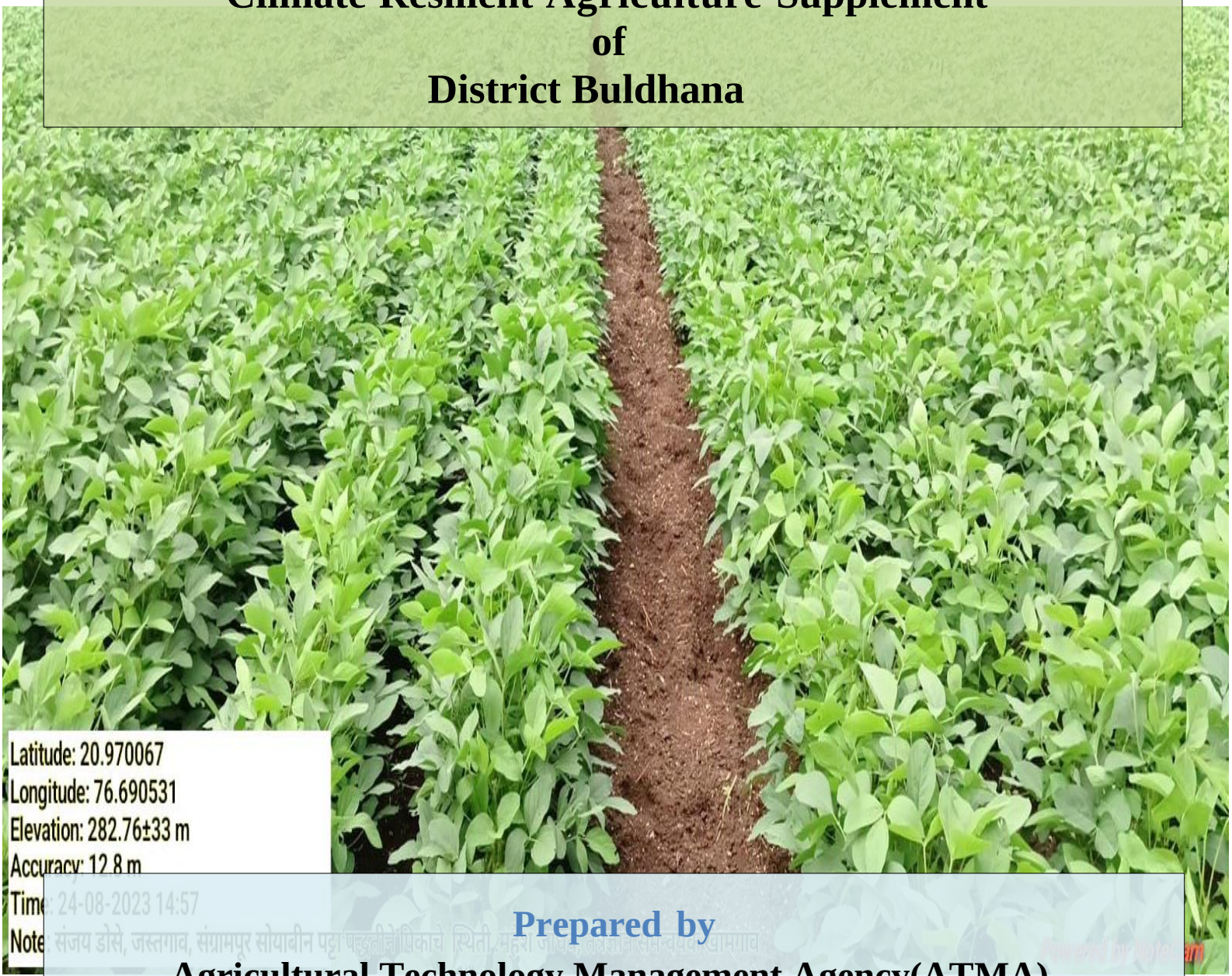
Nanaji Deshmukh Krushi Sanjeevani Prakalp

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



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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 objective (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 Kendra's. 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 Kendra's (KVKs), Farmers, Farmer Producer Organizations from the district. The SREP supplement contains an account of weather analysis, information about cropping pattern, impact of climate change on crop yields, coping mechanisms adopted by the farmers, adoption level of climate resilient technologies, constraints in marketing of agriculture produce and scope for value chain development. The SREP supplement ends with comprehensive template for Village Adaptation Plan which will act as guide for the Agriculture Assistants who are the cutting-edge extension workers. It will be helpful to extension workers while carrying out extension of 'climate resilience technologies.

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Chapter 1: General Profile of the District

1.1 Geographical area and location

Buldhana is a district in the Amravati Division of Maharashtra State, in Western India at the Western most border of Vidarbha region. "The total geographical area of Buldhana district is 9,661 Sq.Km (9,46,727.18 Ha), which is 3.14% of the total geographical area of Maharashtra State. The latitudes of the district places are 19.51° to 21.17° N and longitudes are 75.57° to 76.59° E." Bounded on the north by Madhya Pradesh state and Jalgaon district, to the east by Akola and Washim districts, to the south by Parbhani and Jalna districts, and to the west by Ch. Sambhajinagar and Jalgaon districts.

1.2 Tehsils details

The district consists of six revenue subdivisions and thirteen blocks/tehsils. The district headquarters is at Buldhana. There are 877 *Grampanchayats* in the districts which involves 1433 villages and 13 semi urban centres.

1.3 Demographic Information

Total number of households in the district is 5,60,089. The population of the district is around 27,77,559 as per 2011 census. Total male population is 14,45,843 and the female population is 13,31,716. Sex ratio of the district is 934. The average density of population is 268 per sq. km; as against State's position of 365 per sq. km. Literacy rate of the district is 83.40%, whereas male literacy rate of the district is 90.54% and female literacy rate is 75.84 %.

1.4 Annual Average rainfall & Temperature

Average rainfall of the district is 761 mm. Rainfall ranges between 626 mm to 890 mm during the last three years. 95% of total rainfall occurs during June to October. However, during the last season and current season rainfall has drastically been changing. Buldhana district received less precipitation in the 2014 and 2015 monsoon and that has resulted in reducing the production and productivity of crops. In both kharif seasons Buldhana has faced less than 50 *paisewari.*

Highest temperature observes 46.0°C in Khamgaon and Shegaon tehsil and lowest temperature observes 6.0°C in Buldhana and Chikhli.

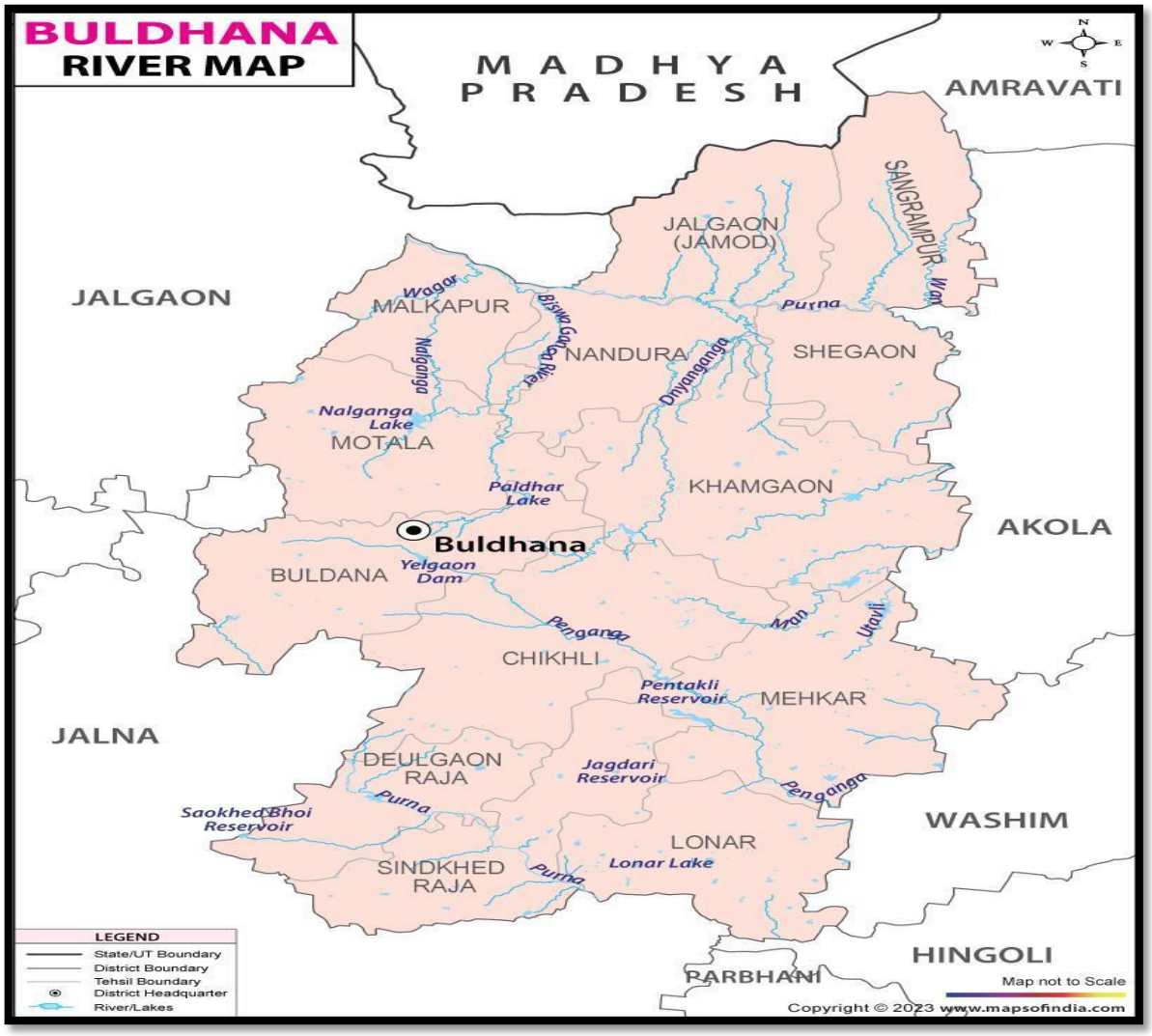
1.5 Soil formation in the district and type of soil

The major portion of the Earth's crust in the district has been synthesized from the rock Basalt. Hence the majority of the soil in the district is black and fertile. Soils of AES III, IV and V are shallow and moderately deep while soils of AES-II are moderately deep and predominantly vertisols.

The district has mostly black soil, which is highly fertile having high contents of calcium, magnesium and carbonates. However, the soil is deficient of Nitrogen, Phosphates, Potash and also humus. The soil has the capacity of retaining high moisture and percolation.

1.6 River Network in the District

Painganga is the major river in the district which originates in the Ajanta mountains and flows south west to join Wardha river. Khadakpurna is the second most important river in the district, which originates in Deulgaon raja tehsil. Nalganga, Dnyanganga, Koradi, Man, Vishwaganga, Utawali, Banganga and Wan are the other rivers which flow into the district.



(Source: www.mapsofindia.com)

1.7 Irrigation Potential of the district

Access to irrigation in Buldhana district is weak. Around 6% of gross cropped area is irrigated and hence farmers are largely rain-dependent. The district generally experiences rainfall at around 700-800 mm a year. But Buldhana is also prone to droughts: for instance, 747 villages in 7 blocks of the district were classified as drought affected in 2011-12 by the Government of Maharashtra.

(Source: District Socio-Economic Review)

1.8 Different zones according to prevailing agro-ecological situations

The major part of the district agro climatically falls in the assured rainfall zone. The district is divided into three distinct topographical features.

	Soil Depth	Special Features	Annual Rainfall	Areas	Crops
Ghat Track	Heavy shallow to moderately deep	Undulating Topography; land slopes around 7%	750 mm - 850 mm	Greater part of the Buldhana district with tehsil viz. Chikhli, Buldhana, Deulgaon Raja, Mehkar, Lonar, Malkapur, Sindkhed Raja, Motala and Nandura.	Kharif - Sorghum, Soybean and Maize Rabbi - Wheat, gram, safflower
Black Plains	Moderately deep and predominantly vertisole		750 mm - 900 mm	Khamgaon & Shegaon	
Saline Alkali Track	The soil is vertisole, deep and saline to saline alkali in reaction.		750 mm - 850 mm	Shegaon, Khamgaon, Malkapur & part of Jalgaon jamod, Sangrampur tehsils of the district.	

