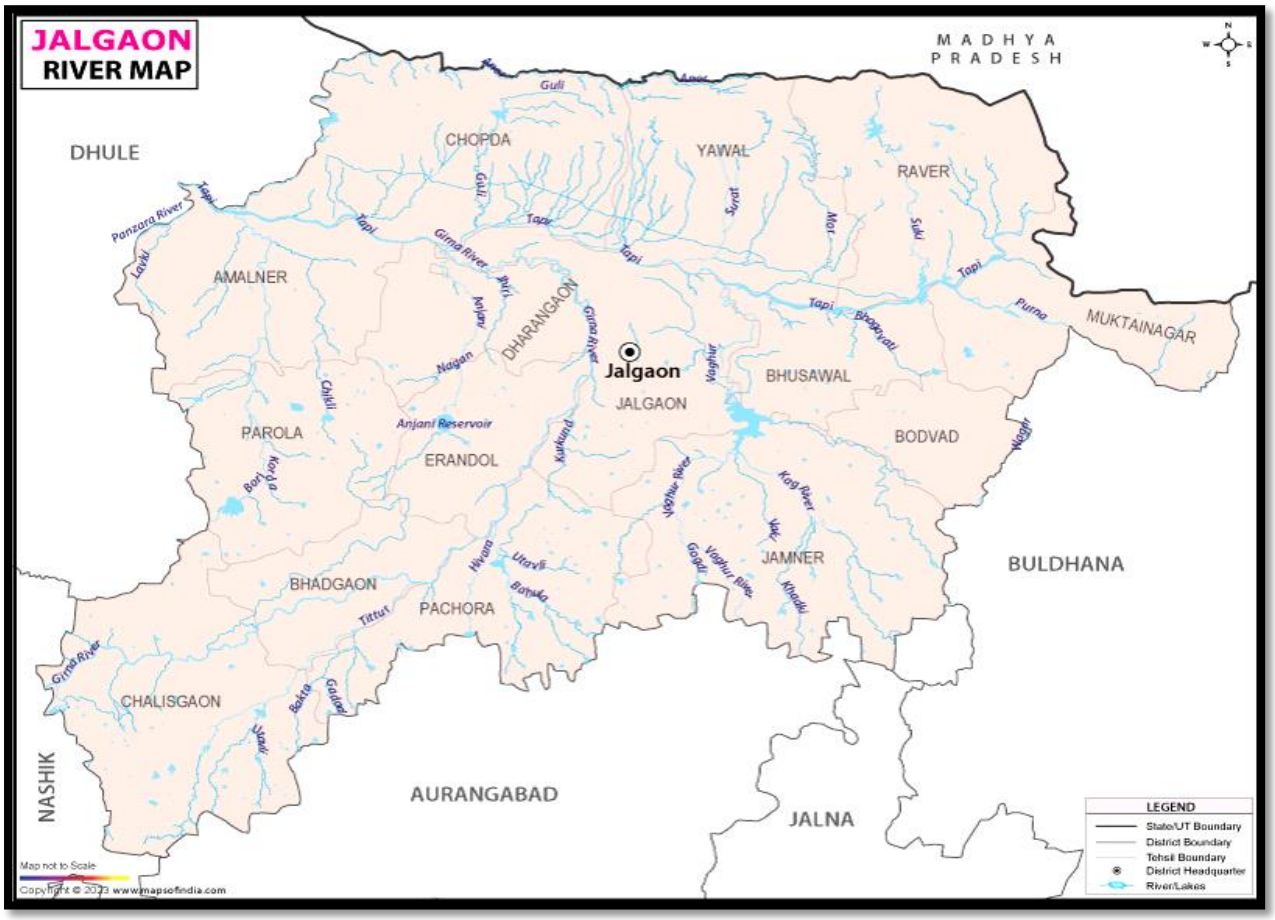
(Source: District SREP 2019, by ATMA, Jalgaon and census 2011)

1.4 Annual Average rainfall & Temperature

The climate of this district is hot and dry. The year is divided into three seasons, cold season is from November to February, hot season is from March to May and the monsoon season is from June to October. The area receives rainfall during the southwest monsoon. **The average rainfall of the district is 690-725 mm.** In the district Parola tehsil has the highest rainfall of 745.5 mm and Amalner tehsil has the lowest rainfall of 455.1 mm. The maximum temperature during summer goes up to **49°c** while the minimum temperature during winter drops to **17°c.**

*(Source: **https://www.worldweatheronline.com)***

1.5 River network in the district.



This district is situated in the mid-basin **of Tapi river** & surrounded by the basins of **sub rivers - Girana, Waghur, Arnawati, Bori, Anjani & Mor. The district is surrounded by Satpuda hills on the North side** and **Ajantha hills on south & south-west side.**

1.6 Irrigation Potential of the district

There are 3 major projects in the district out of which Girna project covers an area of 42590 ha. & Hatnur project covers an area of 27274 ha. The Waghur which is in progress & near to completion and after completion, addition 16890 ha. The area will come under irrigation. As regards to medium projects there are 16 projects in the district out of which 10 are completed, 6 projects are near completion.

Blocks comprised under the projects and the irrigation area.

Sr. No	Project Type	Project Name	Blocks covered	Irrigated Area (ha.)	
				Projected Area	Actual Area
1	Major	Girana	Chalisgaon, Bhadgaon, Pachora, Erandol	57209	22365
		Hatnur	Raver, Yawal, Chopada	37838	21354
		Waghur	Jalgaon, Bhusawal	38570	4181
2	Medium	Aner	Chopda	7180	375
		Manyad	Chalisgaon	4864	1493
		Suki	Raver	5128	12804
		Bori	Parola	4553	875
		Agnavati	Pachora	605	522
		Ambhora	Raver	1115	2239
		Bhokar	Parola	1205	340
		Tondapur	Jamner	1060	983
		Mor	Yawal	2055	1915
		Hivara	Pachora	2231	1641
		Bahula	Pachora, Jalgaon	4047	-
		Magrula	Raver	1683	2490
		Anjani	Erandol, Dharngaon	3100	105
		Gul	Chopada	3025	220
		Niman Tapi	Amalner	43600	1620
		Panzan	Chalisgaon, Nandgaon	12141	2246
Total				**231209**	**77768**

(Source: District SREP 2019, by ATMA, Jalgaon.)

1.7 Soils of the Districts

The soils in Jalgaon district are essentially derived from the **basaltic lava flows** and are classified as **a) Deep black soils b) Medium black soils c) Loamy and sandy soils and d) Forest soils.** Deep black soils are observed in the northern part of Amalner, Erandol, Jalgaon, Bhusaval and Edlabad blocks. Medium black soils occur over large areas in the district viz.; the central belt of the wide Tapi valley and southern hills. In Tapi alluvial basin, soils are black alluvial clay occurring in the southern parts of Yawal, Raver, Chopda, Jalgaon, Bhusaval, Chalisgaon, Amalner,

and Bhadgaon blocks. Loamy soils are observed in the southern-most part of Amalner, Erandol, Jalgaon and Bhusawal blocks. Sandy soils are observed on the foothills of Satpuda ranges and near southern hillocks. Forest soils are dark brown and occur on slopes mainly in the Satpuda ranges.

(source: http://mahades.maharashtra.gov.in/district Report http://cgwb.gov.in/sites/default/files/2022-11/jalgaon_f.pdf)

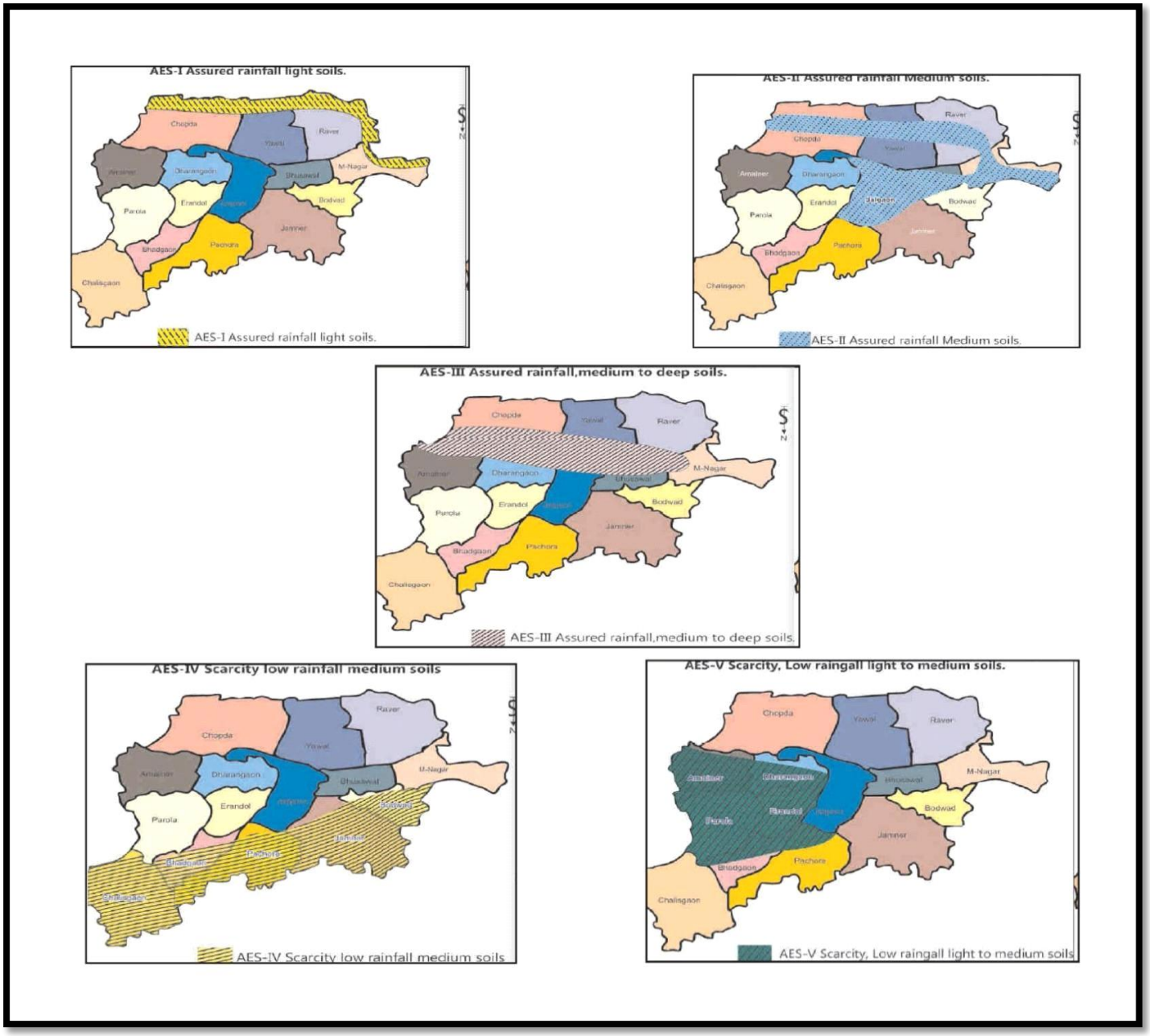
1.8 Different zones according to prevailing agro-ecological situations

As per agro-ecological situations & guidelines of the department two zones were identified. One is **Scarcity Zone** & another is **Assured rain fall zone**. Five Agro Ecological Situations, depending upon soil type, cropping pattern, rainfall was identified which are numbered / marked as **AES I** to **AES V** serially.

Sr. No.	AES No.	Criteria for selecting AES	Name of Representative village	Name of Tehsil Covered
1	AES I	Assured rainfall, light soils	Dolarkheda, Tal. Muktainagar	Northern part of Chopda, Yawal, Raver, Muktainagar (Satpuda Range)
2	AES II	Assured rainfall, Medium soils	Tarsod, Tal. Jalgaon	Northern part of Jamner & Bodwad Tehsil. Central & Southern part of Jalgaon, Bhusawal & Muktainagar. Central part of Chopda, Yawal & Raver Southern part of Chopda, Yawal & Raver.
3	AES III	Assured rainfall, Medium to deep soils	Vichkhede, Tal.Chopda	Northern part of Amalner. Eastern part of Dharangaon, North- East part of Jalgaon, northern part of Bhusawal western part of Muktainagar.
4	AES IV	Scarcity. Low rainfall, Medium soils	Galan Tal. Pachora	Entire Chalisgaon tehsil, except northern part entire Bhadgaon, Pachora, Jamner & Bodwad tehsil
5	AES V	Scarcity, Low Rainfall, light to Medium soils	Dheku Charam, Tal.Amalner	Except the northern part of the entire Amalner tehsil. except eastern part entire Dharangaon tehsil, entire Parola & Erandol tehsil

(Source: District SREP 2019, by ATMA, Jalgaon.)

Maps of Agro climatic Zones.



(Source: Jalgaon district contingency crop planning KVK, Mamurabad)

Chapter-2 Agriculture Profile of District

2.1 Land use classification of the district.

As per socio-economic survey of 2018-19 the total geographical area is 11.64 lakh hectares out of which 8.54 lakh hectares area is under cultivation. The land use pattern is as follows.

Sr. No.	Particulars	(Ha. '000')
1	Geographical Area	1163.90
2	Net sown Area	803.00
3	Double Crop Area	72.00
4	Gross sown Area	875.00
5	Cropping intensity	107.00
6	Land under non-Agricultural use	33.00
8	Land suitable for cultivation but not in use	31.00
9	Permanent Pasture & Grazing land	57.00
10	Land under misc. trees	7.00
11	Current fallow land	13.00
12	Other fallow land	9.00
13	Total cultivable land	854.00
14	Forest (14.69%)	170.75

(Source: District SREP 2019, by ATMA, Jalgaon.)