Agro Ecological Situation	Characteristics	Blocks Covered
I	Hilly topography, Black cotton, soil, High rain fall	Sangrampur (North)- 100% Jalgaon J.(North)- 64%
II	Plain topography, Black cotton, soil, saline track	Malkapur - 23%, Nandura - 50% Shegaon - 50% Khamgaon (North) - 15% Jalgaon J. (South) - 36%
III	Hilly topography, shallow to medium soil	Motala - 94%, Buldana - 100% Chikhali - 30%
IV	Well irrigated, medium to shallow soil	Mehkar - 92% Khamgaon (South)- 76% Chikhali (South) -67% Nandura-50% Shegaon-50% Mehkar-92%
V	Hilly & undulated topography shallow soil	Lonar -100% Deulgaon Raja-95% Sindkhed Raja-96%
VI	Command area under major and medium irrigation project	Mehkar –5%, Chikhali-3% Motala-6%, Khamgaon-9% Deulgaon Raja-5%, Malkapur-5% Sindkhed Raja-4%

Chapter 2: Agriculture Profile of District

2.1 Land use classification of the district

Sr. No.	Particular	Area in Ha
1	Geographical area of the district	9,46,727
2	Forest Land (8.94 %)	85,542
3	Barren Land (7.04 %)	67,369
4	Non agriculture land (5.58 %)	53,387
5	Land useful for sowing (78.44 %)	7,50,457
6	Average sowing area of Kharif crops (5 years average)	7,35,521
7	Average sowing area of Rabbi crops	2,27,215
8	Average sowing area of Summer crops	10,073

(Source:https://buldhana.nic.in/en/document-category/plan-report/)

2.2 Agriculture land holdings

Its distribution according to size

Sr. No.	Classifications as per land holding	Number of farmers	Percentage %
1	Marginal and Small farmers (≤ 2.00 Ha.)	3,92,882	79.99%
2	Medium (2.00 Ha. ते 5.00 Ha.)	97,233	19.80%
3	Big (More than 5.00)	1043	0.21%
Total number of farmers (Agri census 2015)		**4,91,158**	**100**

(Source: https://buldhana.nic.in)

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

Buldhana district was basically considered a dry land region a few years ago. But in the last 25-30 years government departments created many small, medium and big water storage projects which helped to increase irrigation facilities. Tehsil wise information of the said projects is mentioned in the below table. Outside that many small reservoirs like farm ponds, CCT, deep CCT, cement nala bund, Earthen nala bunds, LBS, Gabian bunds etc. had been created by agriculture department in different schemes like VIDP, IWMP, *Jalyukt Shivar Abhiyan*, *Magel tyaala shet-tale*, NDKSP, MREGS etc.

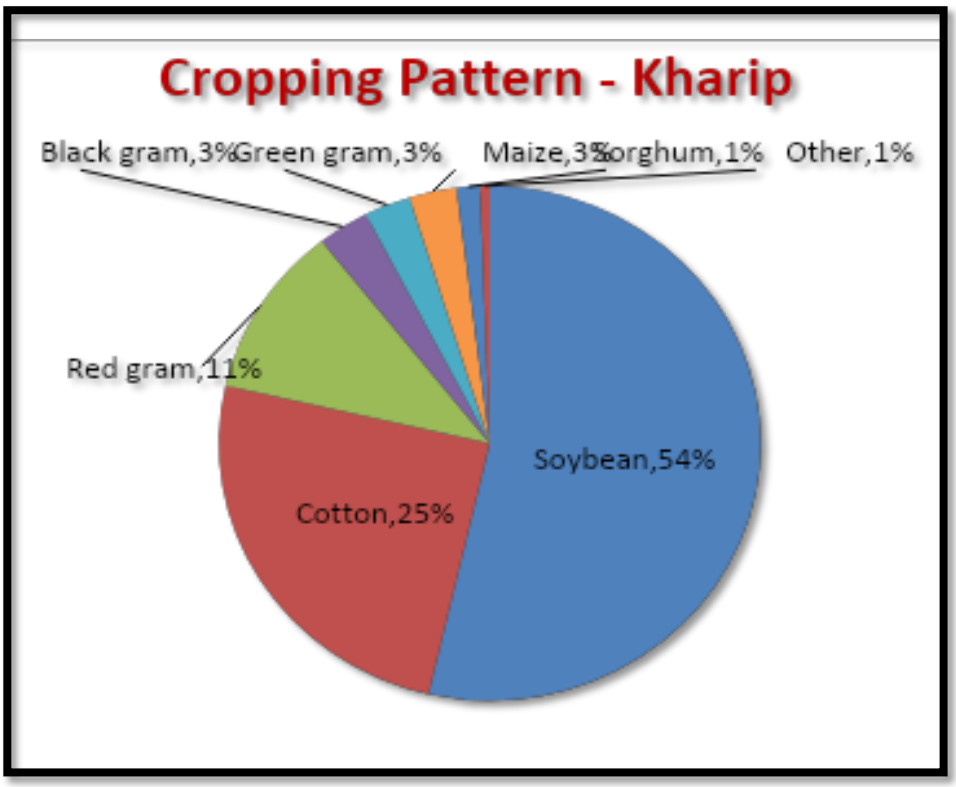
Water resources available in the district

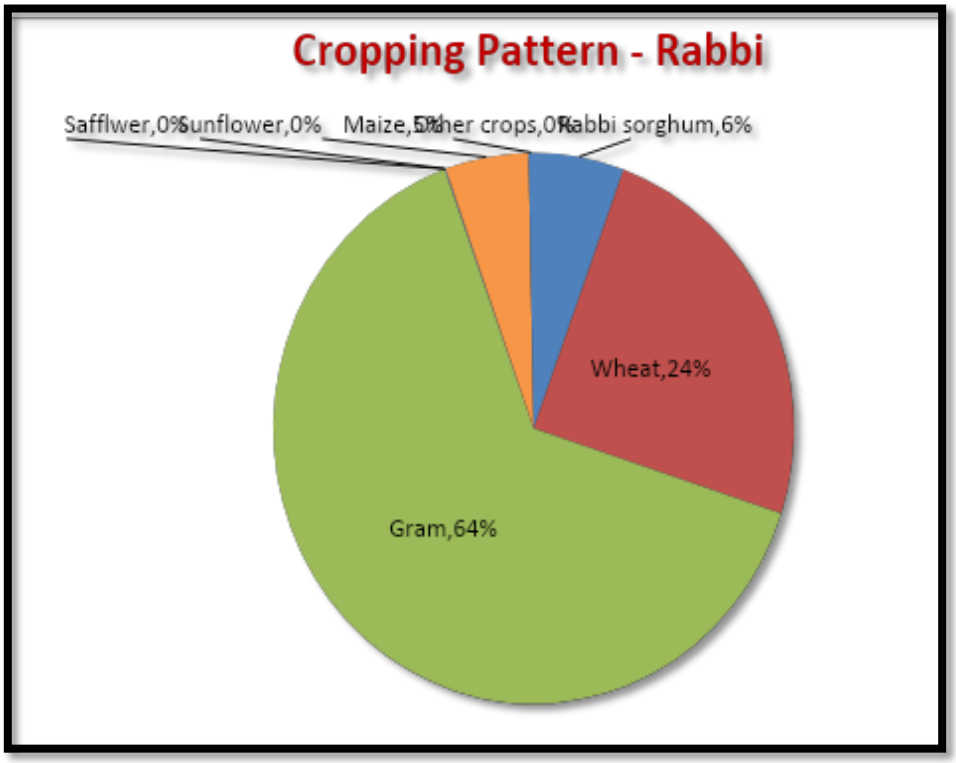
Sr. No.	Taluka	Big projects		Medium projects	Small projects
		Project Name	River Name		
1	Buldhana	--	Painganga	Yelgaon Dam	--
2	Chikhali	---	---	Shivani Armal	--
3	Mehkar	Pentakali	Painganga	Koradi	--
4	Deulgaon Raja	Sant ChokhaMela Dam	Khadakpurna	---	--
5	Motala	Nalganga Dam	Nalganga	Paldhag Dam	--
6	Khamgaon	---	Dnyanganga, Mas, Man	Dnyanganga Dam, Botha, Mas dam, Man dam	--
7	Sangrampur	---	Wan	Wan Dam	--

(Source: https://buldhana.nic.in)

2.4 Types of crops grown, cropping pattern, cropping intensity and farming systems

Total net sown area of kharif crop in the district is 7,35,521 ha, whereas net sown area of rabbi crops is 2,27,215 Ha. Cotton, soybean, red gram, green gram and maize are the major kharif crops sown in the district, whereas wheat, gram, rabbi sorghum, maize and sunflower are the major rabbi crops sown in the district. Groundnut, Banana, Sugarcane, Sesame, Safflower, Bajara etc. are also sown in the district at some places. The district has 12,049 Ha areas under different horticulture crops like Guava, Mango, Citrus, Custard Apple, Kagzi Lime, Sweet Orange and Pomegranate etc. Some farmers have agriculture allied business like Poultry, Goat Rearing, Sericulture, Dairy, Fishery, Apiculture etc.





In Buldhana district Soybean and Cotton are major crops which covers 79% of the total sown area. Whereas other pulses like Red Gram, Black Gram, Green Gram are minor crops sown in the district. Pulses are mainly sown as intercrops at most of the places.

In Buldhana district Gram And Wheat are major rabbi crops which covers 88% of the total sown area.

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

E. Year wise area, production and productivity of major crops for last 5 years																
(Area in Ha, Production in Metric Ton, Productivity in Kg/Ha, Cotton productivity in bells, Bell = 170kg)																
Sr no	Crop	2018-19			2019-20			2020-21			2021-22			2022-23		
		Area (Ha)	Procuction (M. Ton)	Productivity (Kg)	Area (Ha)	Procuction (M. Ton)	Productivity (Kg)	Area (Ha)	Procuction (M. Ton)	Productivity (Kg)	Area (Ha)	Procuction (M. Ton)	Productivity (Kg)	Area (Ha)	Procuction (M. Ton)	Productivity (Kg)
1	Cotton	1864	57030	306	2109	31810	151	1984	79919	403	1939	91133	470	2035	90822	446
2	Soybean	4015	415174	1031	3715	416082	1120	3848	566844	1473	3873	608836	1572	3987	674999	1693
3	Red gram	818	40398	494	780	80081	1027	739	86940	1176	774	242726	3136	795	71789	903
4	Green gram	185	10187	551	173	13143	762	18	8697	466	192	13862	722	133	8485	638
5	Black gram	207	1161	564	187	12236	655	201	12264	611	216	16438	761	139	8788	632

(Source - District Superintendent Agriculture officer, statistical section)