2.2 Agriculture Land holdings – Its distribution according to sizes.

Information on operational land holdings

Sr No	Classification	No. of holding	Area (Ha)
1	Below 1.00 ha (Marginal farmers)	194457	115446
2	1.00 to 2.00 ha (Small farmers)	172818	264800
3	2.00 to 4.00 ha (Semi medium farmers)	84219	230889
4	4.00 to 10.00 Ha (Medium farmers)	25748	144411
5	More than 10 Ha (Large farmers)	1662	25842
	Total	**478904**	**781388**

(Source- Agriculture census survey, 2019)

2.3 Land use classification of tehsil wise in the district

Sr. No.	Name of the Block	Forest (ha.)		Pasture land (Ha.)	Land put to non-agriculture Use (Ha.)	Land under misc. plantation (Ha.)	Barren and unculturable land (waste land) (Ha.)
		Reserved	Open				
1	2	3	4	5	6	7	8
1	Jalgaon	925	0.00	2541	1921	472	3013
2	Bhusaval	3460	0.00	307	742	327	634
3	Yawal	1223	0.00	6346	1359	836	7182
4	Raver	29588	0.00	4062	630	87	1881
5	Muktainagar	780	0.00	5862	2251	1020	2410
6	Bodvad	810	0.00	1612	809	80	1343
7	Pachora	1836	0.00	1995	1636	215	2242
8	Bhadgaon	1272	0.00	2883	1272	576	6183
9	Chalisgaon	16935	0.00	2242	739	-	3079
10	Jamner	4723	0.00	4170	3148	112	2116
11	Amalner	1230	0.00	3135	2023	945	4020
12	Chopda	18213	0.00	7361	2815	1016	8277
13	Dharngaon	1065	0.00	2334	790	385	380
14	Erandol	2198	0.00	2876	572	420	3265
15	Parola	7562	0.00	1312	5841	1512	9002
Total		**91820**	**0.00**	**49038**	**26548**	**8003**	**55027**

2.4 Different types of Irrigation facilities/water resources available in the district.

Sr No.	Name of the block	Rainfed area (ha.)	%	Wells/ Borewells			Tank			Farm Ponds			Others		
				%	P (ha.)	A	%	P	A	%	P	A	%	P	A
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Jalgaon	496.06	87	-	8985	-	-	-	-	-	-	68	-	-	-
2	Bhusaval	287.30	89	-	8107	-	-	-	-	-	-	37	-	-	-
3	Yawal	406.86	74	-	11895	-	-	-	-	-	-	19	-	-	-
4	Raver	301.46	51	-	12075	-	-	-	-	-	-	39	-	-	-
5	Muktainagar	266.12	78	-	9597	-	-	-	-	-	-	76	-	-	-
6	Bodvad	254.12	93	-	3684	-	-	-	-	-	-	47	-	-	-
7	Pachora	552.90	81	-	15194	-	-	-	-	-	-	44	-	-	-
8	Bhadgaon	307.39	85	-	9980	-	-	-	-	-	-	42	-	-	-
9	Chalisgaon	920.70	90	-	23855	-	-	-	-	-	-	87	-	-	-
10	Jamner	1018.92	94	-	15605	-	-	-	-	-	-	90	-	-	-
11	Amalner	591.60	87	-	13215	-	-	-	-	-	-	64	-	-	-
12	Chopda	615.82	95	-	13530	-	-	-	-	-	-	55	-	-	-
13	Dharngaon	352.94	90	-	3503	-	-	-	-	-	-	14	-	-	-
14	Erandol	287.20	72	-	13280	-	-	-	-	-	-	24	-	-	-
15	Parola	510.45	83	-	11107	-	-	-	-	-	-	49	-	-	-
Total		**7169.84**			**173612**							**755**			

(Source: District irrigation plan of Irrigation dept. Jalgaon.)

a- % -Share of the total area under irrigation
b - P- Potential area of the project
c - A - Actual area irrigated
d- Conversion of tanks to percolation tanks if any

2.5 Type of crop grown, cropping pattern, cropping intensity and farming systems

The district in divided into two agro climatic zones - one is Scarcity zone consisting of 5 blocks & another one is Assured rainfall zone of 10 Blocks. In these zones the cropping pattern is different. Today Jalgaon district is known as the cotton & Banana bowl of the state, as the 4.63 lakh ha. area is under cotton & 46,075 ha. The area is under Banana crop. These two crops are main cash crops generating major labor potential. These crops affect the economy of the district.

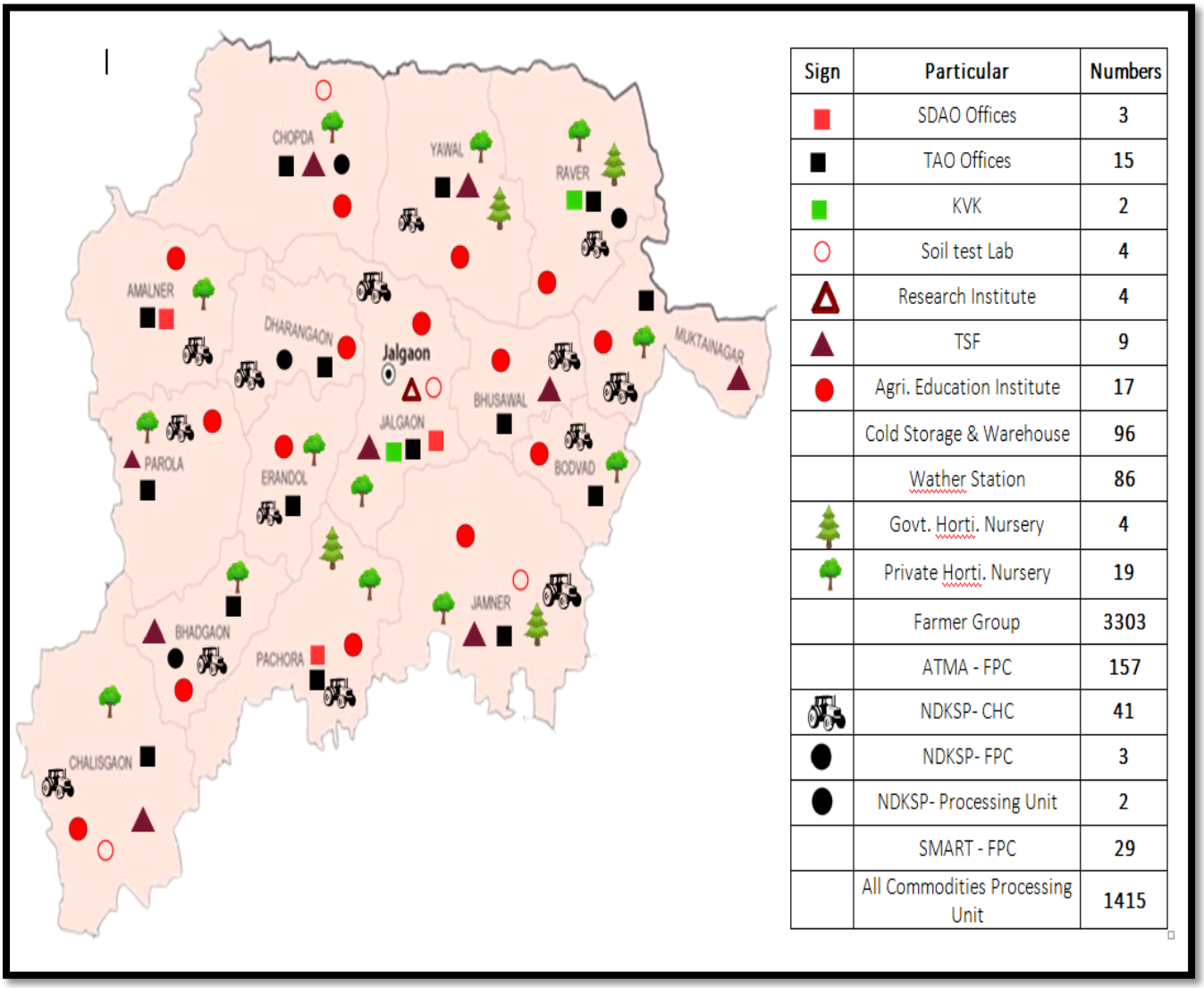
From the last three years Maize is becoming an important cereal crop replacing Jowar. It's because of the higher yield potential of maize. The horticultural crops like Pomegranate, Mosambi, Lime, Ber, and Guava are also of prime importance. Whereas Custard apples have good scope for production in scarcity zones. Also, the Aonla crop is having great potential specially in calcareous soils. In vegetables Brinjal, Okra & Onion are major vegetables. Okra, cucumber & Chilli which are being sent to Mumbai & other state markets. *(Source: District SREP 2019, by ATMA, Jalgaon.)*

2.5 Year wise Area, production and productivity of major crops for 5 years.

Year wise area, production and productivity of major crops for the last 5 years.															
Sr No	Crops (kharif/rabi/ summer)	Year 2018			Year 2019			Year 2020			Year 2021			Year 2022		
		Area (ha.)	Production (Qtl.)	Productivity (Qtl./ha	Area (ha.)	Production (Qtl.)	Productivity (Qtl./ha)	Area (ha.)	Production (Qtl.)	Productivity (Qtl./ha)	Area (ha.)	Production (Qtl.)	Productivity (Qtl./ha	Area (ha.)	Production (Qtl.)	Productivity (Qtl./ha
1	Maize (Makka)	82841	2018006.76	24.36	85225	755945.75	8.87	82583	2645959.32	32.04	77217	1537390.47	19.91	74406	2386944.48	32.08
2	Pearl Millet (Bajra)	11507	100916.39	8.77	11896	93264.64	7.84	9345	107934.75	11.55	8266	36535.72	4.42	5654	61628.60	10.90
3	Sorghum (Jowar)	42045	607970.70	14.46	38982	229214.16	5.88	37880	640550.80	16.91	28478	236936.96	8.32	21445	380434.30	17.74
4	Pigeon Pea (Red Gram/ Arhar/ Tur)	14106	70247.88	4.98	12750	59542.50	4.67	11528	82655.76	7.17	11753	63113.61	5.37	10425	79334.25	7.61
5	Soybean	20928	311827.20	14.90	18852	120464.28	6.39	24419	278620.79	11.41	16965	114513.75	6.75	17506	258738.68	14.78
6	Cotton (Kapas)	491609	2207324.41	4.49	328388	1270861.56	3.87	530449	5431797.76	10.24	231749	1399763.96	6.04	577079	4841692.81	8.39
7	Gram (Chana)	36202	445284.60	12.30	71507	675741.15	9.45	85812	995419.20	11.60	96738	1431722.40	14.80	80015	1441870.30	18.02
8	Wheat	20701	478607.12	23.12	77133	1689212.70	21.90	75035	1680784.00	22.40	58112	1454543.36	25.03	51414	1239077.40	24.10
9	Rabbi Jowar	16586	285113.34	17.19	46132	673527.20	14.60	44396	772490.40	17.40	41467	807777.16	19.48	39131	706314.55	18.05
10	Banana	61384	37026828.80	603.20	62270	39050762.40	627.12	63640	40875335.60	642.29	60913	37959763.34	623.18	62415	40557267.00	649.80

(Source: Statistics, DSAO, Jalgaon)

2.6 Other Facilities



Sign	Particular	Numbers
	SDAO Offices	3
	TAO Offices	15
	KVK	2
	Soil test Lab	4
	Research Institute	4
	TSF	9
	Agri. Education Institute	17
	Cold Storage & Warehouse	96
	Wather Station	86
	Govt. Horti. Nursery	4
	Private Horti. Nursery	19
	Farmer Group	3303
	ATMA - FPC	157
	NDKSP- CHC	41
	NDKSP- FPC	3
	NDKSP- Processing Unit	2
	SMART - FPC	29
	All Commodities Processing Unit	1415

Map: *Agriculture service centres (ASCs), KVK, Agri-clinic agri-business training centres (ACABC), Cold storages and Warehouses, Soil/fertilizer/leaves/water testing labs, Automatic weather Stations, Seed processing centres, nurseries (private and government) of fruit crops, forestry crops, vegetables, sugarcane. Farmer producer companies / SHGs and their businesses, Regulated markets, agriculture credit flow and related institutes, Agriculture education institutes.*

Chapter 3: Weather trend of district

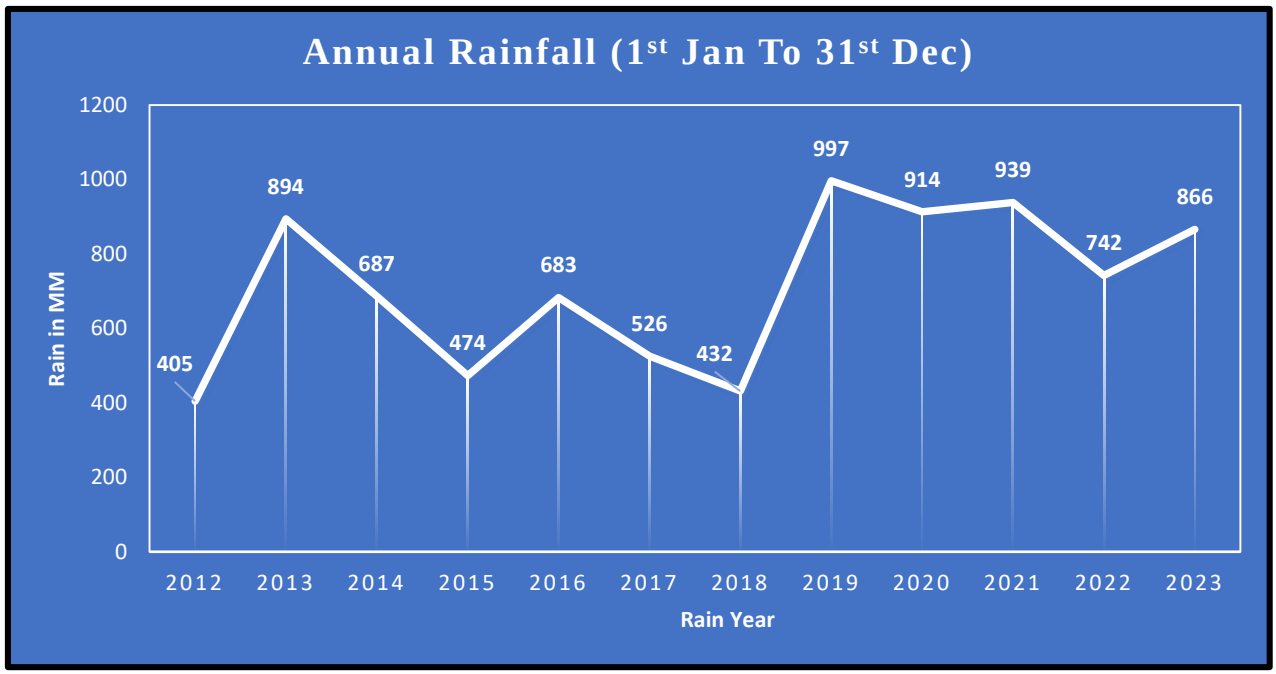
Introduction

Mahavedh project is operationalised by the Government of Maharashtra (GoM) through Public Private Partnership with M/S Skymet Weather Services pvt.ltd. At present 2,127 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.

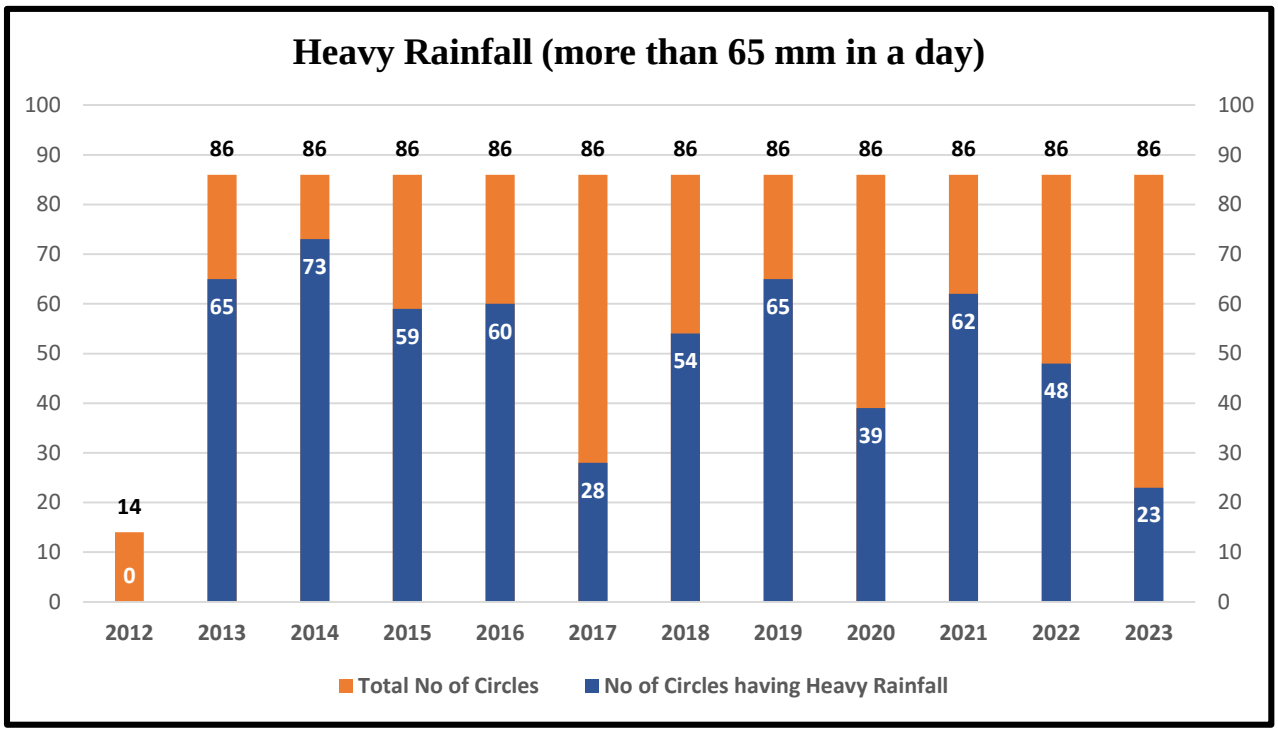
Normal or average rainfall is the amount of precipitation that we expect per year (in a given area). It is obtained and set by calculating the average (mean) of precipitation recorded in an area. Annual rainfall or precipitation is the sum of daily rainfall in a year.



The graph 3.1 presents annual rainfall data of Jalgaon district from 2012 to 2023, highlighting fluctuations in precipitation. Notably, the lowest recorded rainfall was in year 2012 at 405 mm, while the highest occurred in year 2019 with a total of 997 mm annual average rainfall.

3.2 Heavy rainfall.

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



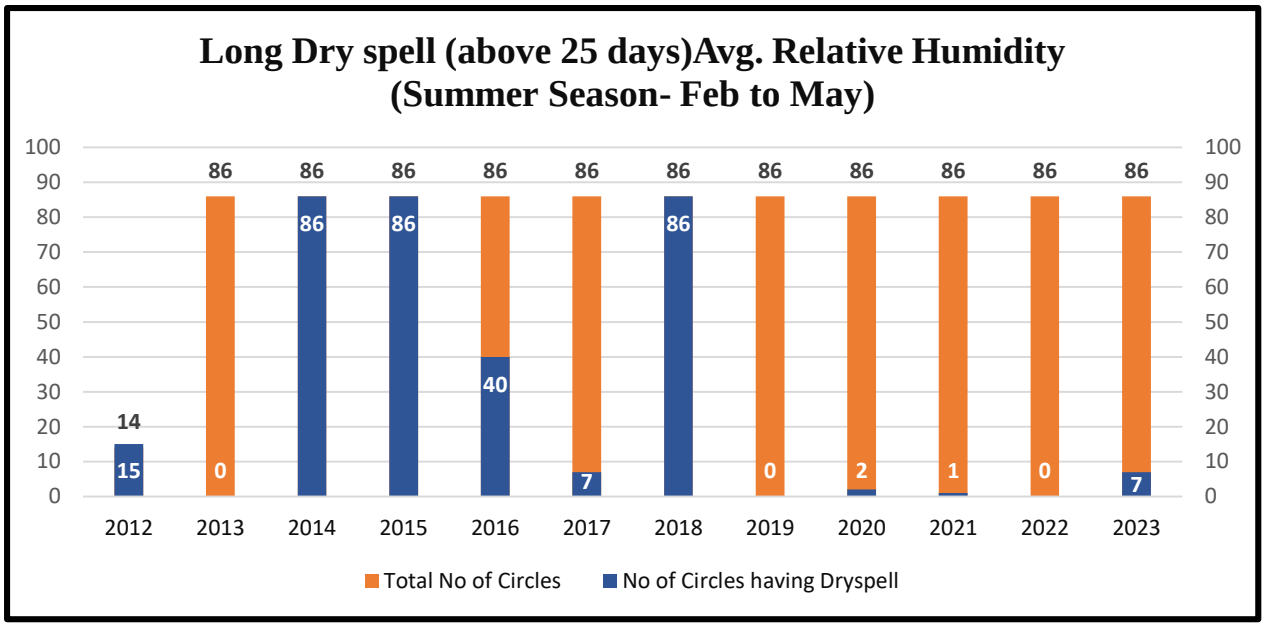
The provided graph 3.2 illustrates occurrences of heavy rainfall in circles within the Jalgaon district from year 2012 to 2023. Notably, in year 2014, heavy rainfall affected the maximum number of circles, with 73 circles out of the 86 circles experiencing such conditions. Conversely, the year 2023 recorded a lower incidence of heavy rainfall, with only 23 circles out of the 86 circles being affected in Jalgaon 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

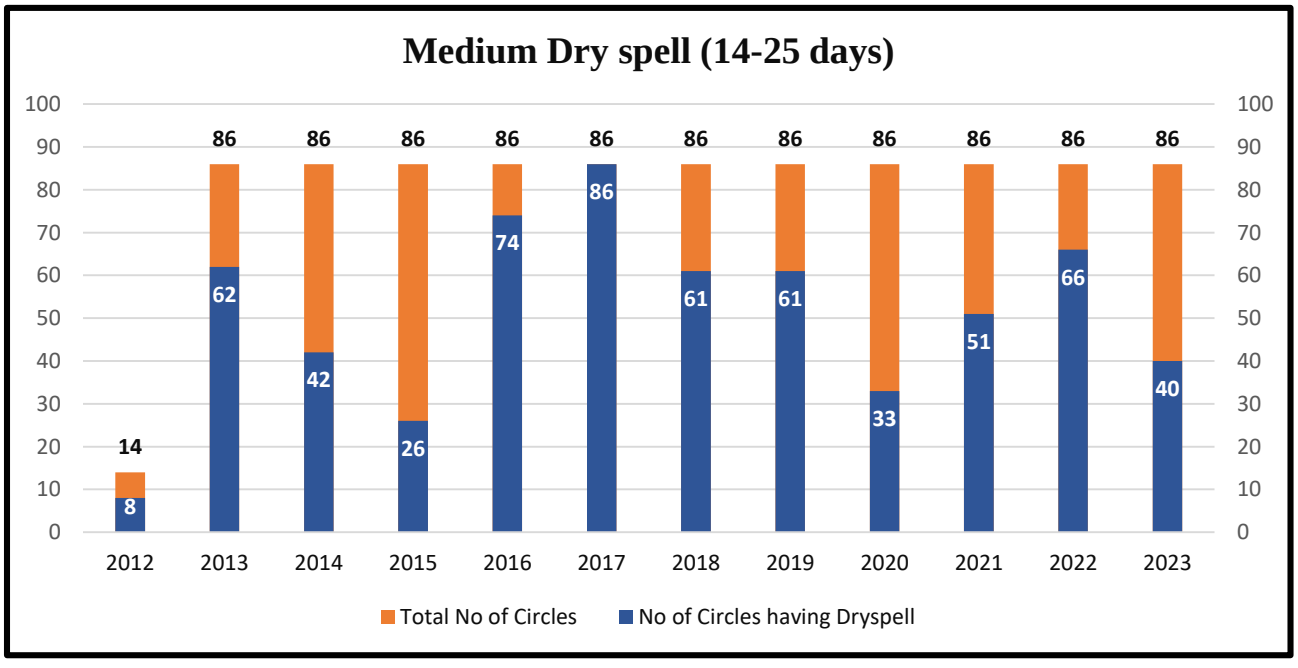
Long Dry spell is a prolonged period above 25 days of dry days in monsoon period



A graph (Graph 3.3.1) that shows the trend of long dry spells observed in a Jalgaon 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 2014, 2015 and 2018, all circles in the district experienced long dry spells. Conversely, in year 2013, 2019 and 2022 there was no long dry spell, across all 86 circles in the district.

3.3.1 Medium Dry spell

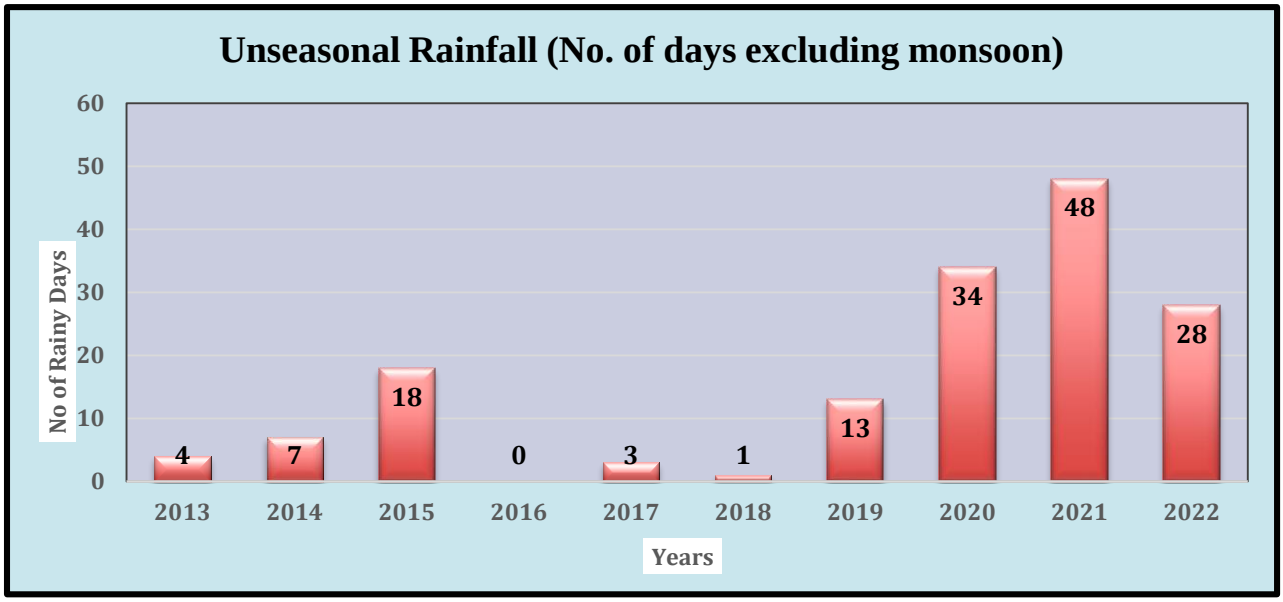
Medium Dry spell a period of 14-25 days of dry weather.



A graph (Graph 3.3.2) that shows the trend of medium dry spells observed in a Jalgaon district. The data covers the total number of circles and the circles that affected medium dry spell (14 to 25 days) in Jalgaon district from the year 2012 to 2023. The graph shows that in year 2017, all 86 circles in the district experienced medium dry spells. Conversely, in year 2015, there was only 26 circles out of 30 circles experienced medium dry spell in the district.

3.4 Unseasonal rainfall.

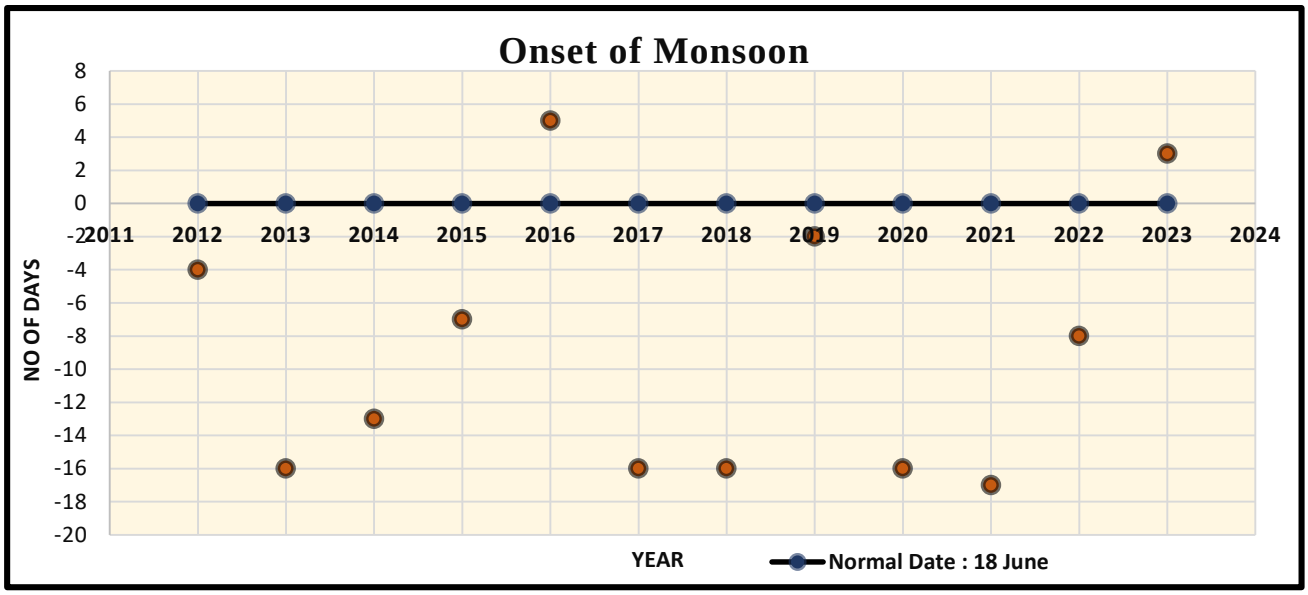
Rainfall received during non mosoon days is treated as unseasonal rainfall. Unseasonal rains-when there is a sudden change in atmospheric pressure, it can result in precipitation, even during non-monsoon seasons.



The graph 3.4 illustrates the annual occurrences of unseasonal rainfall in the Jalgaon district from year 2013 to 2022. The data reveals a variation ranging from 0 days to 48 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 18th June in Jalgaon district.

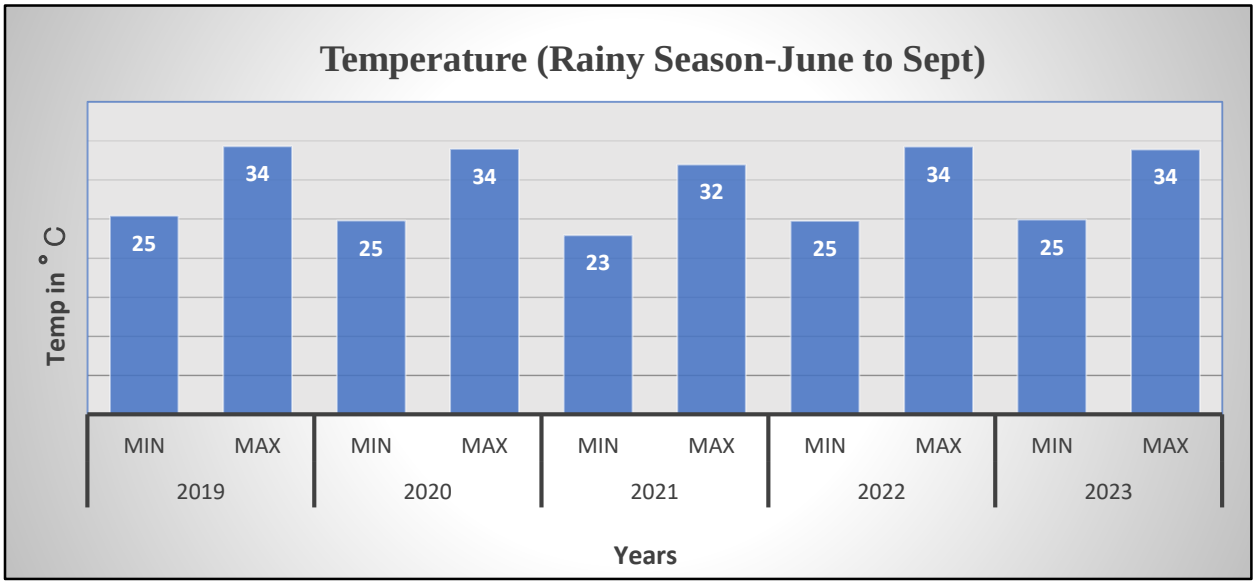


The graph 3.5 depicts the annual onset of the monsoon. The blue line represents the normal day of onset of monsoon. The onset days show variations ranging from -17 to 5 days. Notably, in year 2016 and 2023 the monsoon arrived delayed than the normal onset date. However, in remaining years the monsoon was notably arrived earlier.