Chapter 3: Weather trend of the district

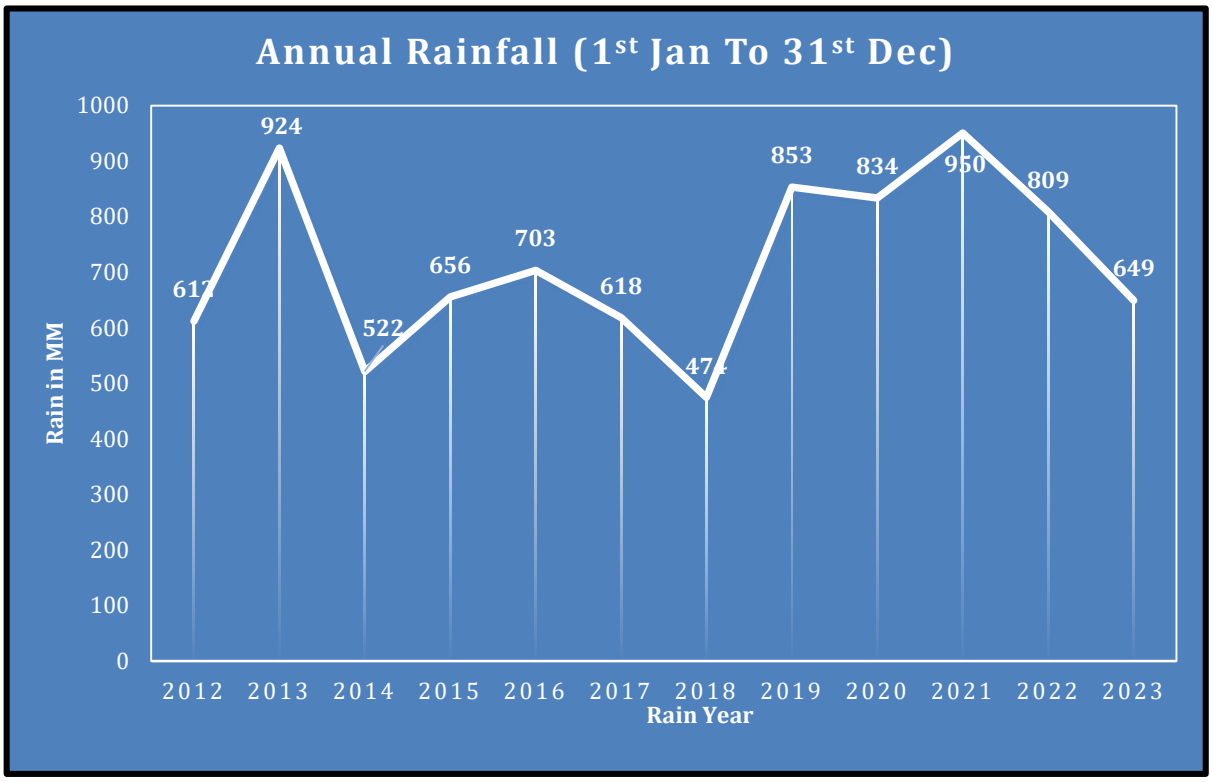
Introduction

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

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

3.1Annual average rainfall of last twelve years

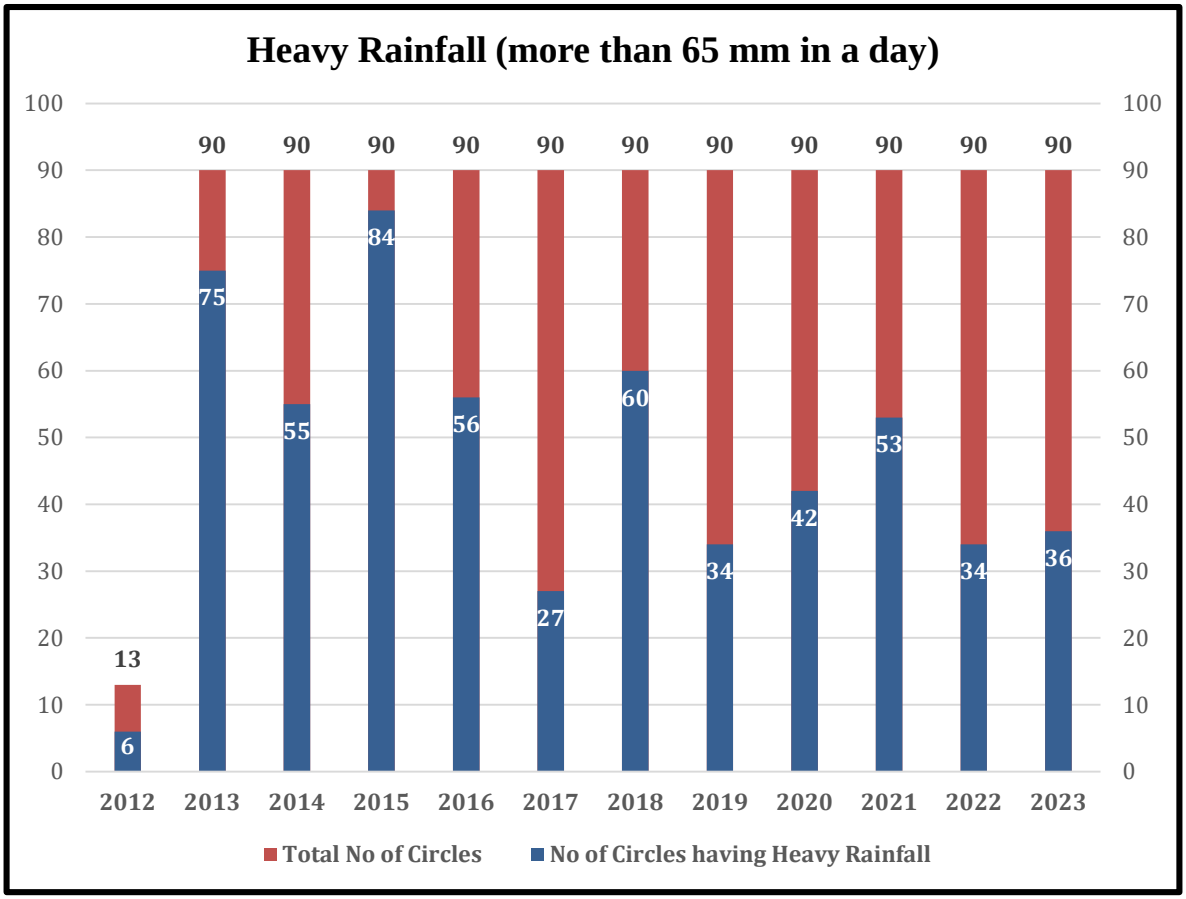
Normal or average rainfall is the amount of precipitation that we expect per year (in a given area). It is obtained and set by calculating the average (mean) of precipitation recorded in an area. Annual rainfall or precipitation is the sum of daily rainfall in a year.



The graph 3.1 presents annual rainfall data of Buldhana district from 2012 to 2023, highlighting fluctuations in precipitation. Notably, the lowest recorded rainfall was in year 2018 at 474 mm, while the highest occurred in year 2021 with a total of 950 mm annual average rainfall.

3.2Heavy rainfall.

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



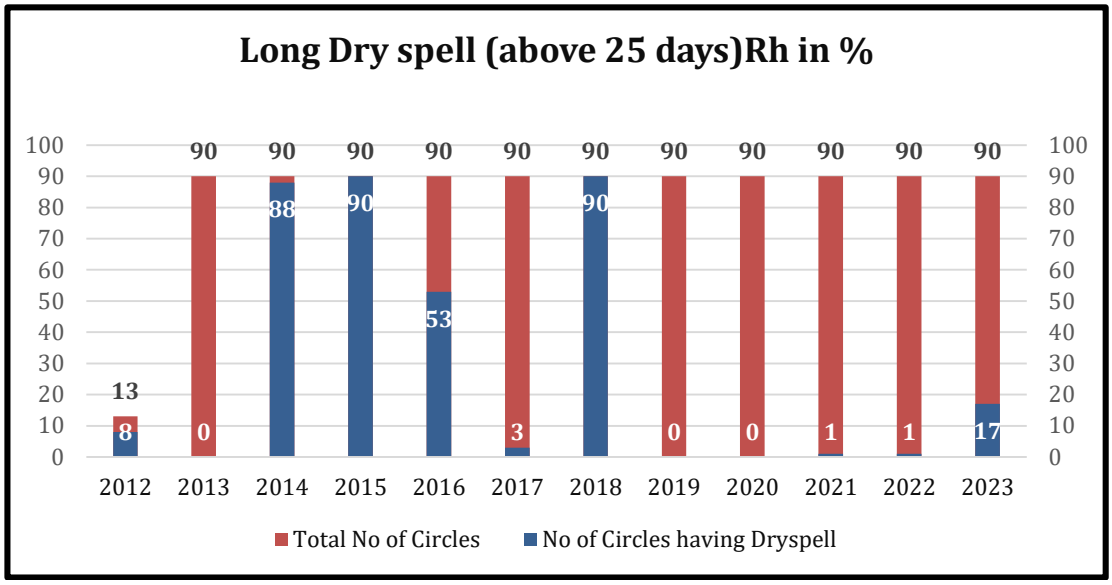
The provided graph 3.2 illustrates occurrences of heavy rainfall in circles within the Buldhana district from year 2012 to 2023. Notably, in year 2015, heavy rainfall affected the maximum number of circles, with 84 circles out of the 90 circles experiencing such conditions. Conversely, the year 2017 recorded a lower incidence of heavy rainfall, with 27 circles out of the 90 circles being affected in Buldhana District.

3.3Dry 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

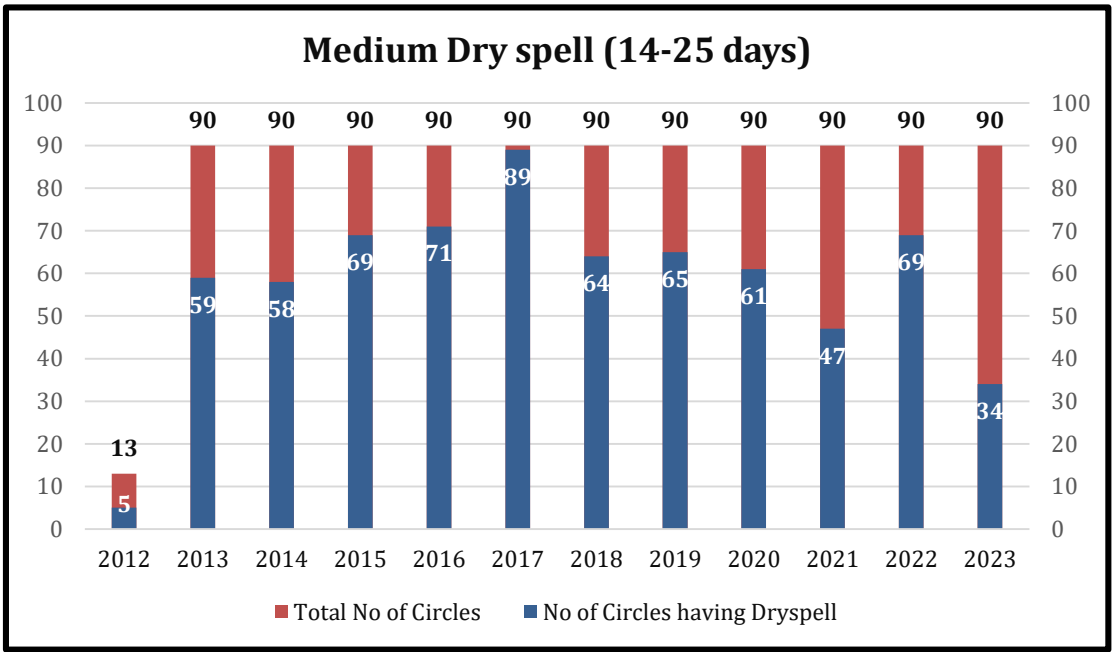
Long Dry spell is a prolonged period above 25 days of dry days in monsoon period



A graph (Graph 3.3.1) that shows the trend of long dry spells observed in a Buldhana 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 2015 and 2018, all circles in the district experienced long dry spells. Conversely, in year 2013, 2019 and 2020, there was no long dry spell, across all 90 circles in the district.

3.3.2 Medium Dry spell

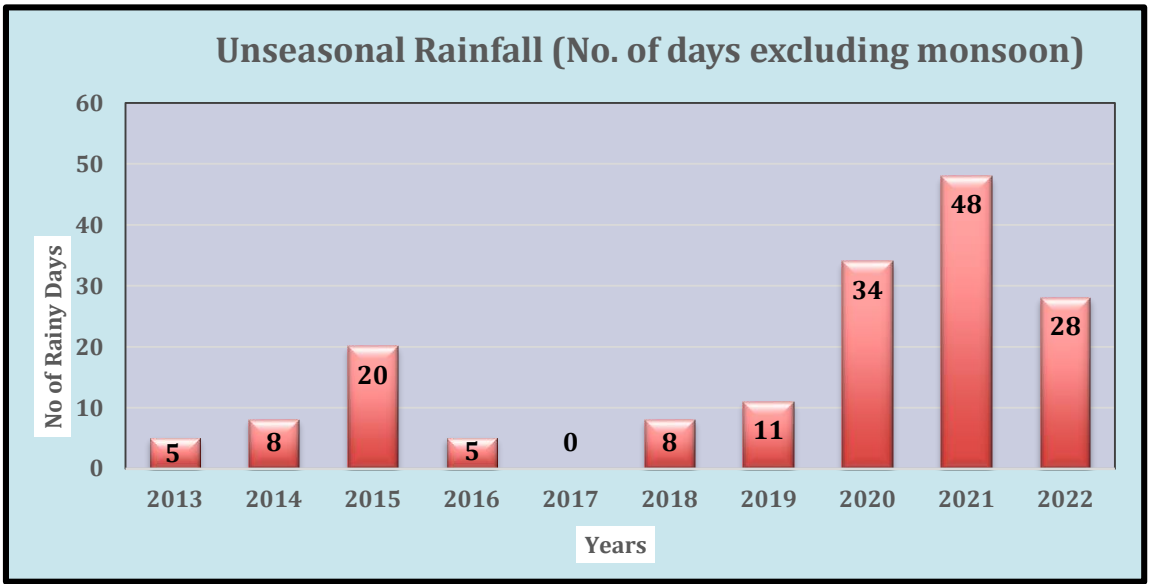
Medium Dry spell a period of 14-25 days of dry weather.



A graph (Graph 3.3.2) that shows the trend of medium dry spells observed in a Buldhana district. The data covers the total number of circles and the circles that affected medium dry spell (14 to 25 days) in Buldhana district from the year 2012 to 2023. The graph shows that in year 2017, highest no. of circles i.e. 89 circles out of 90 circles in the district experienced medium dry spells. Conversely, in year 2023, there was only 34 circles out of 90 circles experienced medium dry spell in the district.