3.6 Temperature.

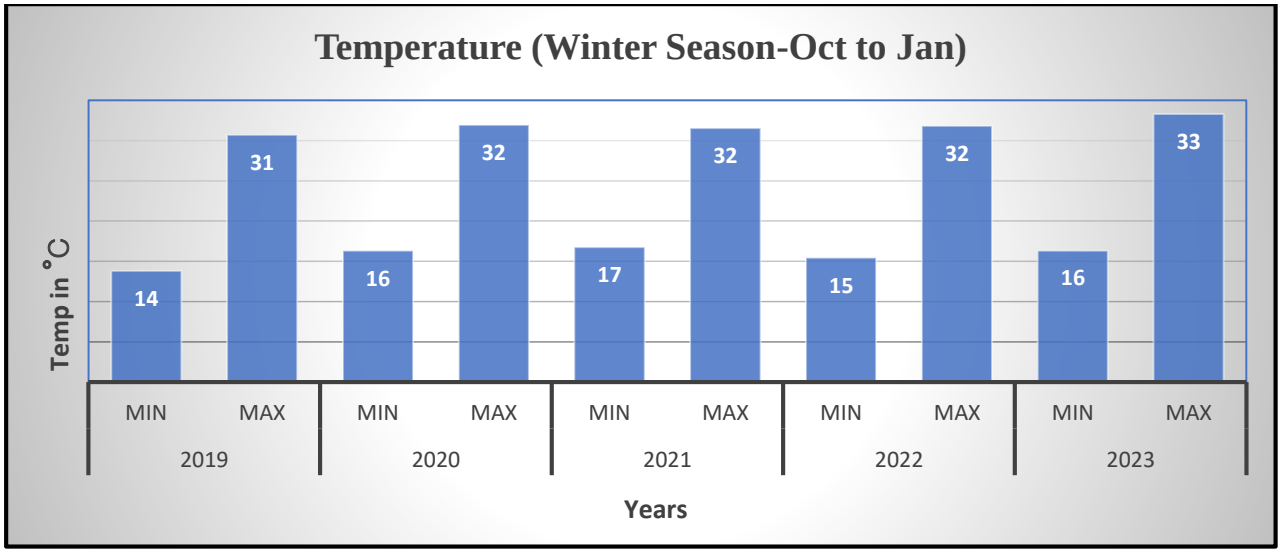
Temperature is a physical quantity that quantitatively expresses the attribute of hotness or coldness.

3.6.1 Temperature (Rainy Season-June to Sept)



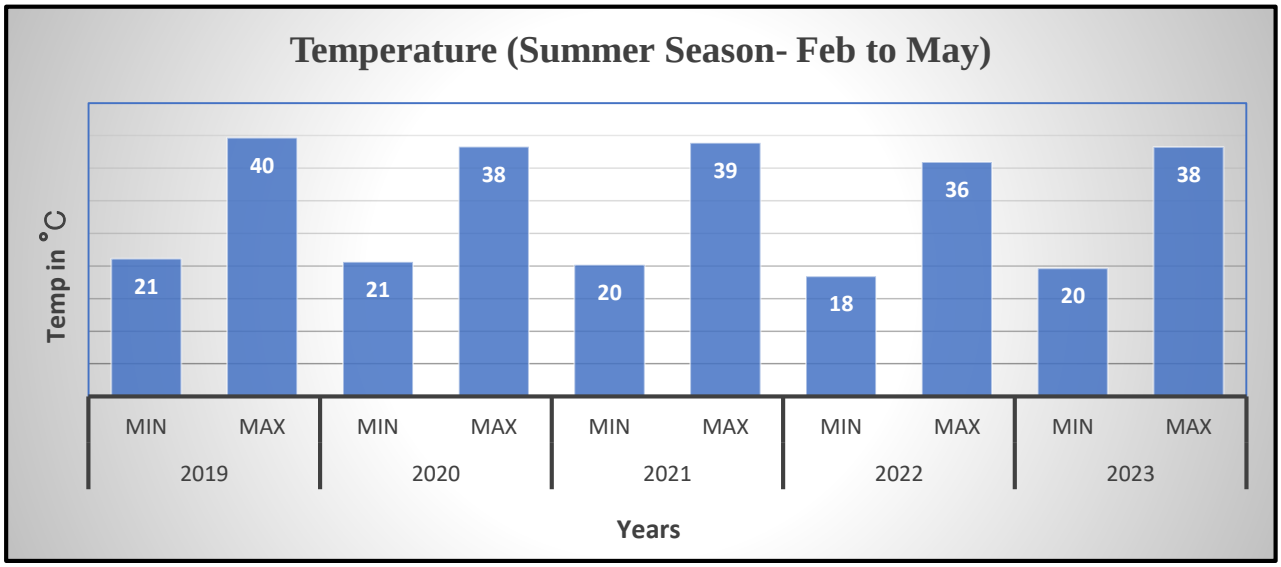
The graph 3.6.1 presents the temperature in the Jalgaon district during the rainy season from year 2019 to 2023 exhibited a consistent range, with minimum temperatures fluctuating between 23-25 ^{o}C and maximum temperatures ranging from 32-34 ^{o}C.

3.6.2 Temperature (Winter Season-Oct to Jan)



The graph 3.6.2 presents the temperature in the Jalgaon district during the winter season from year 2019 to 2023 exhibited a consistent range, with minimum temperatures fluctuating between 14-17 ^{o}C and maximum temperatures ranging from 31-33 ^{o}C.

3.6.3 Temperature (Summer Season- Feb to May)

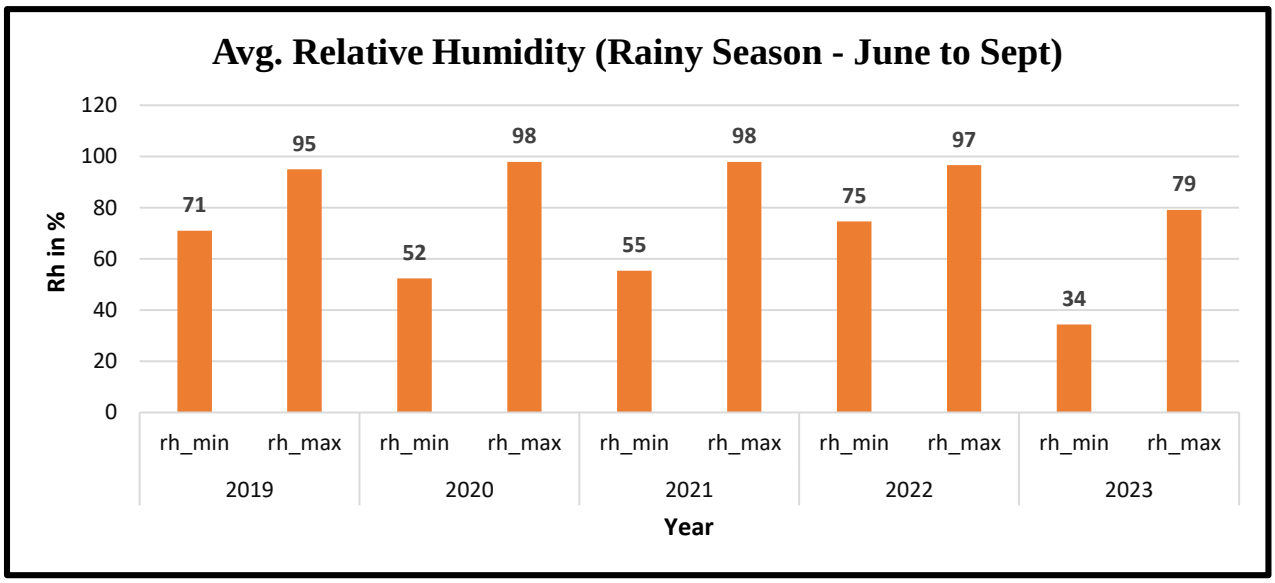


The graph 3.6.3 presents the temperature in the Jalgaon district during the summer season from 2019 to 2023 exhibited a consistent range, with minimum temperatures fluctuating between 18-21 ^{o}C and maximum temperatures ranging from 36-40 ^{o}C.

3.7 Relative Humidity

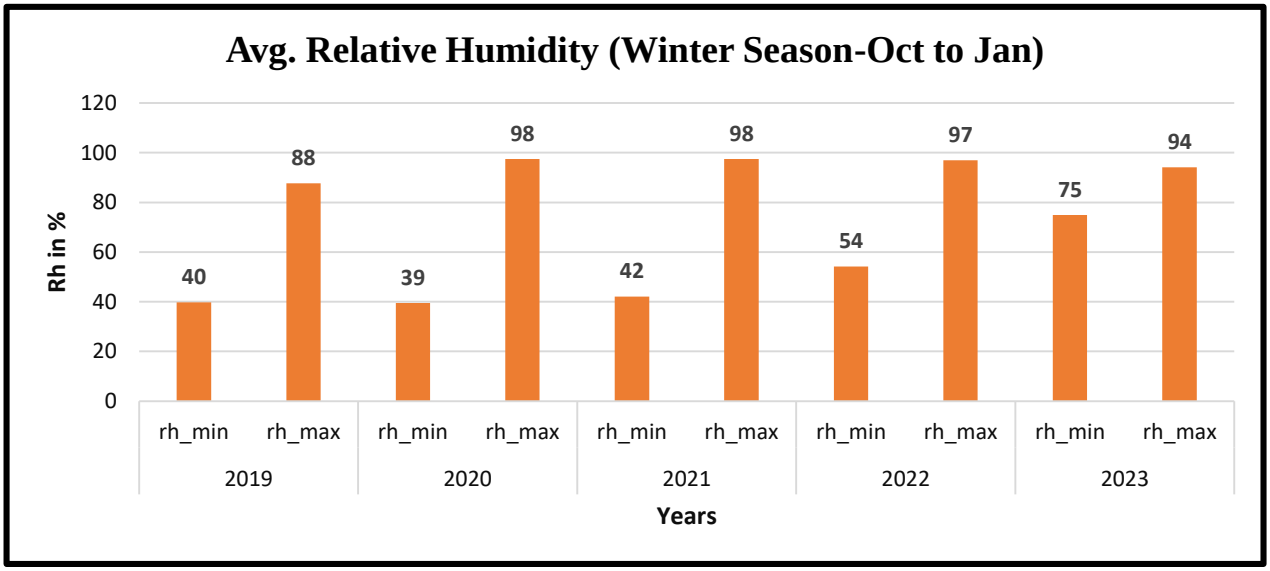
Relative Humidity is the ratio of the actual quantity of moisture at a certain temperature and pressure to the maximum it can hold at the same temperature and pressure. It is usually multiplied by 100 and expressed in percent.

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



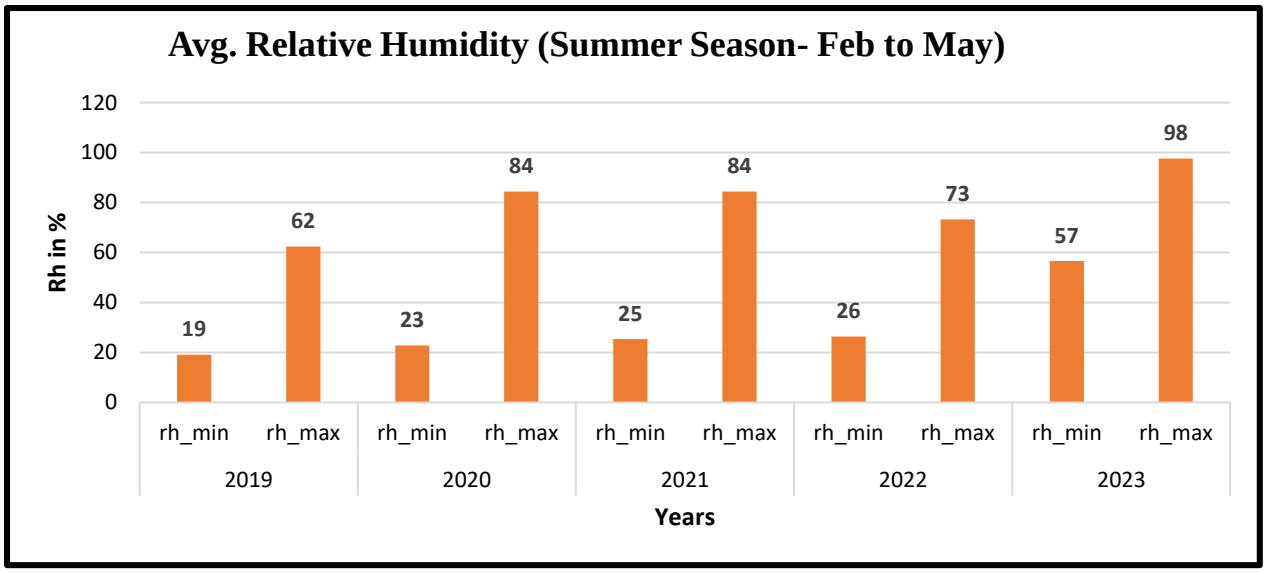
The graph 3.7.1 illustrates humidity levels during the rainy season in the Jalgaon district, revealing a variation in minimum humidity from 34% to 75% and maximum humidity ranging between 79% and 98%.

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 Jalgaon district, revealing a variation in minimum humidity from 39% to 75% and maximum humidity ranging between 88% and 98%.

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



The graph 3.7.3 illustrates humidity levels during the summer season in the Jalgaon district, revealing a variation in minimum humidity from 19% to 57% and maximum humidity ranging between 62% and 98%.

Chapter 4 - Impact of climate variability on agriculture production.