3.4 Unseasonal rainfall.

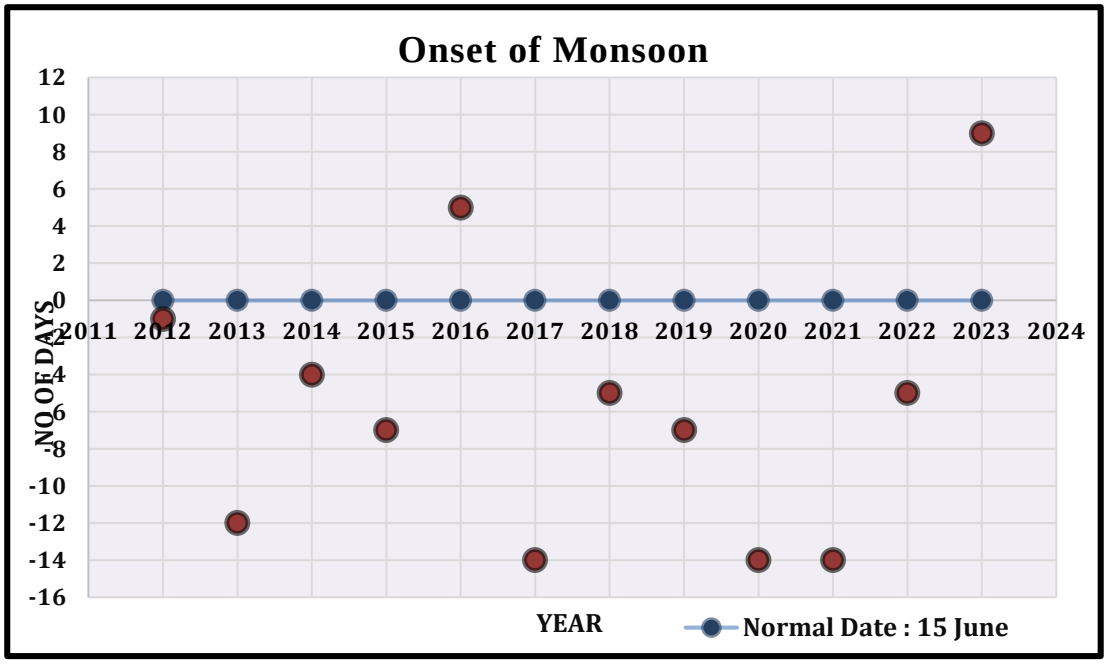
Rainfall received during non mosoon days is treated as unseasonal rainfall. Unseasonal rains-when there is a sudden change in atmospheric pressure, it can result in precipitation, even during non-monsoon seasons.



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

3.5Monsoon 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 15th June in Buldhana district.



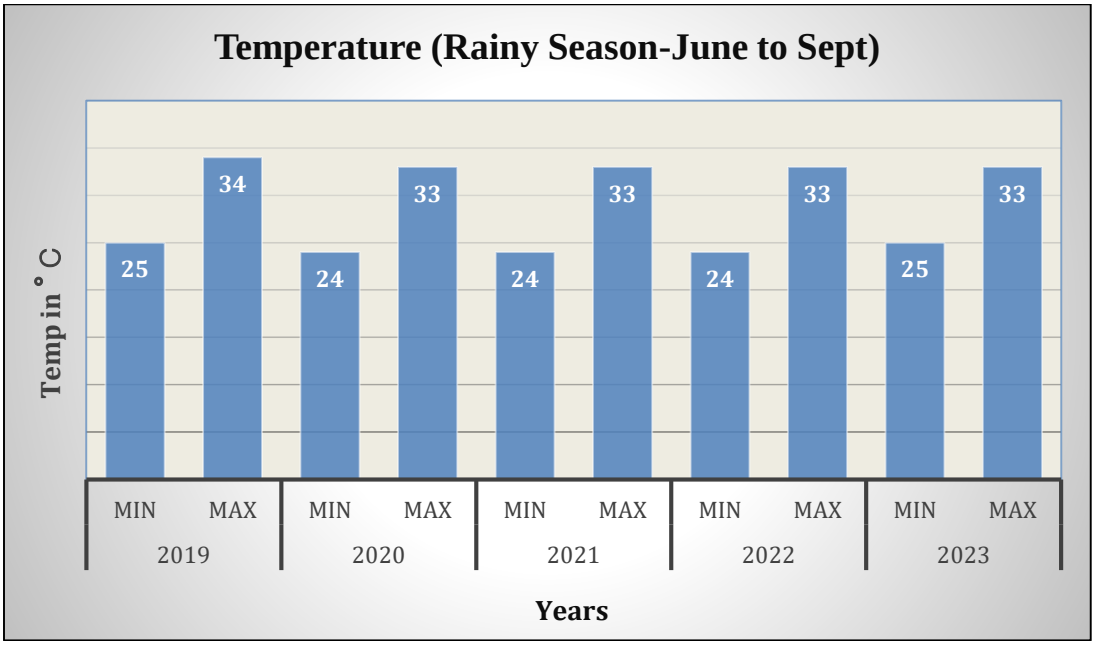
The graph 3.5 depicts the annual onset of the monsoon. The blue line represents the normal day of onset of monsoon. The onset days show variations ranging from -14 to 9 days. Notably, in year 2016

and 2023 the monsoon arrived delayed than the normal onset date. However, in remaining years the monsoon was notably arrived earlier.

3.6 Temperature.

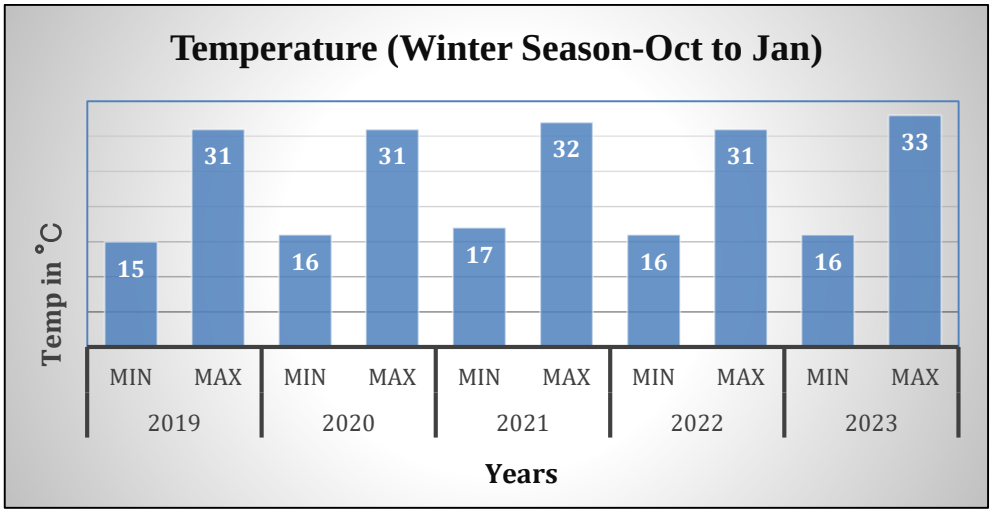
Temperature is a physical quantity that quantitatively expresses the attribute of hotness or coldness. The average temperature is 27.5 °C, with a minimum of 17°C and a maximum of 38°C. On the coldest nights, the temperature usually drops to around 15°C. On the warmest days, the temperature usually reaches around 40°C.

3.6.1 Temperature (Rainy Season-June to Sept)



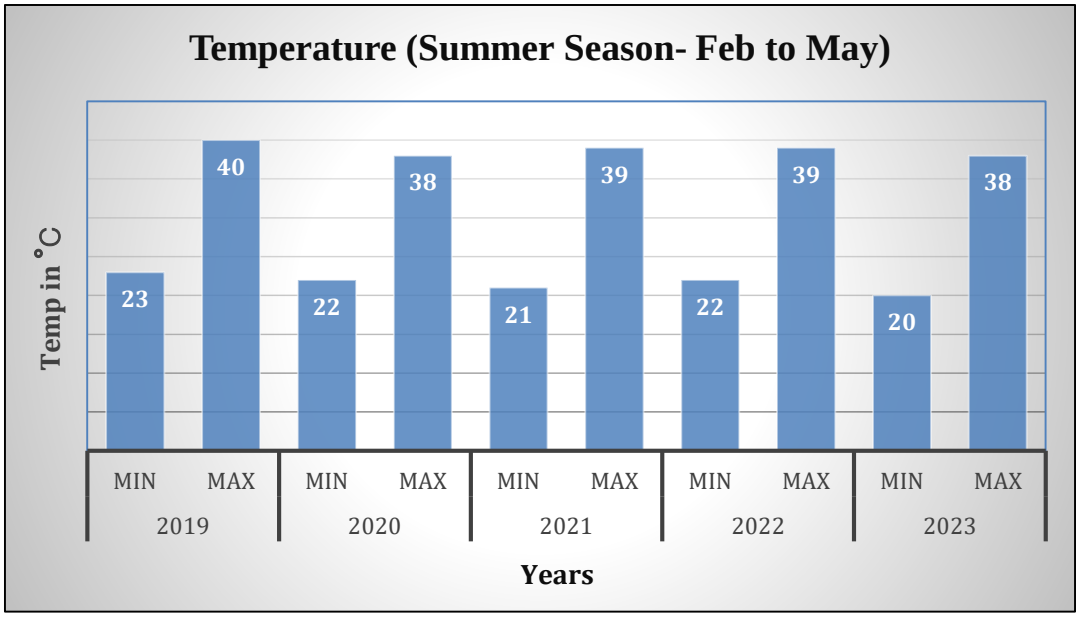
The graph 3.6.1 presents the temperature in the Buldhana district during the rainy season from year 2019 to 2023 exhibited a consistent range, with minimum temperatures fluctuating between 24-25°C and maximum temperatures ranging from 33-34 °C.

3.6.2 Temperature (Winter Season-Oct to Jan)



The graph 3.6.2 presents the temperature in the Buldhana district during the winter season from year 2019 to 2023 exhibited a consistent range, with minimum temperatures fluctuating between 15-17°C and maximum temperatures ranging from 31-33°C

3.6.3 Temperature (Summer Season- Feb to May)

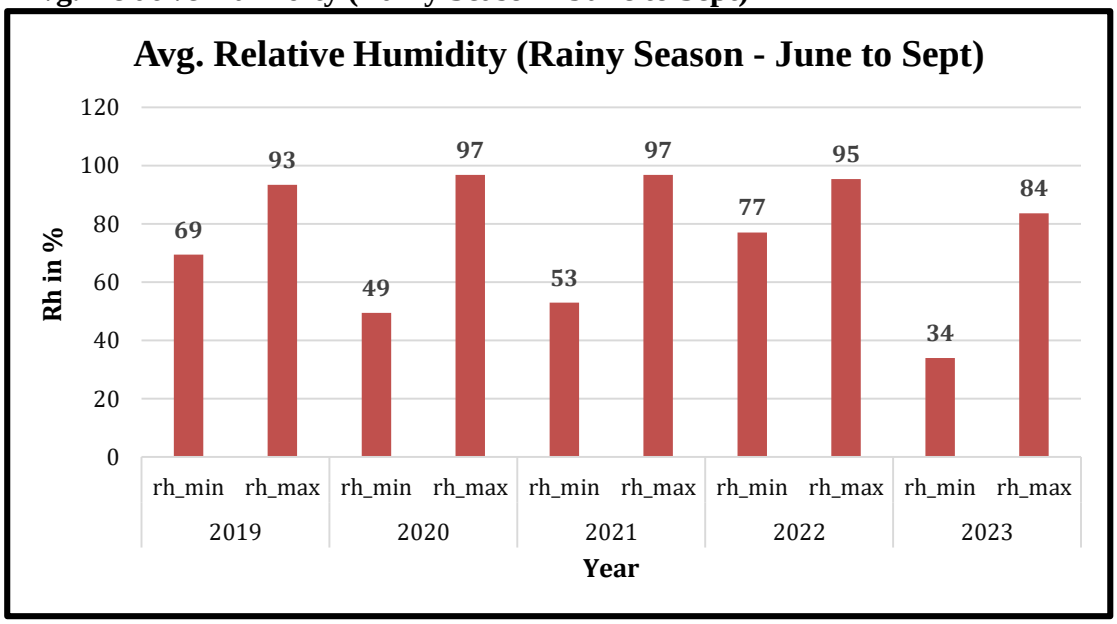


The graph 3.6.3 presents the temperature in the Buldhana district during the summer season from 2019 to 2023 exhibited a consistent range, with minimum temperatures fluctuating between 20-23°C and maximum temperatures ranging from 38-40°C.