4.1 Impact of Temperature

Sr. No	Temperature Impact on	Kharif			Rabbi	
		Cotton	Banana	Maize	Gram	Rabi Sorghum
1	Crop Growth and Yield	Temperature above 40°C at the time of sowing causes Stress situation resulting in stunted growth of seedling Reddening of Leaves.	Temperature of 45°C for 3 days causes Yield losses	Temperature above 40°C for one week or more causes stunted Growth & yield losses.	Temperature above 30°C for one week or more cause vegetative Growth disturb & Yield Losses	Temperature above 30°C for one week or more cause vegetative Growth disturb & Yield Losses
2	Water Availability	1) Boll dangle results from an abortion of a young developing balls in response to stress. 2) which interrupts water supply. Immature small fruit die and dry on the plant.	1)Water level Decrease 2) soil Cracking 3) Wilting of Crop 4) Stress on Crop	1)Insufficient Water Availability 2) Evaporation 3) Wilting of Crop 4) Stress on Crop	1)Insufficient Water Availability 2) Evaporation 3) Wilting of Crop 4) Stress on Crop	1)Insufficient Water Availability 2)Evaporation 3) Wilting of Crop 4) Stress on Crop 5) Crop Lodging
3	Pest and Diseases Infestation	1. Pink Bollworm: Frequent irrigation, high fertilizer application, monocropping, non-synchronization in sowing time 2. Aphid: high temperature and high humidity, insufficient moisture levels in the soil	1. Black Sigatoka-fungus are carried by wind, rain water and old dried infected leaves and they help to spread the disease. 2. Cucumber Mosaic Virus- high temperature and high humidity, insufficient moisture	1. Shoot fly- late sowing favors shoot fly infestation 2. fall armyworm - temperature range of 15°C to 27°C for one week or more it's helpful for development for FAW	Occurrence of wilt and powdery mildew	Blight and Wilt

		and lack of natural enemies 3. Jassid: late sowing, hot and dry weather conditions, insufficient moisture in the field. 4. Thrips: High temperature of about 25 – 30°C, excessive moisture in the soil, early planting, high dose of nitrogen fertilizer.	levels in the soil and high population of aphids.	Disease: 1.Late wilt		

4.2 Impact of Rainfall

Sr. No.	Rainfall Impact on	Kharif			Rabbi	
		Cotton	**Banana**	**Maize**	**Gram**	**Rabi Sorghum**
1	Crop Growth and Yield	1) Delay onset of Monsoon causes delay Sowing season 2) Due to dry spell yield losses 3) Adverse effect on crop health and growth 4) Excessive rainfall causes crop rot	1) Delay onset of Monsoon delay Sowing season 2) Due to dry spell yield losses 3) Adverse effect on crop health and growth 4) Excessive rainfall causes root rot	1) Delay onset of Monsoon delay Sowing season 2) Due to dry spell yield losses 3) Adverse effect on crop health and growth 4) Excessive rainfall causes crop rot	1) Damage of Flowering and Pod Formation 2) Vegetative Growth Disturb 3) Yield Losses	1) Damage of tillers 2) Crop lodging 3) Vegetative Growth Disturb 4) Yield Losses
2	Irrigation Supply	1)Water level Decrease 2) soil Cracking 3) Wilting of Crop 4) Stress on Crop	1)Water level Decrease 2) soil Cracking 3) Wilting of Crop 4) Stress on Crop	1)Water level Decrease 2) soil Cracking 3) Wilting of Crop 4) Stress on Crop	1)Water level Decrease 2) soil Cracking 3) Wilting of Crop 4) Stress on Crop	1)Water level Decrease 2) soil Cracking 3) Wilting of Crop 4) Stress on Crop

3	a) Drought	1) Water Stress 2) Stunted Growth 3) Wilting of Crop 4) Soil Cracking 5) Low Germination	1) Water Stress 2) Stunted Growth 3) Wilting of Crop 4) Soil Cracking 5) Bunch Quality deteriorates	1) Water Stress 2) Stunted Growth 3) Wilting of Crop 4) Soil Cracking 5) Low Germination	1) Water Stress 2) Stunted Growth 3) Wilting of Crop 4) Soil Cracking 5) Low Germination	1) Water Stress 2) Stunted Growth 3) Wilting of Crop 4) Soil Cracking 5)Low Germination
4	b) flood	Heavy Loss of Standing Crop up to 50 to 100 %	Heavy Loss of Standing Crop up to 50 to 100 %	Heavy Loss of Standing Crop up to 50 to 100 %	---	---
5	Pest and Disease infestation and its management	Fusarium wilt id increases due to heavy rainfall.	Outbreak of viral disease and pest eg. Sigatoka	Sudden outbreak of disease and Pest	Increase in H.A. Loss of Grain Quality and Quantity	Blight and Wilt
6	Soil erosion and nutrient loss	Fertile soil and Nutrient losses due to flood and leaching	Fertile soil and Nutrient losses due to flood and leaching	Fertilize soil and Nutrient losses due to flood and leaching	---	---
7	Harvest & Storage	Heavy loss of Quality and quantity of crop	Heavy loss of Quality and quantity of crop	Heavy loss of Quality and quantity of crop	Pod size Decrease	Heavy loss of Quality and quantity of crop
Impact of Other Calamities (Cyclones and hail storms etc.)						
1	Crop Damage and Loss	1) Yield losses up to 40%	1) Yield losses up to 40%	1) Yield losses up to 40%	1) Yield losses up to 40%	1) Yield losses up to 40%

(Source- KVK, Mamurabad, Jalgaon)

Chapter 5: Measures to cope with climate variability

5.1 Recommendation of Universities

A. Rainfall Condition						
Sr. No	**Condition**	**Kharif**			**Rabbi**	
		Cotton	**Banana**	**Maize**	**Gram**	**Sorghum**
1	Heavy Rainfall	1) Excess water should be drained out 2) Spearing of 2 % DAP 3) For wilt 1.5 kg N + 1.5 kg P in 100 ltr. water	1) Excess water should be drained out 2 Planting on raised beds	1) Excess water should be drained out 2) Spearing of 2 % DAP	Excess water should be drained out	Excess water should be drained out
2	Low Rainfall	1) Spearing of 2 % DAP 2) Protective Irrigation	1) Drip Irrigation 2) use of Mulching	protective irrigation during critical crop stage	protective irrigation during critical crop stage	protective irrigation during critical crop stage
3	Dry Spells / water stress	1) Protective Irrigation 2) Mulching 3) Reflector-Kaolin 4) Hoeing	Protective Irrigation Bunch feeding/Nutrition	protective irrigation during critical crop stage	protective irrigation during critical crop stage	protective irrigation during critical crop stage
4	Terminal Drought	1) Application Micro Nutrient	1. Drip Irrigation 2 Mulching with biomass	Use of short duration varieties	1)Spraying Potassium Phosphate & Mulching 2) Application of Micro Nutrient	
5	Late onset of monsoon	1)Selection of short duration Variety 2) Intercropping Cotton + Tur	1) Change in Planting Time 2) Selection of Disease & Pest Free Material			
B. Temperature Condition						

Sr. No	Condition	Cotton	Banana	Maize	Gram	Rabi Sorghum
1	**High Temperature**	Inter Cropping, additional irrigation	1) Wind Breaks 2) Adoption of INM 3) Drip Irrigation 4) Mulching with biomass 5) Cover Bunch with skirting bags or dry leaves	Inter Cropping, additional irrigation	-	
2	**Cold waves/low temperature**	Irrigation in night	1) Flood Irrigation during night increases temp. by 3°C to 4°C 2) Smoking in evening at 15 days interval. 4) Wind Breaks	Irrigation in night	Irrigation in night	Irrigation in night
C. Soil degradation						
	Soil degradation	1) Use of Green manuring or FYM 25 ton per hectare 2) Opening Dead Farrow, 3) Nala Bunding	1) Use of Green manuring or FYM 30 ton per hectare 2)opening Dead Farrow, 3) Nala Bunding	1) Use of Green manuring or FYM 20 ton per hectare 2)opening Dead Farrow, 3) Nala Bunding	1) Use of Green manuring 2) Sowing with BBF Planter 3) Nala Bunding	1) Tillage operation and sowing across the slope 2) Opening Dead Farrow, 3) Nala Bunding

(Source- KVK, Mamurabad, Jalgaon)

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

6.2 CRT Interventions followed by farmer in the district

1. *BBF Technology*

Mr. Manoj Sadashiv Chaudhary, A/P- Mamurabad, Tal. Dist.-Jalgaon in his farm Soybean ***yield was 5.16 quintal per acre using conventional methods and 8.53 quintal per acre*** *using BBF technology***.**

(Source: Data collected from project technology coordinator)

2. SRT Technology

Mr. Amrit Suka Jadhav, A/P- Vitner, Tal, & District- Jalgaon. When he used SRT technology in his farm, he incurred 30% less cost than conventional methods. I Have experience in this technology and using SRT technology for the last 3 years. (Source- Data collect from project technology coordinator)

For the last 2 years, these farmers have been cultivating cotton on a bed of 15 acres of land using drip irrigation and mulching. (Source- Data from project technology coordinator)

3. Drip & Sprinkler Irrigation

Shri. Atul Jagnnath Mahajan,
A/p- Changdev,
Tal- Muktainagar
Dist- Jalgaon.

3. Intercropping

Shri. Sudhir Atmaram Patil,
A/p- Bhadli Bk., Tal- Jalgaon Dist. Jalgaon.
Intercrop soybean + pigeon pea (tur) using dibbling method for plantation and sprayed with nano DAP without application of basal dose.
(Source-Data collected from project technology coordinator)

4. Insect-Pest Management

Farmers using pheromone traps & yellow sticky traps for insects & pests management.
(Source- data collected from project technology coordinator)

Climate Resilient Technology Conducted in Jalgaon dist. (Hectares)															
Sr no	**Tehsil & Subdivision**	**BBF**	**SRT**	**Germination ability test**	**Fertilizer application as per soil test**	**Intercrop**	**Trap crop**	**Nim extract**	**Dashparni extract**	**bird stop**	**Sticky Trap**	**Pheromone Traps**	**Light traps**	**Organic Farming**	**Sericulture**
1	Pachora	24	3	152	192	320	385	5025	5755	6555	5560	6770	190	82	12
2	Bhadgaon	30	4	82	210	278	240	1700	1150	845	1280	2170	81	42	2
3	Jamner	28	8	835	1420	1625	2925	12715	6855	5055	4040	6970	260	97	5
4	Chalisgaon	55	15	780	1260	1525	2720	13330	7960	6400	5320	4640	275	110	10
Total Pachora		**137**	**30**	**1849**	**3082**	**3748**	**6270**	**32770**	**21720**	**18855**	**16200**	**20550**	**806**	**331**	**29**
1	Jalgaon	32	10	515	1778	1587	815	6484	2513	5525	1828	5428	203	110	18
2	Bhusawal	14	5	88	839	254	254	3177	1208	2703	628	2634	78	77	4
3	Yawal	11	0	103	772	442	334	2852	1609	2312	307	2428	102	92	66
4	Raver	27	3	86	416	178	312	1409	603	1222	302	1120	54	22	11
5	Muktainagar	13	3	1606	2502	1234	752	7332	3213	6801	1203	5720	224	234	22
6	Bodwad	14	2	227	782	575	602	3826	1219	3405	723	3331	58	13	3
Total Jalgaon		**111**	**23**	**2625**	**7089**	**4270**	**3069**	**25080**	**10365**	**21968**	**4991**	**20661**	**719**	**548**	**124**
1	Amalner	16	1	562	602	3580	1550	10850	3780	2090	790	7500	66	37	5
2	Parola	11	5	403	595	3380	1205	9920	3500	1910	680	7150	57	25	23
3	Erandol	10	1	308	398	2280	1220	8050	2390	1370	602	4550	51	23	6
4	Dharangaon	11	1	375	385	1743	1045	6560	2020	1210	483	3850	44	21	-
5	Chopada	12	1	502	580	3527	1460	9720	3610	1920	695	7450	62	31	1
Total Amalner		**60**	**9**	**2150**	**2560**	**14510**	**6480**	**45100**	**15300**	**8500**	**3250**	**30500**	**280**	**137**	**35**
Dist Total		**308**	**62**	**6624**	**12731**	**22528**	**15819**	**102950**	**47385**	**49323**	**24441**	**71711**	**1805**	**1016**	**188**

(Source- Data collected from project technology coordinator)

Increased production of staple crops through Climate Resilient technology (CRT)

Sr No	Crop name	Activity	Yield (kg/acre)	Increase yield (kg/acre)
1	Irrigated Cotton	Adoption of CRT	950	105
		Control Plot	845	
2	Dry Cotton	Adoption of CRT	605	93
		Control Plot	512	
3	Maize	Adoption of CRT	1420	210
		Control Plot	1210	
4	Soyabean	Adoption of CRT	853	337
		Control Plot	516	
5	Tur	Adoption of CRT	557	107
		Control Plot	450	
6	Rabbi Jowar	Adoption of CRT	1505	65
		Control Plot	1440	
7	Rabbi Gram	Adoption of CRT	918	508
		Control Plot	410	
8	Wheat	Adoption of CRT	1228	175
		Control Plot	1053	

(Source- Data collected from project technology coordinator)

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 cotton, pigeon pea and gram crops in the Jalgaon 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	Cotton		Pigeon Pea		Gram	
	FFS Plot	Control Plot	FFS Plot	Control Plot	FFS Plot	Control Plot
2020	976	884	1900	1550	1298	1152
2021	912	784	792	592	1662	1504
2022	1623	1443	-	-	2080	2060
Average	**1170.33**	**1037.00**	**1346.00**	**1071.00**	**1680.00**	**1572.00**

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 12.86% 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 25.68% 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 6.87% compared to the control plot.

Chapter 7: Plan to cope with weather related contingencies (District: Jalgaon)

(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 including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks June 4th week	Medium to deep black soils,	Cotton	Bt cotton	Opening of furrows for moisture conservation in between two rows Drip irrigation	Linkages with central campus MPKV, Rahuri, College of Agril, Pune and Dhule NSC, MSSC Private co. Distributers
		Sorghum	CSH-15,16,17	Hoeing at 25 DAS	
		Black gram	TPU-1,4	Hoeing at 25 DAS, weeding	
		Sesamum	PT-1, JLT-7, JLT -408	Conservation furrow after every 12th row, Thinning before 20th DAS	
	Shallow to medium deep black soils	Desi cotton	(Y-1, Nanded 44,)	Opening of furrows for moisture conservation in between two rows	
		Pearl millet	Shraddha, Saburi, Shanti	Conservation furrow after every 12th row,	
		Groundnut	Jl-24,Jl-501,Jl-286	Hoeing at 20 DAS, Weeding	
		Green gram	Vaibhav	-do-	

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 weeks July 2nd week	Medium to deep black soils,	Cotton	Bt Cotton	Opening of furrows for moisture conservation in between two rows. Drip irrigation	Linkages with central campus MPKV, Rahuri, College of Agril., Pune and Dhule· NSC, MSSC Private co. Distributers
		Sorghum	Sorghum(CSH-15,16,17)+ Greengram (Vaibhav0/ Black gram (TPU- 1,4)/ Cowpea for fodder (2:1)	Hoeing at 25 DAS,	
		Black gram	Pigeon Pea (Vipula)+ black gram (TPU-1,4) (1:3)	Hoeing at 25 DAS, Opening of conservation furrow after harvest of Black gram	
		Sesamum	PT-1, JLT-7, JLT -408	Conservation furrow after every 12th row, Thinning before 20th DAS	
	Shallow to medium deep black soils	Desi cotton	Desi cotton (Y-1, Nanded 44,) + Pigeon Pea (Vipula) (6:1)Desi cotton(Y-1, Nanded 44,) + Green gram (Vaibhav) / Black gram (TPU-1,4) (1:1)	Hoeing at 20,40 and 60 DAS· Opening of conservation furrow after harvest of intercrop	
		Pearl millet	Pearl millet (Shraddha, Saburi,S hanti)+ cowpea (Phule Pandhari,C-152)	Hoeing at 25 DAS	
		Groundnut	Groundnut (Jl-24,Jl-501,Jl-286)+green gram(Vaibhav) / Black gram (TPU-1,4) (6:2)	Hoeing at 15 and 30 DAS	

		Green gram	Pearl millet(Shraddha, Saburi, Shanti) + Green gram(Vaibhav) (6:3)	Hoeing at 25 DAS, Weeding	

Condition	**Suggested Contingency measures**				
Early season drought (delayed on set)	**Major farming situation**	**Normal crop/ cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks July 4th Week	Medium to deep black soils,	Cotton	Pigeon Pea (Vipula)	Opening of furrows for moisture conservation in between two rows Drip irrigation,Paired row planting 90 cm between two rows and 180cm between two paired rows	Linkages with central campus MPKV, Rahuri, College of Agril., Pune and Dhule
		Sorghum	Maize(Rajarshee, Karveer)	Sowing on ridges	
		Black gram	Pearl millet(Shraddha,Saburi, Shanti	Hoeing at 25 DAS	NSC, MSSC Private co. Distributers
		Sesamum	Maize(Rajarshee, Karveer)	Sowing on ridges	
	Shallow to medium deep black soils	Desi cotton	Pigeon pea (Vipula)	Opening of furrows formoisture conservation in between two rows Drip irrigation, Paired row planting 90 cm between two rows and 180 cm between two paired rows.	
		Pearl millet	Maize Rajarshee, Karveer)	Sowing on ridges & furrows	
		Groundnut	Pearl millet(Shraddha, Saburi, Shanti	Hoeing at 25 DAS	
		Green gram	Maize(Rajarshee, Karveer)	Sowing on ridges	

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 weeks 2nd week of August	Medium to deep black soils,	Cotton	Maize	Sowing on ridges & furrows	Linkages with central campus MPKV, Rahuri, College of Agril., Pune and Dhule· NSC, MSSC Private co. Distributers
		Sorghum	Fodder maize (African tall) Sorghum(Phule Amrita)	Drill fodder maize and / sorghum	
		Maize	Pearl millet (Shraddha, Saburi, Shanti	Hoeing at 25 DAS	
		Black gram	Onion (Phule samartha,N-2-4-1)	Sowing / planting on ridges & furrows for sprinkler / Drip method of irrigation	
		Sesamum			
	Shallow to medium deep black soils	Deshi cotton	Maize(Rajarshee, Karveer)	Sowing on ridges & furrows	
		Pearl millet	Pearl millet(Shraddha, Saburi, Shanti	Hoeing at 25 DAS	
		Soybean	Sunflower (SS-56, Bhanu, Phule Raviraj	Opening of conservation furrows	
		Groundnut	Onion (Phule samartha, N-24-1)	Sowing / planting on ridges & furrows for sprinkler / Drip method of irrigation	
		Green gram			

7.1.1.2. Early season drought (Normal onset)

Condition	Suggested contingency measures				
Early season drought (Normal onset)	**Major farming situation**	**Normal crop/cropping system**	**Crop management**	**Soil nutrient and moisture conservation measures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading the poor germination / crop stand	Medium to deep black soils,	Cotton	Use of poly bag seedlings for gap filling if needed	Opening of furrows for moisture conservation in between two rows Drip irrigation	Linkages with central campus MPKV, Rahuri, College of Agril., Pune and Dhule · NSC, MSSC Private co. Distributers
		Sorghum	Re sowing in case of poor germination	Hoeing Weeding	
		Sesamum	Thinning and weeding		
		Black gram	--		
	Shallow to medium deep black soils	Desi cotton	Use of poly bag seedlings in cotton for gap filling	Hoeing Weeding	
		Pearl millet	Resowing in case of poor germination		
		Groundnut	--		
		Green gram	--		

7.1.1.3. Mid-season drought(long dry spell)

Condition	Suggested contingency measures				
Mid season drought , long dry spell, consecutive 2 weeks, rainless (>2.5 mm)period	**Major farming situation**	**Normal crop/cropping system**	**Crop management**	**Soil nutrient and moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Medium to deep black soils,	Cotton	Protective irrigation, Urea (2%) spray, DAP (2%) spray	Opening of furrows for moisture conservation in between two rows Drip irrigation, 8% Kaolin Spray, hoeing	Linkages with central campus MPKV, Rahuri, College of Agril., Pune and Dhule · NSC, MSSC Private co. Distributers
		Sorghum	Protective irrigation, Reduce plant population (30%)and apply as mulch, Urea (2%) spray ,DAP (2%) spray	Hoeing	
		Black gram	-	As above	
		Sesamum	-	Opening of furrows for moisture conservation in between two rows	
	Shallow to medium deep black soils	Desi cotton	Protective irrigation, Urea (2%) spray DAP (2%) spray	Opening of furrows for moisture conservation in between two rows. Drip irrigation, 8% Kaolin Spray, hoeing	
		Pearl millet	Remove every third row and used for fodder	Hoeing	
		Groundnut	--	As above	
		Green gram	--	As above	

At flowering /fruiting stage	Medium to deep black soils,	Cotton	• Protective irrigation, Urea (2%) spray, DAP (2%) spray, Topping	Opening of furrows for moisture conservation in between two rows Drip irrigation, 8% Kaolin Spray, hoeing	Use of farm ponds for life saving irrigation
		Sorghum	Protective irrigation	-	
		Black gram			
		Sesamum			
	Shallow to medium deep black soils	Desi cotton	• Protective irrigation, Urea (2%) spray, DAP (2%) spray, Topping	Opening of furrows for moisture conservation in between two rows Drip irrigation, 8% Kaolin Spray, hoeing	
		Pearl millet	Protective irrigation	-	
		Groundnut	Protective irrigation	-	
		Green gram	Protective irrigation	-	

Condition	**Suggested contingency measures**				
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
	Medium to deep black soils,	Cotton	Protective irrigation	Rabi sorghum, chickpea,	Use of farm ponds for life saving irrigation
		Sorghum	Protective irrigation, In case of poor grain filling harvest for fodder	As above	
		Black gram	Harvest at physiological maturity	As above	
		Sesamum			
		Desi cotton	Protective irrigation	As above	

	Shallow to medium deep black soils	Pearl millet	Protective irrigation, In case of poor grain filling harvest for fodder	As above	
		Groundnut	harvest at physiological maturity	As above	
		Green gram	harvest at physiological maturity	As above	

7.1.2. Irrigated situation

Condition	Suggested Contingency measures				
	Major farming situation	**Normal crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient ground water recharge due to low rainfall	Medium to deep black soils- Open well irrigated	Cotton	Bt. cotton/pearl millet (Shraddha, Saburi, Shanti) / Pigeon Pea (Vipula) /sunflower(SS-56, Bhanu, Phule Raviraj)	In case of Bt. cotton Drip irrigation, Skip row irrigation, hoeing In case of Pigeon pea, Pearl millet and Sunflower - Hoeing, irrigation at critical growth stages	Seed source: Central campus MPKV, Rahuri, College of Agril., Pune, Kolhapur and Dhule NSC, MSSC Private co. Distributers
		Maize	Rajarshee, Karveer	Sowing on ridges, Skip row irrigation,	
		Soybean	JS-335, DS-228	Hoeing at 25 DAS	
	Shallow to medium deep black soils- Open well irrigated	Desi cotton	Cotton (Y-1, Nanded -44)	In case of Bt. cotton Drip irrigation, Skip row irrigation, hoeing	
		Chickpea	Vijay, Digvijay	Sprinkler irrigation	

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

Condition	**Suggested contingency measure**			
Continuous high rainfall ina short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post- harvest**
Cotton	Drain out excess water	Drain out excess water, NAA spray, drenching of 1.5% Urea + 1.5 % MOP	Harvest at physiological maturity	Shift the produce to saferplace
Sorghum	As above	Drain out excess water		
Maize				
Black gram				
Sesamum/Groundnut				
Horticulture				
Banana	• Draining out excess water, Cleaning and maintenance • Drenching of orchard – Copperfungicides, Spraying with 2% urea and application of fertilizers afterflood			Shift the produce to saferplace
Acid lime				
Sweet orange				
Outbreak of pests and diseases dueto unseasonal rains				
Cotton	Insect pest: Aphids, Jassids, Thrips Spray NSKE @ 5%,Dimethoate 1.5 ml/l, Imidacloprid 0.5ml/lit alternatingspray	Insect pest: Boll worm Use Bt. Cotton, Spray HNPV, use IPMTechnology Disease:- Alternaria leaf blight Spray COC (0.25%), Reddening-2% DAP spray Para wilt:-Timely irrigation ,2% DAP drenching	Insect pest: White fly Spray Acetamiprid2 g / 10 lit, water,Dimethoate 1 ml/ lit water Pink Bollworm:- USE IPM Technology	

Sorghum	Insect pest :-Shootfly /Stem borer Endosulfan 35 EC 1.5ml/lit water	Insect pest :- Army worm Quinolphos 1.5 % or carbaril 10 % 20 kg/hadusting Disease :- Leaf Blight , spry COC 3 g/ lit water	Insect pest :-Ear head caterpillar Endosulfan 35 EC 1.5ml/lit water	
Maize	Insect pest :-Aphid, Jassids spray Dimethoate 30EC or Mono crotophos 36 SL1ml / lit water	Insect pest :-Stem Borer Endosulfan 35 EC 75s0 ml in 500 lit water		
Black gram	Insect pest :-Aphid, Jassids spray Dimethoate 30EC @ 1ml /lit	Insect pest :- Hairy caterpillar Spray Endosalfan 1.5 ml / lit water Disease:- Powdery mildew, Spray wettable sulphur 2.5 g/ lit, Yellow Vein Mosaic- Spraydimethoate 30EC 1.5 ml/lit for white fly		
Sesamum		Insect pest :- leaf eating caterpillar Endosulphan 1.5 ml/lit / quinolphos 2ml/lit Disease:- Alternaria blight spray COC 3g/lit		
Horticulture				
Banana	Disease:-Sigatoka leaf blight Spray Carbendazim 1 gm/lit,Spray Propiconazole 1ml/l With sticker	Pests - stem borer, thrips, aphids,nematodes Diseases – Sigatoka, bunchy top, cigar end rot,erwinia rot Remedies • Cleaning and maintenance of the orchards • Drain out excess water	Insect pest :- Thrips Acitamiprid 2.0 gm/10 lit water	

		from the orchards • Drenching with 0.4 % copper fungicides • Staking with available material • Sanitation of the affected plants 1. Spray the crops with 0.20 to 0.25 % copper fungicide for control of fungal diseases. 2. Drench 200 ml of solution (15 g Streptocycline + 300 g COC + 300 ml Chlorpyriphos in 100 L of water) per plant. 3. Spraying with Imidachloprid 17.8 SL @ 3-4 ml/ 10 L of water for control of sucking pests.		
Acid lime	Disease :- Citrus canker spray 1 % BM, COC 0.3 % + Streptocycline 100 ppm Insect pest :-Mealy bug Methyl demeton 1.5 ml/lit	Disease :- Citrus canker spray 1 % BM, COC 0.3 % + Streptocycline100 ppm Insect pest :-Mealy bug Methyl demeton 1.5 ml/lit	Insect pest :-Mealy bug Methyl demeton 1.5 ml/lit Disease :- Citrus canker spray 1 % BM,COC 0.3 % + Streptocycline 100 ppm	
Sweet orange	As above	Insect pest :- Fruit fly Baiting of malathion 200ml + 1 kg Jaggery + 1Lit Fruit Juice + 10 lit water for 10 Plants	Insect pest :- Fruit fly Bating of malathion 200ml + 1 kg Jaggery + 1 Lit Fruit Juice + 10 lit water for 10Plants	

Chapter 8. Agro- Meteorological advisory

8.1 Importance / Need of Agro-met advisory:

Agro-meteorological advisory contribute to collect and organize climate/weather, soil and crop information and to amalgamate them with weather forecast to assist farmers in taking management decisions. NDKSP Project is based specifically on climate resilient agriculture, so agro-meteorological advisory plays an important role in kharif/rabi crops. So, agro advisory is needed in various stages of crops, which helps to increase in production and ultimately an increase in net profit of farmers. Crop growth and various paste/disease infestations need management, so agro-meteorology advisory is an important part of the farming occupation.

8.2 Forecasts or advisories generated at district level:

KVK Mamurabad & Pal, RMD and PMU generate and provide weekly agro-met advisory and forecast. So, we communicate with farmers via the WhatsApp group, text messages, campaigning, Radio and Newspaper and FFS campaign etc.

8.3 DAMU information:

No any district agro-meteorological unit situated in Jalgaon district.

8.4 Other source/sources of Agro-met advisory:

Automatic weather station of sky-met has been set up in total of 86 revenue circles in the district. This weather station records daily rainfall data, temperature and wind speed. By analyzing this information through scientists, agricultural advice is given regarding climate change, drought, irregular rainfall, pest and diseases outbreaks and it is conveyed to the farmers through the KVK Mamurabad & KVK, Pal & Agriculture department Government of Maharashtra.

8.5 Different apps/dashboards/channels/stations/means used to disseminate the information's:

PoCRA project dashboard, IMD (Indian Meteorological Department) website, DDMA (District Disaster Management Authority), Jalgaon website etc. also generate advisory.

8.6 Utilization of Agro-met advisory by farmers in changing climate conditions:

Farmers face various climatic conditions and challenges such as low rainfall, high rainfall, drought, flood, high temperatures and sometimes insect-pest attack on crops etc. So, therefore, agro-met

advisory is needed to tackle the above-mentioned conditions and to do proper crop management to minimize the loss of yield. Therefore, from time to time, advisory is very important for proper growth of crops at various stages.

8.7 Advisory based on Pest surveillance activity:

8.7.1 Implementation status of CROPSAP:

- Since 2009-10 agriculture department implemented CROPSAP scheme in Jalgaon dist.
- CROPSAP scheme creates awareness among the farmers about the incidence of major diseases according to season for soybean, cotton, maize, sorghum, sugarcane & gram suggesting timely remedies.
- Agri Assistant and Agri Supervisor conduct survey, four time in week for major pest & diseases of above crops.
- The data of the survey conducted by the field officers of the department of agriculture is submitted to the University of Agriculture through “M CROPSAP” mobile app.
- According to the survey data, agriculture universities send advisory to the agriculture department twice a week.
- The advisory is conveyed to the farmers through the KISAN PORTAL, village meetings, jumbo Xerox on the notice board of Gram panchayat.

8.7.2 Impact on crop pests and diseases Management:

- Farmers get awards for the occurrence of major pest & disease.
- Through advisory farmers can get timely remedial plans.
- Avoiding losses to farmers due to accidental outbreaks of pests.
- Production cost is reduced by avoiding unnecessary expenditure on spraying.

Chapter 9: Commodity wise status of climate resilient Agriculture value chains.

9.1 Existing marketing scenario in the district

9.1.a Year wise Marketable Surplus of Major Crops

Sr. No.	Crops (kharif/rabi/ summer)	Year 2018-19	Year 2019-20	Year 2020-21	Year 2021-22	Year 2022-23
		Yield (Qtl.)	Yield (Qtl.)	Yield (Qtl.)	Yield (Qtl.)	Yield (Qtl.)
1	Maize	2018006.76	755945.75	2645959.32	1537390.47	2386944.48
2	Pearl Millet (Bajra)	100916.39	93264.64	107934.75	36535.72	61628.60
3	Sorghum (Jowar)	607970.70	229214.16	640550.80	236936.96	380434.30
4	Pigeon Pea (Tur)	70247.88	59542.50	82655.76	63113.61	79334.25
5	Soybean	311827.20	120464.28	278620.79	114513.75	258738.68
6	Cotton	2207324.41	1270861.56	5431797.76	1399763.96	4841692.81
7	Gram (Chana)	445284.60	675741.15	995419.20	1431722.40	1441870.30
8	Wheat	478607.12	1689212.70	1680784.00	1454543.36	1239077.40
9	Rabbi Jowar	285113.34	673527.20	772490.40	807777.16	706314.55
10	Banana	37026828.80	39050762.40	40875335.60	37959763.34	40557267.00

(Source: Statistics data by DSAO, Jalgaon.)