3.7Relative Humidity

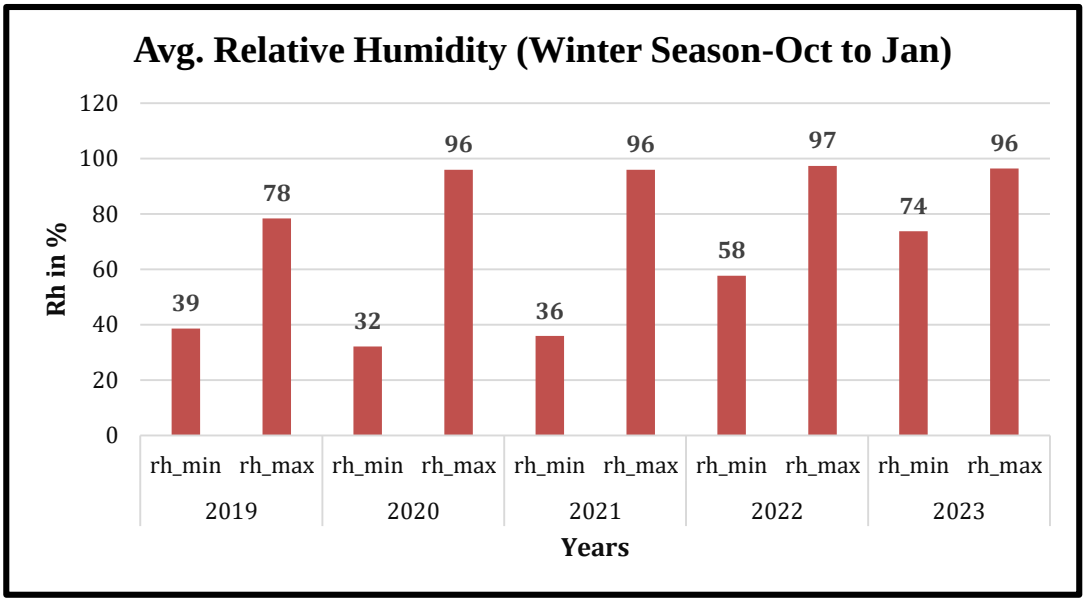
Relative Humidity is the ratio of the actual quantity of moisture at a certain temperature and pressure to the maximum it can hold at the same temperature and pressure. It is usually multiplied by 100 and expressed in percent.

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 Buldhana district, revealing a variation in minimum humidity from 34% to 77% and maximum humidity ranging between 84% and 97%.

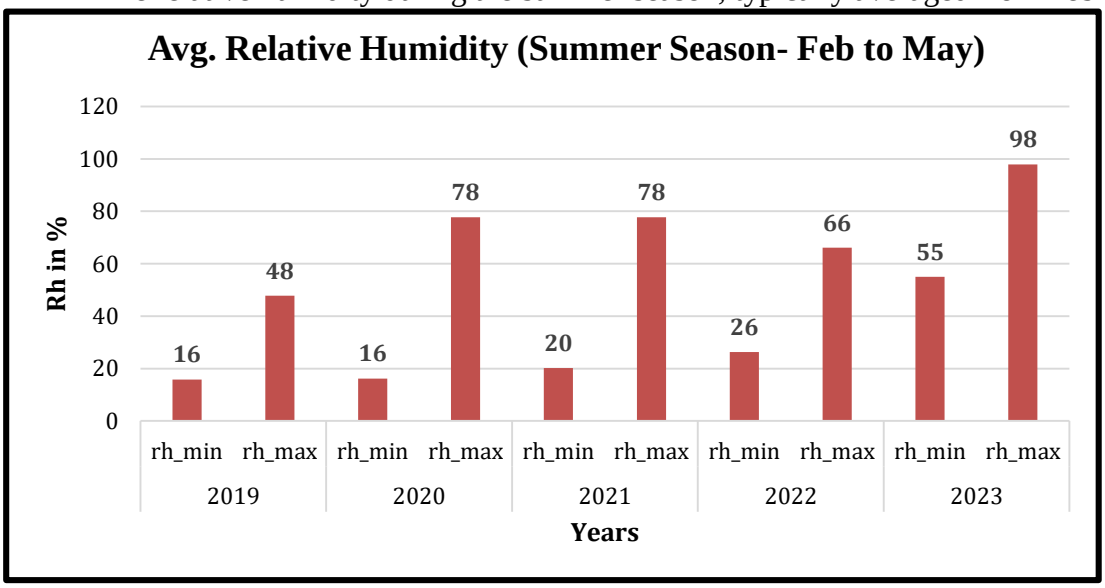
3.7.2 Avg. Relative Humidity (Winter Season-Oct to Jan)



The graph 3.7.2 illustrates humidity levels during the winter season in the Buldhana district, revealing a variation in minimum humidity from 32% to 74% and maximum humidity ranging between 78% and 97%.

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

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



The graph 3.7.3 illustrates humidity levels during the summer season in the Buldhana district, revealing a variation in minimum humidity from 16% to 55% and maximum humidity ranging between 48% and 98%.

Sr. No.	Climate Variability	**Kharif (**Temperature range 27°c - 35°c)			**Rabbi** (Temperature range (27°c - 35°c)	
1	**Impact of temperature**	**Cotton**	**Soybean**	**Red Gram**	**Gram**	**Wheat**
	Crop growth and yield	Cotton crop required soil temperatures between 20-30°C, some farmers sow the cotton in the last week of May at high soil temp. and face the problem of stunted seedling growth, for better growth of cotton crops it required average temperature range 24 to 30°C. When Temperature goes below 20°C during the flowering period, maturity is delayed. When temperature goes above to 35°C leads to poor pollination, less boll formation, heavy square ,flower, boll shading and early maturity observed. also affect fiber quality and decrease yield, rise in temperature reduce the yield of cotton crop in district a) Reddening of leaves b) Shedding of square c) Stunted growth.	Soybean is major crop in Buldhana district sowing window in the district is first week of June to first fortnight of July, temperature play an important role in growth and production of soybean germinate between 15°-32°c. It will not grow below 10°C and above 40°C. The optimum soil temperature for germination and early seedling growth is 25 to 30°C. temperatures below 21°C and above 32°C can reduce flowering and pod set. If the maximum and minimum temperature go up by 1°C and 1.5°C respectively yield reduced by 17 percent. High night temperatures (28°C) resulted in smaller seed size, lower seed weight, and a	Pigeon pea required temperature ranging from 26°C to 30°C in the rainy season (June to October) and 17°C to 22°C in the post rainy season (November to March),warm (>28 °C) and cool (<20 °C) temperature delay flower initiation and that the optimal temperature for flowering for early maturing type is close to 24°C. Pigeon pea is very sensitive to low radiation at pod development, therefore flowering during the monsoon and cloudy weather, leads to poor pod formation and 60-70% reduction in yield, such condition	In chickpea, temperature is a major environmental factor regulating the timing of flowering thus influencing grain yield. Both low and high temperatures can limit the growth and grain yield of chickpea at all phenological stages. 1°C increase in seasonal temperature the yield loss was estimated to be 10–15% for every 1°C increase beyond the optimum temperature. The effect of high and low temperatures on grain quality (grain size and seed coat colour) is also a recognized problem When temperatures exceed 35°C during the reproductive stage, photosynthesis was reduced, which resulted in smaller grain. At temperatures of 30°C at 50% flowering and less than 30°C for 3–4 days	Wheat crop require 20 to 25°C for germination, 16 to 20°C for tillering, 20 to 23°C for accelerated growth and 23 to 25°C for proper grain filling. Wheat plants are sensitive to very cold or frost injury at any stage of growth particularly at reproductive growth if temperature is below 15°C, increase in temperature at the time of growth period leading low productivity. a) Low Germination problem b) Less tillering c) Low Seed Filling d) force maturity e) Yield losses up to 30%

			reduced number of effective pods and seeds per plant and thus, a significant reduction in yield per plant. extreme temperatures above 40°C are harmful for seed production. This condition observed in the District if there is dry spell in the month of August-sept. a) Decreasing number of flowers b) Vegetative growth stunted c) Yield losses up to 20%	observed in the Buldhana district a) Vegetative growth stunted b) Yield losses up to 25%	at 100% blooming, yield loss has been reported. Growing at 35/25°C significantly increased biomass in both tolerant and sensitive genotypes, but growing at 40/30°C significantly decreased biomass at maturity in all genotypes. Exposure of chickpea to heat stress (35/20°C) decreased anther growth, pollen output, and fertility a) Low Germination b) Less Vegetative c) Early Maturity d) Less Branching, flowering e) Yield losses up to 25%	
	Water Availability	During summer temperature range (40°c - 45°c) River- Painganga, Khadakpurna dry during summer. Well- Well water level varies by area like Mehkar, Lonar, Sindkhed-raja taluka water level decreases up to 20-25 ft. Soil moisture availability play an important role in various growth stage of crops. Soil moisture availability in soil is directly affected by Temperature variation. when temperature goes high above 35°C soil moisture depletion and due to insufficient moisture at critical growth stages of crops .yield reduce by 30%				
	Pest and disease infestation	The major insect pests of cotton such as thrips, *Thrips tabaci*, jassid, *Amrasca devastans*, whitefly, *Bemisia tabaci*, aphid, *Aphis gossypii* mite,	Dry spell of 20 days favours to infestation of whitefly on soybean leads to spread of yellow wen mosaic virus high temperature increases the	No effect of diseases and pests on Red Gram by temperature rise.	.increase in temperature leads to incidence of dry root rot and Fusarium wilt	Temperature of 25 0C and high relative humidity leads to the disease leaf blight. Temperature of 20-21 0C is ideal for the

		Tetranychus cinnabarinus, spotted bollworm, *Eariasinsulana*, pink bollworm, *Pectinophora gossypiella* and American bollworm, *Helicoverpa armigera*. The insect pest infestation cause deterioration in lint quality and 10–40% losses in crop production have been noted a) Hot and dry weather conditions favours leafhopper infestation High temperature of about 25 – 30°C, increase in thrips population High temperature (27 – 32°C), increase the whitefly infestation High temperature and low humidity level increase the Mite infestation. High temperature of above 27°C, drought stress increases the red cotton bug infestation. Diseases Increase b) Sucking Pest Increase	infestation of charcoal rot			disease development But No measures insects and pest found on wheat crop No effect of diseases and pests on wheat by temperature rise.

		Disease- Angular leaf spot, etc) Pest- thrips, whitefly				
2	**Impact of Rainfall on -** Rainfall of 2022-23 Lowest 626mm to 890 mm)					
	Crop Growth and Yield	High rainfall results in over saturation and water logging which has an adverse effect on cotton growth and development. Large intra seasonal variability of rainfall and day to day variation of rainfall. Effects kharif crop production	Soybeans are sensitive to water stress during flowering and pod formation. Inadequate moisture in soil or drought during this period can lead to poor pod development. Adequate rainfall is important during seed filling to ensure good development and size of soybean seeds. Excessive rainfall, in poorly drained soils can lead to waterlogging and increase the risk of plant diseases Insufficient rainfall during critical growth stage can result in smaller seeds, leading to reduced yields.	high Rainfall in October damaged standing tur crop and low rainfall leads less flowering which is likely to reduced yield by 20%	If unseasonal rainfall occurs during vegetative growth leads to wet root rot and yield losses occur.	If rainfall occurs at the time of flowering favour rust diseases and yield losses.
	Irrigation Supply	**Major Farming situation** Open well irrigated-Rabbi cropping - Tapping of other sources of irrigation. Sprinkler Irrigation With limited water availability prefer micro irrigation n system Intercultivation implements/ machineries to be popularized through Govt. schemes				

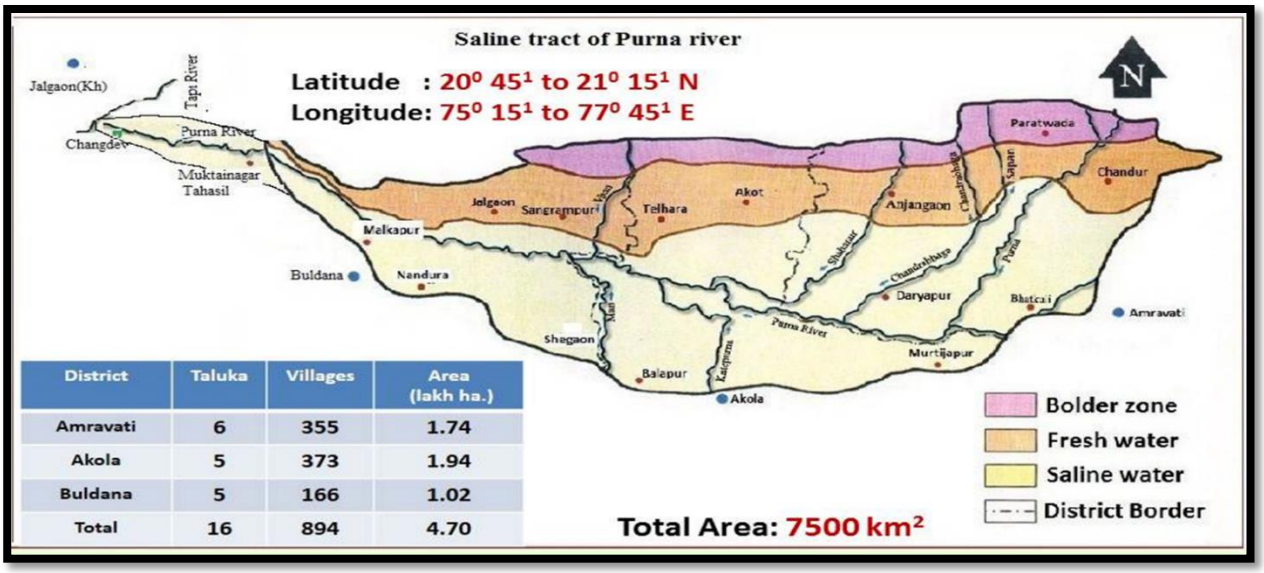
	a) Drought	In Buldhana district around 2012 is drought prone year in that year the losses happen around 30-35%.				
	b) Flood	In the year 2021-22 the district had heavy rainfall, especially in Jalgaon Jamod, Nandura tehsil.				
	Pest and Diseases infestation and its management	**Low Rainfall**: Low rainfall and cloudy weather provide favourable conditions to grow pests like spotted pod borer, plume moth, spiny pod borer, aphid, jassids, thrips, white fly etc. **High Rainfall:** In heavy rainfall pests like *Helicoverpa*, tobacco leaf eating caterpillars washed away, and increasing fungal diseases and wilting diseases increase in humidity.			NA	NA
	Soil erosion and nutrient loss	**Low Rainfall**: NA **High Rainfall:** In heavy rainfall a high amount of soil erosion occurs which results in nitrogen losses. Horticulture Plantation, Bamboo Plantation				
	Harvest & Storage	**Low Rainfall**: NA **High Rainfall:** if rainfall happens during harvesting farmers face yield losses and while storage there is chance to increase moisture.				
3	**Impact of Other Calamities (Cyclones and hailstorms etc.)**	**Low Rainfall**: NA **High Rainfall:** if rainfall happens during harvesting farmers face yield losses and while storage there is chance to increase moisture.				
	Crop Damage and Loss	If a Hailstorm occurs in the flowering dropping of leaves happens. The collapse of crops happens in some cases. Yield losses up to 40%	shedding of flowers and pods. Yield losses up to 40%	Yield losses up to 40%	Yield losses up to 40%	Yield losses up to 40%

Saline Soils and their impact on cropping in the district

Soils: In general, the soils in the area are clayey, sticky and poorly permeable in nature. They have an excellent soil moisture retention capacity. Because of these physical properties, leaching of excess water does not take place causing water logging and deposition of salts. The chemical analysis of soils from this depth has shown that the soils are alkaline in nature and sodic. The alkalinity in the soil goes on increasing in depth. The pH value in the soil profile thickness of up to 6 cm ranges in between 7.5 and 8.5. The soils of the basin are mostly alkaline with exchangeable sodium percentage in surface, i.e. ESP < 8, while the subsurface has higher values of the salinity and sodicity being ECe > 2.7 and ESP > 17 (Singh and Sharma 1996). The interfluvial zones of the northern and southern alluvial plains are covered with thick to very thick black soils. Owing good fertility, it supports the growth of important crops in the region, viz. cotton, jawar, tur, soybean, safflower, gram and groundnut. Pal et al. (2001) reported that in the north-eastern and south-western parts of the basin, surface-oriented plasma separation indicates a high degree of clay activity and shrink–swell phenomena; however, the plasmic fabric is not uniform throughout. In the southern part of the basin, in general, the soils in the area are clayey, sticky and poorly permeable in nature. They have an excellent soil moisture retention capacity. Because of these physical properties, leaching of excess water does not take place causing water logging and deposition of salts. The chemical analysis of soils from this depth has shown that the soils are alkaline in nature and sodic. The alkalinity in the soil goes on increasing in depth. The pH value in the soil profile thickness of up to 6 cm ranges in between 7.5 and 8.5. The soils of the basin are mostly alkaline with exchangeable sodium percentage in surface, i.e. ESP < 8, while the subsurface has higher values of the salinity and sodicity being ECe > 2.7 and ESP > 17 (Singh and Sharma 1996). The interfluvial zones of the northern and southern alluvial plains are covered with thick to very thick black soils. Owing good fertility, it supports the growth of important crops in the region, viz. cotton, jawar, tur, soybean, safflower, gram and groundnut. Pal et al. (2001) reported that in the north-eastern and south-western parts of the basin, surface-oriented plasma separation indicates a high degree of clay activity and shrink–swell phenomena; however, the plasmic fabric is not uniform throughout. In the southern part of the basin, the soil is strongly alkaline with exchangeable sodium percentage ranging from 5 to 26, whereas moderately alkaline with ESP < 5 in the north-eastern part (Pal et al. 2001) the soil is strongly alkaline with exchangeable sodium percentage ranging from 5 to 26, whereas moderately alkaline with ESP < 5 in the north-eastern part (Pal et al. 2001).

Land Use/Land Cover, Palaeochannels and Lineaments:

Land use/land cover map, prepared by using the satellite data of three seasons, viz. Kharif, Rabbi and Zaid, and following the standard land use classification as pro-posed by NRSA (1995) denotes five major units: (i) built-up land (282.47 km2),(ii) agricultural land (12,438.35 km2), (iii) forest land (3068.05 km2), (iv) waste-lands (2409.35 km2) and (v) water bodies (316.64 km2). The major problem of the basin is inland groundwater salinity in the central alluvial part covering significant parts of districts **Amravati, Akola and Buldhana.**



District	Taluka	Villages	Area (lakh ha.)
Amravati	6	355	1.74
Akola	5	373	1.94
Buldana	5	166	1.02
Total	16	894	4.70

The salinity is recorded in both shallow and deep aquifers as revealed by the dug well and bore well data. It has also been experienced that there is an irregular trend in the magnitude of salinity both in lateral and vertical profiles of the basin. Because of it, the groundwater of the area is unsuitable for both drinking and agricultural purposes. **More than 400 villages falling in saline area are continuously facing severe problem of drinking water, which becomes more acute in summer months. The magnitude of the problem is so high that in some of the area it is directly affecting the socio-economic set-up, i.e. desertification of villages, reduction of crop yield, and infertility of soil. The area is also deprived of well irrigation; hence, only rainfed crops are cultivated.**

Socio-economic Status:

Agriculture is the main land use in the basin area. Maximum agriculture is un-ir-rigated followed by the non-cultivable area and grazing land. Cotton (Gossypium) is major crop in Kharif season followed by jowar (Sorgum), mung (Vigna), tur Purna River, Maharashtra 499 (Pisum) and soybean (Glycine), whereas some farmers also crop the gram (Cicer), wheat (Triticum), groundnut (Arachis) and kardi (Carthamus) in Rabbi season. In the saline tract area, the well water is moderately to highly saline and unsuitable for irrigation; therefore, the agriculture is mainly rain-fed. **Majority of farmers in the village of the basin own the land <2 ha of land that indicates the higher percentage of marginal farmers.** Bamboo is widely spread in the forests. The area, particularly the Melghat forest, is rich in medicinal plants. Flash flood is a regular phenomenon of the area. Large areas of cultivated land get devastated and eroded by flash floods. These floods also cause damage to houses and cattle, as well as erode the soil and rendered it barren. Extensively hazardous flood during September 1959 due to heavy rains is still remembered, which affected 179 villages in the Amravati district. Damage was caused to villages along the banks of the Pendhi tributary in Amravati, Belmandi the Kholat sub-tributaries in Chandurbazar, Chandrabhaga and Shahanur tributaries in Daryapur talukas. Houses were washed away and an area of about 74 km 2with standing crops was also completely swept away by floods. Thousands of acres of standing crops were submerged in water for a number of days.

(Source: The Indian Rivers (pp.479-502) Authors: Ashok Srivastava (Sant Gadge Baba Amravati University) and Vivek Kale (Maharashtra Remote Sensing Applications centre, hyderabad.)

Chapter 5: Measures to cope with climatic variability

Sr. No.	Climate Variability	Kharif			Rabbi	
1	**Recommendation of Universities**	**Cotton**	**Soybean**	**Red Gram**	**Gram**	**Wheat**
	Heavy Rainfall	Opening of field channels to remove surface ponding. Improved drainage and drenching with copper oxychloride to avoid wilting incidence	Opening of field channels to remove surface ponding	Opening of field channels to remove surface ponding	Opening of field channels to remove surface ponding	Short duration variety (Bansi)
	Low Rainfall	Horizontal sowing on a slope, dead furrow, short duration variety	a) Horizontal sowing on a slope b) Dead farrow, short duration variety	a) Nipping of apical bud b) Horizontal sowing on a slope c) Dead furrow, short duration variety	Nipping of apical bud. Nipping helps in formation of horizontal branches which improves yield.	Selection of short duration variety (Lokvan)
	Dry Spells / water stress	a) Application of ammonium nitrate potassium phosphate b) Application of fertilizer (ammonium nitrate, potassium phosphate) c) Don't cultivation of soil d) Irrigation			NA	NA
	Terminal Drought	a) Spraying Potassium Phosphate & Drenching b) Application of micro nutrient.				
	Late onset of monsoon	a)Selection of late duration variety b) Selection of climatic crop			NA	NA
2.	**Temperature Condition**					
	High Temperature	Selection of climatic crop like millet	provide protective irrigation, mulching to rabbi crops and replace rabbi cropping patterns into dragon food, bear etc.			
	Cold waves/low temperature	Smogging in the field and providing irrigation to crops.				
3.	**Hailstorms**	Sowing of busy and dwarf crop varieties., use of hail nets.				
4.	**Soil degradation**	a) Horizontal sowing on a slope b) Dead farrow, short duration variety c)Nala bunding				

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 on 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 rabbi season
2. Intercropping	Resilience to risk due to crop failure, moisture stress, pest incidence	Ensures optimum use of soil moisture & nutrients, overcomes risk due to aberrant climatic variabilities, helps in effective pest management, and reduces financial risk in farming.	Cotton, soybean, pulses, sorghum & pearl millet
3. Use of climate resilient seed varieties	Resilience to moisture stress due to dry spell & drought, pest epidemic, infestation by wilt & soil borne pathogens	Higher yields than existing varieties, helps escape drought condition due to shorter durations, tolerance to moisture stress, resistance to pest & disease infestation fetches good price due to better consumer preference.	All crops
4. Seed treatment	Resilience to biotic stress	Protection from soil born pathogen and pests, enhances good root development.	All field crops
5. Integrated Nutrient Management	Resilience to abiotic stresses including soil salinity, nutrient deficiencies, susceptibility to pest & disease	Enhances crop health, higher yields, enhances quality of produce, resistance to biotic & abiotic stresses, enhances quality of produce, enhances consumer preference, helps to fetch better market price.	All crops
6. Integrated Pest Management	Resilience to pest & disease epidemic, environmental hazards	Protection from pest & disease attack, reduction in use of chemical pesticide, helps in production of residue free agriculture commodities, reduces environmental hazards, enhances quality of produce, enhances consumer preference in domestic and export market, helps to fetch better market price.	All crops
7. Furrow opening	Resilience to moisture stress,	Helps in conservation of moisture around root zone of crops during dry spell.	Cotton, soybean, pulses,

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

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

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

Year wise crop yield (Kg/ha)

Year	Soybean		Cotton		Pigeon Pea		Gram	
	FFS Plot	Control Plot	FFS Plot	Control Plot	FFS Plot	Control Plot	FFS Plot	Control Plot
2019	1000	800	-	-	-	-	1367	1260
2020	1235	1037	1544	1296	882	747	1486	1304
2021	1448	1244	1671	1466	977	828	1914	1637
2022	-	-	700	689	825	764	1800	1100
Average	**1227.67**	**1027.00**	**1305.00**	**1150.33**	**894.67**	**779.67**	**1641.75**	**1325.25**

The FFS plot for soybean crops benefited from various CRT interventions, including seed treatment with fungicide and biofertilizer, sowing using the BBF method, intercropping, protective irrigation during dry spells and foliar spray of Neem seed kernel extract (NSKE). As a result, the yield of the FFS plot increased by 19.54% compared to the control plot.