9.1.b Year wise price variation of major Crops

Sr. No	Commodity	Year 2018-19 Price (Rs.Qtl)	Year 2019-20 Price (Rs.Qtl)	Year 2020-21 Price (Rs.Qtl)	Year 2021-22 Price (Rs.Qtl)	Year 2022-23 Price (Rs.Qtl)
		Kharif Season Crop				
1	Cotton	4050	4600	5700	11000	7500
2	Banana	470	450	500	400	400
3	Maize	1300	1380	1450	1350	2000
4	Soyabean	3750	3800	4100	6050	5400
5	Jowar	2200	2650	2700	2725	3690
6	Bajra	1400	1550	1480	2360	2760
7	Green Gram	5500	6250	7800	5755	6800
8	Black Gram	4500	4800	5500	5500	6000
9	Pigeon Pea	5800	5500	6000	5800	7500
		Rabbi Season Crop				
1	**Wheat**	1600	1700	1750	2075	2115
2	**Chickpea**	5800	5500	5000	8300	6100
3	**Maize**	1800	1765	1760	1300	2100

(Source: www.agmarknet.gov.in, APMC market Jalgaon)

9.1.c Markets available in the district with commodities handled (e-Nam, e-Markets, APMC's / Kharedi-Vikri Sangh)

In Jalgaon district majorly cotton, Maize, Jowar, Bajara, Sunflower, Tur, Gram, Soybean, and Wheat is traded at APMC and private markets. Whereas Maize, Tur, Gram and other commodities are traded at APMC, NAFED at government level and also at private markets.

9.2 Constraints in existing value chain

1	**Farmers**	1. Dependence on weather conditions, which can lead to crop failure. 2. Lack of knowledge about sustainable and efficient farming techniques. 3. Limited access to modern agricultural practices and technology.
2	**APMC (Agricultural Produce Market Committee)**	1. Middlemen may exploit farmers by offering low prices. 2. Limited infrastructure and facilities at many APMC markets. 3. Complex and bureaucratic procedures for selling produce.
3	**Big Traders**	1. Limited transparency in pricing and transactions. 2. May have disproportionate bargaining power, disadvantaging smaller farmers. 3. May engage in speculative trading, which can lead to price volatility.
4	**Brokers**	1. May not always act in the best interests of farmers. 2. Lack of standardization in brokerage practices. 3. Potential for conflicts of interest if brokers represent both buyers and sellers.
5	**Processors**	1. Need significant capital investment in processing facilities. 2. Vulnerable to price fluctuations in the international market. 3. Dependent on the quality and quantity of raw materials from farmers.
6	**National and International Markets**	1. Limited access to international markets for small-scale players. 2. Price fluctuations due to global supply and demand dynamics. 3. Vulnerability to international trade policies and tariffs. 4. Geopolitical factors can affect trade relationships and market access.

(Source: SREP Prepared by ATMA)

9.3 Potential for strengthening of commodity wise value chains:

1. **Banana:** Small scale industries such as Banana Wafers, Banana flour, Biscuits have huge scope in Jalgaon district and industries can be set up by adding PMFME scheme.
2. **Cotton:** Cotton is the main crop in Jalgaon district and there is a large scope for ginning and pressing industry to process it.

3. Oil Seed: There is scope in Jalgaon district for processing industries such as making oil, Soya Vadi, animal feed etc. from soybean crop.

4. Pulses: Tur is the main crop and there is scope for making dal and by-products for animal feed.

5. Dairy: Livestock is available in abundance in Jalgaon district and there is ample scope for making by-products from milk. There is scope for small scale industries in the manufacture of Khawa / Pedha / Kulfi / Paneer / Dahi with the help of the PMFME scheme.

9.4 FPCs' contributions in value chain development:

9.4.1 Status of FPCs in the Jalgaon District:

In the district 157 FPC's registered in ATMA under, 3 FPC's registered on the PoCRA portal. They applied for various types of activities like Godown Construction, Cleaning & Grading unit, Customer Hiring center etc. in our project till now we have disbursed 3 FPC's of amounts Rs.77.00 lac.

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 **77** 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. 9.4.2.1.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.

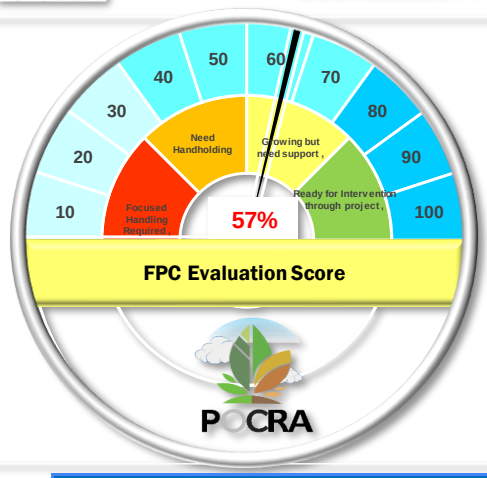
Customized FPC Evaluation Report

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

Padmalaya Farmer Producer Co Ltd

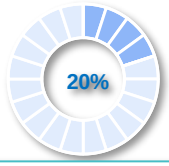
Address

Plot No 31, At Post Shivani,Taluka
Bhadgaon, Dist-Jalgaon, Pincode- 424105

Score Report

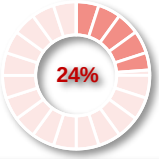
Criteria	Max. Score	Score Obtained
Organization & Adminstration (Core Foundation Strength)	21	17
Governance (Control Systems in Place)	11	10
Management (Decision making processes)	8	8
Infrastructure (Assets and resources)	5	1
Finance (Financial base and health)	25	12
Business & Market Linkages (Resource quality)	21	5
Capacity Building (Resource quality)	5	3
Climate Resilience (Adaptability to climate risk)	4	1
Final Score	100	57

What could improve your FPC?



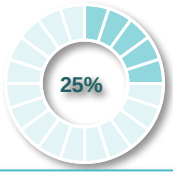
Infrastructure

Better Financial Management can help in improving available infrastructure



Business & Market Linkages

Bankable business plans will help in increasing financial turnover. Backward and forward linkages should be developed for commodity procurement, value addition and marketing



Climate Resilience

The FPC should promote various climate resilient agricultural technologies.

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

9.4.3 Information about FPCs supported by NDKSP

Information about FPCs of NDKSP- 3 FPCs				
Sr. No	**FPCs Name**	**Activity**	**Numbers**	**Disbursement in Lac.**
1	MATOSHREE INDUTAI AGRO Farmer producer Company	Custom Hiring Center	1	8.66
2	Rajanitai Farmer Procedure Company	Construction of Godown & Cleaning & Grading Unit	1	51.84
3	Rajodak Farmer Producer Company	Turmeric Processing Unit	1	16.5
Total			**3**	**77.00**

(Source: NDKSP)

Sr. No	Project Name	No of FPC's	Disbursed amount (Rs in lakh)
1	SMART	29	All application under process
2	NDKSP	3	77.00
3	MAGNET	-	-

9.4.4 Details of commodity transacted by FPCs:

Sr. No.	FPCs Name	Project Name
1	Matoshri Indutai FPCs	Maize
2	Rajanitai Deshmukh FPCs	Oil Extraction Unit & Jowar, Bajara
3	Bhumivir FPCs	Onion Collection & Onion Hygiene
4	Ashai FPCs	Cotton Ginning
5	Agro Fuels FPCs	Turmeric
6	Saiguru Krushi Vikas FPCs	Atta chakki & Packaging Unit
7	Chandrama FPCs	Banana

9.4.5 Details of services provided by FPCs:

The majority of FPC's provide services to farmers, like they have also increased their income source by giving all services to farmers.

Information Of SMART FPCs		
Sr No.	FPCs Name	Project Name
1	Matoshri Indutai FPCs	Grain Storage, Making animal feed from maize
2	Shrirajaji Agro FPCs	Grain Storage, Cleaning & Grading, Flour Mill,
3	Agritech Fed FPCs	Godown, Grain Processing Unit, Solar Electricity
4	Rajanitai Deshmukh FPCs	Grain Cleaning, Processing & Oil Extraction Unit
5	Naisty FPCs	Godown & Grain Cleaning,Flour Mill
7	Jay Matrubhumi Krushi Vikas FPCs	Godown, Grain Cleaning & Grading
8	Utkrustha FPCs	Grain Collection, Cleaning & Grading, Godown
9	Adishakti Muktai Krushi Vikas FPCs	Grain Collection, Cleaning & Grading
10	Jay Shivneri FPCs	Godown, Grain Processing Unit, Solar Electricity
11	Yashodai FPCs	Godown, Cleaning & Grading
12	Agriva India Hightech FPCs	Grain Collection, Cleaning & Grading, Godown
13	Bhumivir FPCs	Onion Hygiene Unit
14	Sahyadri Kranti FPCs	Godown, Cleaning & Grading, Fodder Making
15	Panchdhananjay FPCs	Godown, Grain Cleaning & Grading,Flour mill
16	Sarvadnya FPCs	Godown, Cleaning & Grading, Weight Bridge,
17	Virendra Agro FPCs	Grain Collection, Cleaning & Grading, Godown
18	Nevej FPCs	Godown & Processing Unit
20	Swa. Sambhaji Chindhu Patil FPCs	Godown & Grain Cleaning & Grading Unit, CHC,
21	Krishna Vandan FPCs	Grain Storage, Cleaning & Grading, Flour Mill,
22	Sant Muktai Vikas FPCs	Grain Collection, Cleaning & Grading, Godown
23	Ashai FPCs	Cotton Ginning
24	Agro Fuels FPCs	Turmeric Processing Unit
25	Saiguru Krushi Vikas FPCs	Godown, Cleaning & Grading, Packaging Unit

26	Atmanirbhar FPCs	Godown & Grain Cleaning, Grading Unit, CHC
27	Gorakshnath FPCs	Godown, Grain Cleaning & Grading
28	Shri. Swami Vivekanand FPCs	Godown, Cleaning, CHC
29	Chandrama FPCs	Banana Grading, Cold Storage, Packaging
NDKSP FPC's		
1	MATOSHREE INDUTAI AGRO FPCs	Custom Hiring Center
2	Rajanitai FPCs	Construction of Godown & Cleaning & Grading Unit, Solar Electricity unit
3	Rajodak FPCs	Turmeric Processing Unit

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. programmes with extension Plan

A. ATMA (Agricultural Technology Management Agency) :

In the year 2022-23, 42 farmer trainings have been completed under the Atma in the district, including 21 trainings outside the state regarding silk industry and dairy business management, 16 trainings within the state regarding goat rearing and grain processing unit and 5 trainings within the district regarding fruit processing unit and hygiene, goat rearing and dairy business are completed. Farmers' trips 18 farmers and 2 farmer groups outside the state, 60 farmers, 5 farmer groups within the state, 185 farmers and 7 farmer groups within the district have completed their farmer trips. There are 6 *Kisan Gappa-Gosthi* programs in which 501 farmers participated. 15 agricultural schools have been completed. 1023 crop demonstrations have been completed under Atma Yojana.

B. *Ranbhaji Mahotsav:*

District Level Ran-bhaji Mahotsav was organized during 09 to 15 August 2022 on behalf of Maharashtra State, Department of Agriculture on 09/08/2022 Project Director ATMA, Jalgaon was organized. which was inaugurated by Hon. Guardian Minister Hon. Mr. Gulabrao Patil. According to the suggestion of the Commissioner of Agriculture, according to the natural availability of wild vegetables at district level and taluka level. 2270 farmers participated in the vegetable festival organized at district and tehsil level. At this time 65 wild vegetables were available for sale.

C. *Krushi Sanjeevani saptah*:

from 23st June to 1st July 2022, meetings were organized in 1519 villages with the participation of 32560 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 63052 farmers will be covered for kharif season 2022 by Rs.396.99 cr under weather-based fruit crop insurance scheme Rs.313.83 cr has been sanctioned for 42242 farmers

E. *Vikel Te Pickel*:

In the year 2022-23, a total of 81 farmer groups / farmer producer companies are selling agricultural produce to bulk buyers / sellers / processors. In this, 61 farmer groups 282 M. Tons of their produce have been sold, 20 farmers producing companies,29400 M. Tons of agricultural produce has been sold.

F. SMART:

29 applications have been received under the project for various activities and all the applications have received pre-sanction and the construction work, procurement process is in progress.

G. NDKSP:

Till date 104816 farmers of the district have been registered on the online portal DBT PoCRA and a total of 222706 individual benefit applications have been registered. Out of which till date 85719 farmers have been given subsidy amounting to Rs.640.26 cr. Also under the agribusiness component till date 48 farmer groups and farmer producer companies in the district have distributed subsidy amounting to Rs.5.75 cr.

Convergence activities obtained under different schemes

Sr No	Scheme	Crop Demonstration	Cluster based Crop Demonstration (1 demo= 10 ha)	Exposure Visit	Farmers Workshop / Training	SHG Groups Training	Farmers Field School	Kisan Ghosti
1	ATMA	1023	0	26 Farmers 14 Farmers Groups	42	0	15	6
2	PoCRA	0	0	4	0	38	290	0
3	SMART	0	0	0	0	0	30	0
4	NFSM / Nutri cereals	0	602	0	0	0	147	0
5	State funding scheme	0	161	0	0	0	599	0
6	RKVY		196	0	0	0	20	0
7	CROPSAP	0	0	0	0	0	10	0
8	HORTSAP	0	0	0	0	0	19	0

(Source: Related department wise data collected by project specialist agri. business)

III. Monitoring mechanism for village adaptation plan progress.

1. In Jalgaon district regular monthly meeting of SDAO, TAO, CAO will be conducted by DSAO Jalgaon. Number of applications of different activity, their progress and desk wise pendency will be monitored by DSAO. Technical session are also conducted by DSAO Jalgaon.
2. Monthly meeting of CA, AA, CAO & TAO will be regularly conducted by SDAO Pachora, Jalgaon and Amalner. The progress and proper direction will be regularly delivered by SDAO to all field staff.
3. In FFS farmers are trained to identify the insect pest and disease. Harmful insect and beneficial insect their roll in crop growth, regular observation of Crop Economic Threshold level (ETL), Integrated Pest Management (IPM), Eco friendly farming all these activities are conducted regarding climate resident technology to create sustainable livelihood.
4. The farmers are regularly visited by Krishi-tai, Krishi-Mitra, CA and made aware about new technology and scheme conducted by NDKSP. they help the farmer to select proper scheme and Technology which is suitable for them for their sustainable livelihood.
5. Krushi tai, CA, AA by identifying the needs and problems of farmers for effective implementation of various agricultural schemes & Proper guidance is given to the farmers to implement various schemes.
6. All the official and extension workers related to NDKSP Jalgaon are regularly trained by different kind of trainings sessions conducted at district level, KVK, PMU, seminar and various training institutes in Maharashtra and outside the state. So the result is 85967 individual farmers, 48 SHG & FPC are get benefit by NDKSP.
7. In Jalgaon district all CA, AA, AS, CAO, TAO, SDAO, DPIU team, PD ATMA, DSAO are connected to each other through different WhatsApp group. so information about the latest trend and in mechanization and Government support programme will be easily disseminated to from top to bottom level.
8. In Jalgaon district farming the joint investment 4 construction of Godown and warehouse, 42 custom hiring centre and 2 Processing Unit are come to exist on the cooperatively basis through NDKSP.
9. Near about 308 Ha. BBF, 62 ha SRT, 12731 ha. fertilizer application as per soil test report, organic farming, sericulture farming and so many techniques are adopted and conducted preciously to reduce chemical uses.
10. By the joint efforts of NDKSP Jalgaon 464 farmer are get benefit in mechanization, 42 custom hiring centre, 329 poly house /shaded house, 69157 adopt drip irrigation it is biggest achievement in Jalgaon district.

IV. Strategy for revisiting the village adaptation plan

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:

- **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.

- **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.
- **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.
- **Market and Value Chain Analysis**: Analyze the local and regional markets for agricultural produce. Identify opportunities to strengthen value chains, improve market access, and increase farmers' income.
- **Resource Management**: Evaluate the sustainable management of natural resources, including water, soil, and forests. Consider strategies for resource conservation and sustainable practices.
- **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.
- **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.
- **Community Participation**: Involve local communities in the planning and decision-making process. Encourage community-led initiatives and self-help groups.