The FFS plot for cotton crops benefited from various CRT interventions, including seed treatment with biofertilizer, intercropping, protective irrigation during dry spells, foliar spray of Neem seed kernel extract (NSKE), nipping of bud and use of traps (pheromone traps, sticky traps). As a result, the yield of the FFS plot increased by 13.45% 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 14.75% 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 23.88% compared to the control plot.

BBF Technology:

SRT Technology:

Mr. Nitin Ugale,
At/Po: Mandwa
Taluka: Jalgaon Jamod
SRT: 13 Acre

The farmers of Mandva village in Jalgaon Jamod, Buldhana were highly impressed and motivated by the SRT cultivation practices due to its cost effectiveness, less labour consuming, high energy saving, increasing cropping intensity and higher net income with efficient utilization of available resources in the village. In fact, the success of zero tillage technology empowered the farmers of the Mandwa village.

Drip and Sprinklers:

Intercropping:

Pest Management:

Farmers using pheromone trap & yellow sticky trap for controlling insect & pest management

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

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

7.1 Drought

7.1.1 Rainfed situation

7.1.1.1. Early season drought (delayed onset)

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop/ cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks 25th June-1st July	Deep & Medium deep black soils	Bt.-Cotton	No change	**Normal recommended Package of Practices by Dr. PDKV, Akola**	Linkage with Dr. PDKV / MSSC NSC
		Cotton + Tur Intercropping	No change in crop orvariety	**Normal recommended Package of Practices by Dr. PDKV, Akola** (Cotton + Pigeon pea 6:2 & Cotton+Greengram/ Black gram 1:1 intercropping system.)	
		Soybean	No change in var.	**Normal recommended Package of Practices by Dr. PDKV, Akola** (Test GP% Use seed rate @ 75-80kg/haSeed Treatment with *Rhizobium*+ PSB (250gm. each /10Kg seed + Thiram 3 gm.+ Carbendazim1gm.+*Trichoderma* 4 gm./Kg of seed Intercrop one row of pigeon pea after every 4 or 6 rowsof soybean as per convenience Open furrow after six /Three rows of soybean)	
		Pigeon pea	No change in var.	**Normal recommended Package of Practices by Dr.PDKV, Akola** Intercrop Soybean+ Pigeon pea (4:2 / 6:2), Cotton + Pigeon pea (8:1 / 6:2)	
		Sorghum (Kh. Jowar)	No change in var.	**Normal recommended Package of Practices by Dr.PDKV, Akola** Seed Treatment of Imidachloprid 70 WS 7g/Kg Seed Sulphur 4g/Kg Seed	
	Shallow blacksoils	Soybean	No change in var.	**Normal recommended Package of Practices by Dr. PDKV, Akola** (Test GP% Use seed rate @ 75-80kg/haSeed Treatment with *Rhizobium*+ PSB (250gm. each /10Kg seed + Thiram 3 gm.+ Carbendazim 1gm.+*Trichoderma* 4 gm./Kg of seed	
		Green gram	No change in var.	**Normal recommended Package of Practices by Dr.PDKV, Akola** Seed Treatment with *Rhizobium*+ PSB (250gm. each /10Kg seed + Thiram 3 gm.+ Carbendazim 1 gm. +*Trichoderma* 4 gm./Kg of seed	
		Black gram		**Normal recommended Package of Practices by Dr.PDKV, Akola** Seed Treatment with *Rhizobium*+ PSB (250gm. each /10Kg seed + Thiram 3 gm.+ Carbendazim 1 gm. +*Trichoderma* 4 gm./Kg of seed	

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
Early season drought (delayed onset)			**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4weeks 28th wk 9-15th July	Deep to medium deepblack soils	Bt. Cotton	Soybean, Pigeon pea	**Normal recommended Package of Practices by Dr. PDKV, Akola**(Test GP% Use seed rate @ 75-80kg/ha Seed Treatment with *Rhizobium*+ PSB (250gm. each /10Kg seed + Thiram 3 gm.+ Carbendazim 1gm.+ *Trichoderma* 4 gm./Kg of seed Intercrop one row of pigeon pea after every 4 or 6 rows of soybeanas per convenience Open furrow after six /Three rows of soybean)	Linkage with Dr. PDKV / MSSCNSC
		Cotton +Tur Intercropping	Use early varieties of American / Desi cottonvarieties No change in varietiesfor Pigeon pea	Use 20-25% more than recommended seed rate and reduce fertilizerdose by 25% for Cotton. Replace the hybrids with improved varieties in cotton.(American Cotton:- AKH-8828, PKV Rajat, AKH-081, Deshi Cotton:- AKA-5, AKA-7, AKA-8) Avoid sowing of green gram and black gram. To reduce the risk of late sowing follow cotton: sorghum: pigeonpea: sorghum (6:1:2:1) intercropping system.	Linkage with PDKV / MSSC NSC
		Soybean	No Change in varieties	Follow Normal Recommended Package of Practices	
		Pigeon pea	Change in variety AKT 8811,Vipula, PKV-Tara, BSMR-736	Use spacing 90 x 20 cm instead of 90 X 30 cm.	
		Sorghum (Kh. Jowar)	Replace sorghum bysoybean Varieties JS-335, JS-93 -05 or Pigeon pea variety AKT 8811, Vipula, PKV- Tara, BSMR-736	Follow Normal Recommended Package of Practices	

	Shallow blacksoils	Soybean	No change in var.	**Normal recommended Package of Practices by Dr. PDKV, Akola**(Test GP% Use seed rate @ 75-80kg/ha Seed Treatment with *Rhizobium*+ PSB (250gm. each /10Kg seed + Thiram 3gm.+ Carbendazim 1gm.+*Trichoderma* 4 gm./Kg of seed	
		Green gram Black gram	Replace Green gram & Black gram by Soybean Varieties JS-335, JS-93 -05	Follow Normal Recommended Package of Practices Seed Treatment with *Rhizobium*+ PSB (250gm. each /10Kg seed +Thiram 3 gm.+ Carbendazim 1 gm. + *Trichoderma* 4 gm./Kg of seed	

Condition	**Major Farming situation**	**Normal Crop / Cropping system**	**Suggested Contingency measures**		
Early season drought (delayed onset)			**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks23-29 July	Deep to Medium deepblack soils	Bt.Cotton	Sole Pigeon pea AKT-8811, Vipula,PKV Tara, BSMR-736. Sunflower (hybrids)/ sesame AKT64/ castorAKC-1, GCH-456 & DCH-117, 32/pearl millet. PKV Raj Shradha, Saburi pearl millet + pigeon pea inter-cropping(2:1,.4:2)	Adopt closer spacing (60x30 cm) forPigeon pea Follow *insitu* moisture conservation measures	
		Cotton +Tur Intercroppi ng	Sole Pigeon pea AKT-8811, Vipula, PKV Tara, BSMR-736. Sunflower (hybrids) Pearl millet. PKVRaj Shradha, Saburi / Sesame AKT64/ Castor GCH-4,5,6& DCH-117, Pearl millet +Pigeon pea inter-cropping(2:1, .4:2).	Adopt closer spacing (60x30 cm) forPigeon pea Follow *insitu* moisture conservation measures	For Seed Source and Technology contact Dr. PDKV / KVK/MSSC/ NSC.

		Soybean	Sole Pigeon pea AKT-8811, Vipula, PKV Tara, BSMR-736. Sunflower (hybrids) / Sesame AKT64/ castorAKC-1, GCH-4,5,6& DCH-117, 32/pearl millet. PKV Raj Shradha, Saburi Pearl millet + pigeon pea inter- cropping (2:1, 4:2).	Adopt closer spacing (60x30 cm) forPigeon pea Follow *insitu* moisture conservation measures	
		Pigeon pea	Pigeon pea AKT-8811, Vipula, PKVTara, BSMR-736.	-do-	
		Sorghum	Sole Pigeon pea AKT-8811, Vipula,PKV Tara, BSMR-736. Sunflower (hybrids) /Sesame AKT64/ CastorAKC-1, GCH-4,5,6& DCH-117, 32/pearl millet. PKV Raj Shradha, Saburi Pearl millet + Pigeon pea inter-cropping(2:1, 4:2).	-do-	
	Shallow blacksoils	Soybean	Sole Pigeon pea AKT-8811, Vipula Sunflower (hybrids) / Sesame AKT64/ pearl millet. PKV Raj Shradha, Saburi pearl millet+ pigeon pea inter-cropping (2:1, .4:2).	-do-	
		Green gram	-do-	-do-	
		Black gram	Sole Pigeon pea AKT-8811, Vipula Sunflower (hybrids) / Sesame AKT64/ pearl millet. PKV Raj Shradha, Saburi pearl millet + pigeon pea inter-Cropping (2:1, 4:2).	Adopt closer spacing (45x20 cm) forPigeon pea Follow *insitu* moisture conservation measures.	

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 8weeks 6-12 August,	Deep to Medium deep black soils	Bt.Cotton	Sole Pigeon pea AKT-8811, Vipula, Sunflower (hybrids) / Sesame AKT64/ CastorAKC-1, GCH-4,5,6& DCH-117, 32/pearl millet. PKV Raj Shradha,Saburi	Adopt closer spacing(60x30 cm)forPigeon pea Follow *insitu* moisture conservation measures	
		Cotton +Tur Intercropping	-do-	-do-	
		Soybean	-do-	-do-	
		Pigeon pea	Pigeon pea Varieties PKV Tara, BSMR-736,	-do-	
		Sorghum (Kh. Jowar)	Sole Pigeon pea AKT-8811, Vipula, Sunflower (hybrids) / Sesame AKT64/CastorAKC-1, GCH-4, 5,6 & DCH-117, 32/pearl millet. PKV Raj Shradha, Saburi	-do-	
	Shallow black soils	Soybean	Sunflower (hybrids) / Sesame AKT64/pearl millet. PKV Raj Shradha, Saburi,	Follow *insitu* moisture conservation measures	
		Green gram	-do-	-do-	
		Black gram	-do-	-do-	

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 & moisture conservation measures**	**Remarks on Implementation**
		Bt. Cotton			
Normal onset followed by 15-20days	Deep to Medium deepblack soils	Cotton +Tur Intercropping	Give protective irrigation wherever possible. Raise cotton seedlings in nursery & transplant at sufficientsoil moisture or Gap filling to be done by pot watering 7-10 days after sowing when crop stand is less than 80%	Avoid applying fertilizer till sufficient moisture insoil.	Sowing on BBF

dry spell after sowing leading to poor germination /cropstand etc.		Soybean	Give protective irrigation wherever possible. Gap filling with maize and sesame. If germination is less than 50% resowing immediately after receipt of rains.	One hoeing	Rain water harvesting &recycling to be strengthen
		Pigeon pea	Gap filling either by sesame or maize. Provide protective irrigation, wherever is possible	One hoeing	
		Sorghum (Kh. Jowar)	Follow thinning to maintain optimum plant population.	One hoeing. Fertilizer application at sufficient moisture	
	Shallow blacksoils	Green gram	Protective irrigation if possible.	One hoeing is to be done forconservation of soil moisture.	
		Black gram	Do-	Do-	

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 & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Deep to Mediumdeep black soils	Bt. Cotton	Weeding Intercultivation to create soil mulch to conserve moisture. Protective irrigation if possible.	Avoid applying fertilizer till there is sufficient moisture in the soil. Opening of alternatefurrows.	With limited water availability prefer micro irrigation system Intercultivation implements/ machineries to be popularizedthrough Govt. schemes.
		Cotton +Tur Intercropping		Opening of alternatefurrows.	
		Soybean		Opening of alternate furrows.	
		Pigeon pea		Avoid Applying fertilizer till there is sufficient moisturein the soil. Opening of alternate furrows.	
		Sorghum (Kh. Jowar)		Opening of alternatefurrows. Spraying of 2% urea or DAP.	
	Shallow black soils	Soybean		Spraying of 2 % urea orDAP.	
		Green gram	Intercultivation to create		

		Black gram TAU -1, 2 and AKU-15	soil mulch to conserve moisture. Protective irrigation if possible.		
At flowering/fruiting stage	Deep to Medium deep black soils	Bt. Cotton	Protective irrigation if possible.	Spraying of 2 % urea or DAP.	
		Cotton + Pigeon pea Intercropping			
	Shallow black soils	Soybean			
		Pigeon pea			
		Sorghum (Kh. Jowar)			
	Shallow black soils	Soybean			
		Green gram			
		Black gram			