ANNEXURE I (Village Level Micro Plan)

गाव विकास आराखडा प्रपत्र

महाराष्ट्र शासन - कृषि विभाग
नानाजी देशमुख कृषि संजीवनी प्रकल्प

POCRA

गाव विकास आराखडा

गाव समुहाचा क्रमांक- 499_te-13_02

गावाचे नाव-	लोहारा	सेन्सस कोड-	527900
महसुल मंडळ-	Kurhad	तालुका-	पाचोरा
उपविभाग-	पाचोरा	जिल्हा-	जळगाव

गावसमुहातील इतर समाविष्ट गावे

अ. क्र	गावाचे नाव	सेन्सस कोड	अ. क्र	गावाचे नाव	सेन्सस कोड
1	मोरगाव .	528048	2	चिंच खेडे दिगर	528081
3	कासमपुरे	527901	4	शेंदूर्णी	528076
5	नांद्रा प्र. लो.	528053	6	शहापूरे	527902
7	अंबाडी	528071	8	सावत खेडे .	528049
9	मालखेडे	528072	10	रामेश्वर	527898
11	सार्वे प्र. लोहारे	528052	12	जंगीपुरा	528073
13	म्हसास	527899	14	कळमसरे	527903
15	रोटवद	528047			

सुक्ष्मनियोजन प्रक्रिया कालावधी - ते

गाव विकास आराखडा तयार करणा-या कृषि सहाय्यकाचे नाव - R H Johre

गाव विकास आराखडयाची तांत्रिक तपासणी करणारे कार्यालय - उपविभागीय कृषि अधिकारी,पाचोरा

ग्राम कृषि संजीवनी समिती मंजूरी ठराव क्रमांक व दिनांक - ठराव क्रमांक दि. --

ग्रामसभा मंजूरी ठराव क्र व दिनांक - ठराव क्रमांक 1 दि. 21-09-2021

जिल्हास्तरीय समन्वय समितीकडील मंजूरीचा दिनांक - _____

जिल्हा अधिक्षक कृषि अधिकारी,जळगाव कार्यालय

ANNEXURE II (*Village Profile*)

नानाजी देशमुख कृषि संजीवनी प्रकल्प — कृषी विभाग महाराष्ट्र शासन

अहवाल क्रमांक : नादेकृसप्र/गामाप्र/527900/2023/303 — दिनांक : 30/10/2023

ग्राम कृषी संजीवनी विकास दर्शिका

गावाचे नाव : लोहारा	गावाचा सांकेतांक : 527900	ग्रामपंचायत: Lohara
गावाचा (प्रकल्प) टप्पा : 2	गाव खारपान मध्ये येते का ?: नाही	समूह कोड: 499_te-13_02
तालुका : पाचोरा	उपविभाग : पाचोरा	जिल्हा : जळगाव

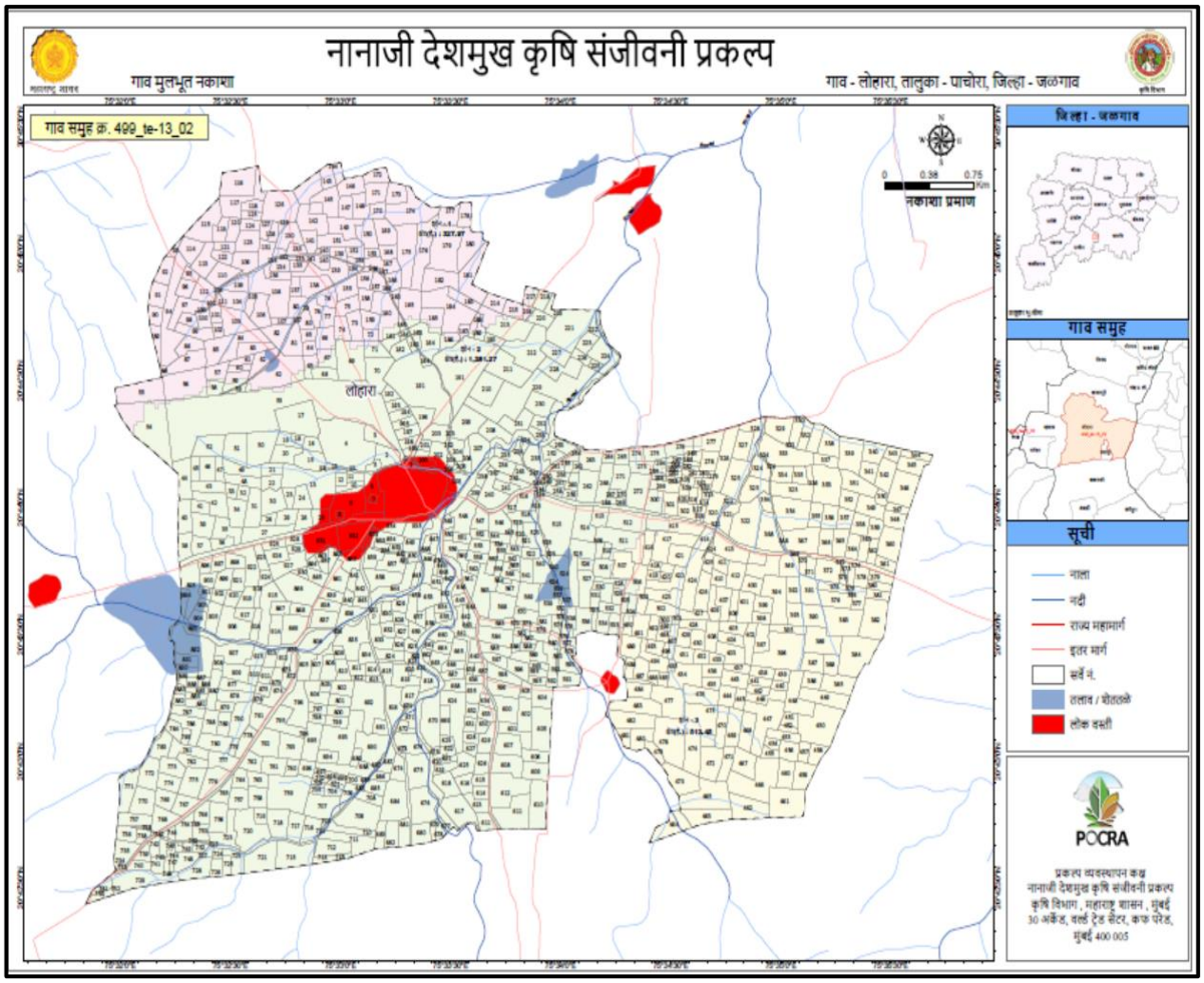
प्रकल्प कर्मचारी/अधिकारी

पदनाम	पूर्ण नाव	भ्रमणध्वनी क्रमांक
उपविभागीय कृषी अधिकारी	Jadhav Ramesh nina	7588814889
तालुका कृषी अधिकारी	R N Jadhav	7588814849
कृषी सहाय्यक	Johre R H	9552819656
समूह सहाय्यक	Ghanghav Varsha Rajendra	9420404309
शेतीशाळा प्रशिक्षक	NA	NA
कृषीमित्र	Tadavi Anil Supadu	9130184341
कृषीताई	NA	NA

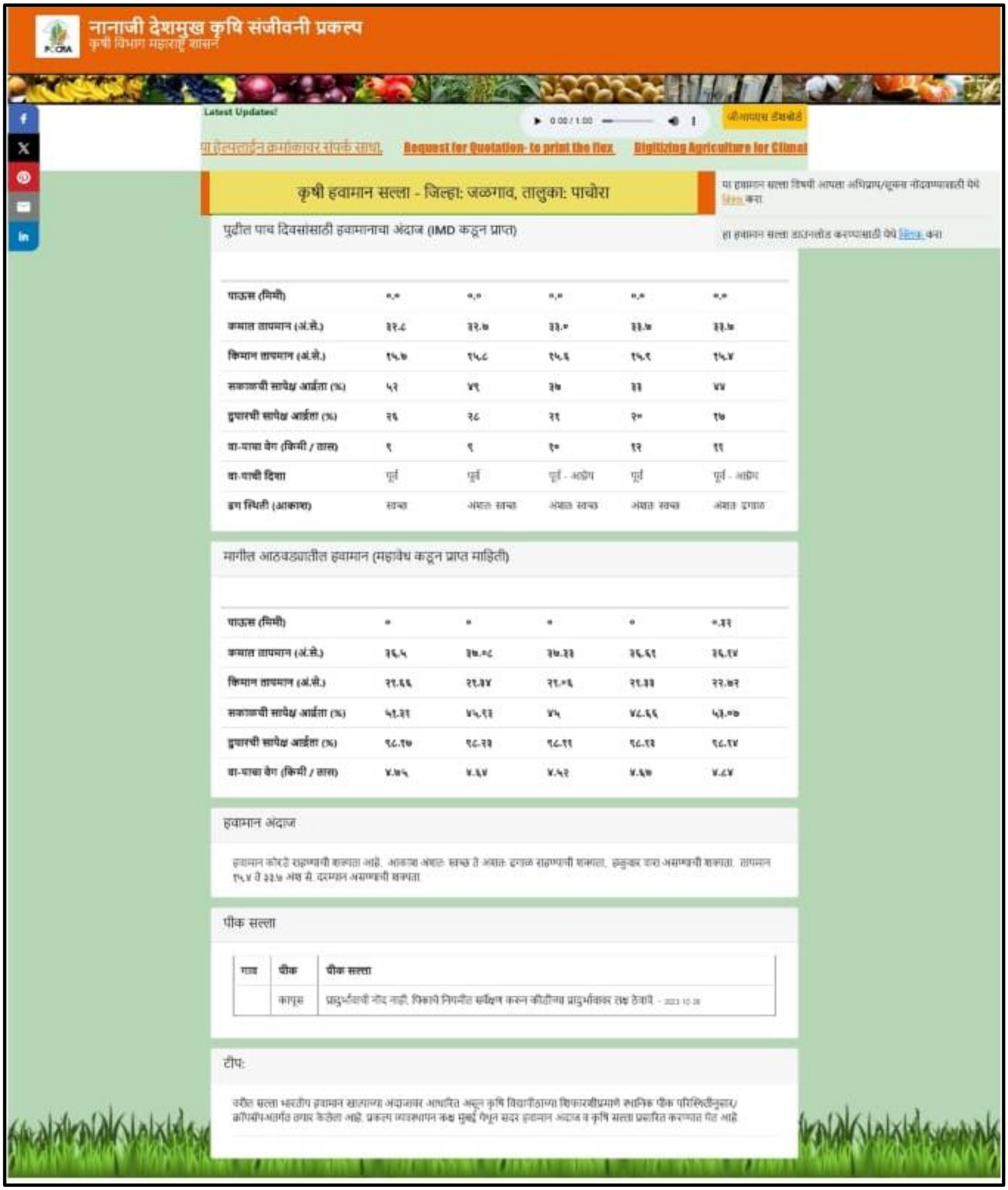
ग्राम कृषी संजीवनी समिती

पदनाम	पूर्ण नाव	भ्रमणध्वनी क्रमांक
सरपंच	Jaiswal Akshaykumar Uttamlal	9822625524
उपसरपंच	NA	NA
ग्रामपंचायत सदस्य	Chaudhari Kalpana Amrut	8308310826
ग्रामपंचायत सदस्य	Deshmukh Ishwar Ananda	9689769348
प्रगतिशील शेतकरी	JAdhav Sulabha Devram	8329909288
प्रगतिशील शेतकरी	Chaudhari Suresh Garbad	9763424434
महिला शेतकरी	Lokhande Ashabai Julal	8788622722
महिला शेतकरी	Dhangar Kevalbai Ramesh	9579801848
महिला शेतकरी	Patil Ashabai Dhanraj	9850904821
शेतकरी उत्पादक कंपनी प्रतिनिधी	She Usman Rehaman	8999467583
बचत गट महिला प्रतिनिधी	Waghmode Manjula Sanjay	97632962
कृषि पूरक व्यावसायिक शेतकरी	Jain Rahulkumar Supadulal	82714444
कृषि पूरक व्यावसायिक शेतकरी	Kshirsagar Sunil Pundalik	9763296

ANNEXURE III (Village Base Map)



ANNEXURE IV (Agromet advisory)



नानाजी देशमुख कृषि संजीवनी प्रकल्प
कृषी विभाग महाराष्ट्र शासन

Latest Updates!

जीआयएस डॅशबोर्ड

या हेल्पलाईन क्रमांकावर संपर्क साधा.   Request for Quotation- to print the flex   Digitizing Agriculture for Climat

कृषी हवामान सल्ला - जिल्हा: जळगाव, तालुका: पाचोरा

या हवामान सल्ला विषयी आपला अभिप्राय/सूचना नोंदवण्यासाठी येथे क्लिक करा

हा हवामान सल्ला डाउनलोड करण्यासाठी येथे क्लिक करा

पुढील पाच दिवसांसाठी हवामानाचा अंदाज (IMD कडून प्राप्त)

पाऊस (मिमी)	०.०	०.०	०.०	०.०	०.०
कमाल तापमान (अं.से.)	३२.८	३२.७	३३.०	३३.७	३३.७
किमान तापमान (अं.से.)	१५.७	१५.८	१५.६	१५.९	१५.४
सकाळची सापेक्ष आर्द्रता (%)	५२	४९	३७	३३	४४
दुपारची सापेक्ष आर्द्रता (%)	२६	२८	२१	२०	१७
वा-याचा वेग (किमी / तास)	९	९	१०	१२	११
वा-याची दिशा	पूर्व	पूर्व	पूर्व - आग्नेय	पूर्व	पूर्व - आग्नेय
ढग स्थिती (आकाश)	स्वच्छ	अंशत: स्वच्छ	अंशत: स्वच्छ	अंशत: स्वच्छ	अंशत: ढगाळ

मागील आठवड्यातील हवामान (महावेध कडून प्राप्त माहिती)

पाऊस (मिमी)	०	०	०	०	०.३२
कमाल तापमान (अं.से.)	३६.५	३७.०८	३७.३३	३६.६१	३६.९४
किमान तापमान (अं.से.)	२१.६६	२१.३४	२१.०६	२१.३३	२२.७२
सकाळची सापेक्ष आर्द्रता (%)	५१.३१	४५.९३	४५	४८.६६	५३.०७
दुपारची सापेक्ष आर्द्रता (%)	९८.१७	९८.२३	९८.११	९८.१३	९८.१४
वा-याचा वेग (किमी / तास)	४.७५	४.६४	४.५२	४.६७	४.८४

हवामान अंदाज

हवामान कोरडे राहण्याची शक्यता आहे. आकाश अंशत: स्वच्छ ते अंशत: ढगाळ राहण्याची शक्यता. हलुवार वारा असण्याची शक्यता. तापमान १५.४ ते ३३.७ अंश से. दरम्यान असण्याची शक्यता

पीक सल्ला

गाव	पीक	पीक सल्ला
	कापूस	प्रादुर्भावाची नोंद नाही. पिकाचे नियमीत सर्वेक्षण करून कीडींच्या प्रादुर्भावावर लक्ष ठेवावे. - 2023-10-18

टीप:

वरील सल्ला भारतीय हवामान खात्याच्या अंदाजावर आधारित असून कृषि विद्यापीठाच्या शिफारशीप्रमाणे स्थानिक पीक परिस्थितीनुसार/ क्रॉपसॅप-अंतर्गत तयार केलेला आहे. प्रकल्प व्यवस्थापन कक्ष मुंबई येथून सदर हवामान अंदाज व कृषि सल्ला प्रसारित करण्यात येत आहे.