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/croppingsystem**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
Terminal drought (Early withdrawal of monsoon)	Deep to Mediumdeep black soils	B.t Cotton	Giving life saving supplemental irrigation, if available or taking up harvest at physiological maturity with some realizable yield.	-	-
		Cotton + Pigeon pea Intercropping		-	-
		Soybean		Plan for *rabbi* season	
		Pigeon pea			
		Sorghum Kh. Jowar)		Plan for *rabbi* season	
	Shallow black soils	Soybean			
		Green gram		Prepare for *rabbi* sowing Provided irrigation is available	

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**
Delayed release of water in canals due to low rainfall	Deep to Medium deep black soils	Wheat & Chickpea	Wheat to be replaced by Chickpea/Safflower/Mustard	Follow alternate row irrigation/irrigate at critical stages/ Stream cutoff	Tapping of other sources of irrigation. Sprinkler Irrigation
	Shallow black soils	Chickpea	Safflower/Mustard		
Limited release of water in canals due to low rainfall	Deep to Medium deep black soils	Wheat & Chickpea	Wheat to be replaced by Chickpea/Safflower/Mustard/ Linseed/Sesame	Follow alternate row irrigation/irrigate at critical stages/Stream cutoff	Tapping of other sources of irrigation. Sprinkler Irrigation
	Shallow black soils	Chickpea	Safflower/Mustard	-Do-	-Do-
Insufficient groundwater recharge due to low rainfall	Open well irrigated-Rabi cropping	Wheat , Chickpea, Safflower	Chickpea, Safflower	Sprinkler Irrigation	

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

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Cotton, Soybean, Green gram, Black gram Pigeon pea	Opening of field channels to remove surface ponding, Foliar spray of 2% Urea Interculture at optimum soil moisture to improve soil aeration	Opening of field channels to remove surface ponding, Nutrient spray to arrest flower drop	Opening of field channels to remove surface ponding,	Shifting to safer place for drying

Horticulture				
Acid Lime and orange	Opening of field channels remove surface toponding,	*Mrig bahara* not affected For *Ambia bahar* Opening of field channels to remove surface ponding, Nutrient spray of NAA 10 ppm+ 1% urea to prevent flowers drop	Timely harvto avoid losses	Fungal removal followed by g & waxing
Heavy rainfall with high-speed winds in a short span				
Cotton	Opening of field channels to remove surface ponding. Improved drainage and drenching with copper oxychloride to avoid wilting incidence.	Opening of field channels toremove surface ponding, Improved drainage and drenching with copper oxy chloride by opening of the nozzle of spray pump to avoid wilting incidence. Occurrence of grey mildew-control by sulphur spray @ 25 g/10 lit.	Occurrence of greymildew-control by Sulphur spray @ 25g/10 lit.	Shifting to saferplace for drying
Soybean, Green gram, Black gram, Pigeon pea	Opening of field channels to remove surface ponding	Opening of field channels toremove surface ponding		Shifting to saferplace for drying
Horticulture				
Nagpur Mandarin Acid lime and sweet orange	Support by bamboo if < 3 years plants.	Support by bamboo if < 3 yearsplants. Opening of field channels toremove surface ponding,	Opening of field channels to remove surface ponding,	Fungal removal followed by Washing & waxing
Outbreak of pests and diseases due to unseasonablerains				
Cotton	To control Jassids and Thrips spray with Acetamiprid 20 SP @ 1.5 g/ 10 lit.	Jassids and Thrips will increasespray with Acetamiprid 20 SP @ 1.5 g/ 10 lit.	-	-
Soybean	To control semi-looper spray NSKE 5% or	To control semi-looper	-	-

	quinalphos 25 EC 20 ml/10 lit.	sprayNSKE 5% or quinalphos 25 EC 20 ml/10 lit.		
Green gram	To control Powdery mildew penconozol 5 ml or dinocap 10 ml or triadomorph 5 ml or sulphur spray@ 30 g/10 lit. of water.	To control Powdery mildew penconozol 5 ml or dinocap 10 ml or triadomorph 5 ml or sulphur spray @ 30 g/10 lit. of water.	-	-
Black gram				
Pigeon pea	Improved drainage and drenching with copper oxychloride @25g/10 lit of water to avoid incidenceof wilt and root rot	Improved drainage and drenching with copper oxy chloride@25g/10 lit of water to avoid incidence of wilt and root rot	-	
Horticulture				
Mandarin Orange Sweet Orange	To control Citrus *psylla* Malathion 50EC 10ml Or Quinolphos 25EC 10ml Or Cypermethrin 25 EC 4 ml/10 lit	To control Citrus *psylla* Malathion 50EC 10ml Or Quinolphos 25EC 10ml Or Cypermethrin 25 EC 4 ml/10 lit	Immediate harvesting	Selling

Note: - Field bunds on slopy area to be strengthened

7.3 Extreme events: Heat wave / Cold wave/Hailstorm

Extreme eventtype	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave				
Horticulture	Increase the frequency of irrigation, Use of temporary shed net. Spraying of antitranspirant. Mulching, Pruning of damaged parts	Increase the frequency of irrigation, Spraying of antitranspirant. Mulching , Pruning of damaged parts, Application of Bourdeux paste	Increase the frequency of irrigation, Spraying of antitranspirant. Mulching , Pruning of damaged parts	Immediate harvesting of fruits, Increase the frequency of irrigation, Spraying of antitranspirant. Mulching, Pruning of damaged parts, Application of Bourdeux paste.
Cold wave				
Horticulture	Covering with poly tunnel, floodirrigation at evening.	Smogging, Flood irrigation at evening, Basin Mulching, Supplementary dose of fertilizer.	Smogging, Flood irrigation at evening, Basin Mulching, Foliar application of potash fertilizers.	Immediate harvesting, smogging, Flood irrigation, Basin Mulching, Foliar application of potash fertilizers.
Hailstorm				
Horticulture	Remove damaged parts , fungicidal spray	Remove damaged parts , fungicidal spray	Remove damaged parts, fungicidal spray, Spraying ofNAA 20 ppm + 1 % urea.	Harvesting and grading

Chapter 8: Agro meteorological Advisory

8.1 Agro-metrological advisory

It is a branch of meteorology that examines the effect and impact of weather and climate on crops, livestock and various agricultural operations.

Agro-advisory services are the farm decisions taken in response to past, current and future weather change. It includes agronomical, pest and disease, water and input management. Basic considerations to prepare weather based agro-advisories are weather sensitive crops, their weather sensitive stages and weather sensitive farm operations.

8.1.1 Importance / Need of Agro-met advisory

Agro met advisory services provide timely and accurate weather forecasts and miscellaneous agricultural operations to be carried out for better crop growth. Agro advisory services (AAS) were formed to be helpful to the farmers in managing climate risks effectively for sustainable and profitable agricultural production.

8.1.2 Forecasts or advisories generated at district level

At Buldhana district farmers refer Agro one, Government YouTube channels etc. on the other side institutions like India Meteorological Department and Agriculture Universities also provide weather forecasts for the farmer.

8.1.3 DAMU information

The district Agro-Met Unit was established and operational at ICAR Krishi Vigyan Kendra (KVK), Buldhana and the Automatic Weather Station (AWS) was installed and started functioning since March 2021. Since then, the unit has been serving the farming community of Buldhana district by issuing district and Block level Agromet Advisory Services (AAS) in both English and Regional languages, twice a week on every Tuesday and Friday, and special bulletins on extreme weather events when required. The AAS bulletins has information on value added weather forecast data for the next 5 days with crop specific weather advisory messages prepared with the help of KVK Scientists and disseminated to the farming community, which helps the farmers plan their day-to-day Agricultural and Horticultural operations accordingly. This will immensely benefit the farmers by preventing crop losses and in turn double their income and contribute to the growth of Indian Economy.

8.1.4 Other source/sources of Agro-met advisory

Farmers refer Nanaji Deshmukh Krushi Sanjeevani Prakalp (NDKSP) Portal and Krushi Vidnyan Kendra for Block level Agro Met Advisory at Buldhana.

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

In the era of information technology farmers refer the mobile apps to get easy access to agro met advisory like Meghdoot, Damini, Mausam, Agri Central, Kisan Suvidha, APEDA farmer connect, eNAM, Agri Market, Digital Mandi, Krushik etc. farmer refers other farmers opinion for using this kind of advisory or forecast.

ग्रामीण कृषी मौसम सेवा
भारत मौसम विभाग
डॉ. पंजाबराव देशमुख कृषी विद्यापीठ
अकोला

हवामानावर आधारीत कृषि सल्ला

दिनांक : 07-11-2023

बुलढाणा(महाराष्ट्र) साठी हवामान पूर्वानुमान - वर जारी :2023-11-07 (पुढील पाच दिवसांसाठी सकाळी ८:३० वाजेपर्यंत वैध)

हवामान घटक	2023-11-08	2023-11-09	2023-11-10	2023-11-11	2023-11-12
पर्जन्यमान (मिमी)	0.0	0.0	0.0	0.0	0.0
कमाल तापमान (अं.से)	32.8	33.1	33.0	33.6	33.9
किमान तापमान (अं.से)	16.9	17.6	17.7	17.3	17.2
सकाळची सापेक्ष आर्द्रता (टक्के)	52	50	48	51	54
दुपारची सापेक्ष आर्द्रता (टक्के)	30	28	29	31	33
वाऱ्याचा वेग(किमी/तास)	5	5	5	4	5
वाऱ्याची दिशा(अंश)	99	103	125	105	81
मेघाच्छादन (ऑक्टा)	4	4	2	1	1

हवामान सारांश / चेतावणी:

भारत मौसम विज्ञान विभाग यांनी आज वर्तविलेल्या हवामान अंदाजानुसार बुलढाणा जिल्ह्यात दि. ०७ ते ११ नोव्हेंबर दरम्यान कोरडे हवामान राहण्याची शक्यता आहे.

कृषि सल्ला:

प्रत्येक वेचणीनंतर कापूस सावलीत वाळवून नंतरच साठवावा.कापूस मोकळी हवा असलेल्या ठिकाणी साठवावा. ओलसर जागेत साठवणूक केल्यास कापसाला पिवळसरपणा येतो, त्यामुळे रुई आणि धाग्याची प्रत खालावते.

संक्षिप्त संदेश सल्ला:

हरभरा पिकाची पेरणी केल्यानंतर दोन दिवसांच्या आत उगवणपूर्व तणनाशक म्हणून पेंडीमेथॅलीन ३० % ई.सी. ४०-५० मिली प्रती १० लिटर पाण्यात मिसळून फवारणी करावी.

पिक निहाय सल्ला:

पिक	पिक निहाय सल्ला
हरभरा	ओलिताखालील हरभरा पेरणी नोव्हेंबरच्या १५ तारखेपर्यंत उरकून घ्यावी. पेरणी करताना बियाणे ५ सेंमी. पेक्षा जास्त खोल जाणार नाही याची काळजी घ्यावी. हरभरा पिकाची पेरणी रुंद वरंबा सरी पद्धतीने करावी ज्यामुळे बियाण्याचे प्रमाण इतर पेरणी पद्धतीच्या तुलनेत कमी लागते व आंतरमशागतीची कामे सहजपणे करता येतात.बियाण्याला पेरणीपूर्वी ऱ्हायझोबियम,स्फुरद विरघळणाऱ्या जीवाणू संवर्धकाची प्रत्येकी २५ ग्रॅम/किलो बियाणे तसेच जैविक बुरशीनाशक ट्रायकोडर्माची ४ ग्रॅम/किलो बियाणे याप्रमाणात बीजप्रक्रिया करावी. ओलिताखालील हरभरा पिकाला २५ किलो नत्र + ५० किलो स्फुरद + ३० किलो पालाश प्रती हेक्टरी पेरणीच्या वेळी द्यावे.

पिक	पिक निहाय सल्ला
कपाशी	कापूस वेचणी योग्य वेळी केल्यास चांगल्या प्रतीचा कापूस मिळतो. जास्त दिवस कापूस झाडावर राहिल्यास त्याला पालापाचोळा,हवेतील धुळीचे कण चिकटतात व कापसाची प्रत खराब होते. कापसाची वेचणी हि शक्यतो सकाळी किंवा दुपारी उशिरा करावी, जेणेकरून कापसाला पालापाचोळा चिकटून येणार नाही, बोंडे वेचताना पालापाचोळा चिकटून आल्यास त्याचवेळी काढावे व स्वच्छ कापूस गोळा करावा.
तूर	तुरीतील पाने खाणाऱ्या अळीच्या व्यवस्थापनासाठी शेतकरी बंधूंनी ईमामेक्टीन बेन्झोएट ५ % एस जी ३ ग्रॅम प्रती १० लिटर पाण्यात मिसळून फवारणी करावी.
ज्वारी	रब्बी ज्वारीच्या शेतात डवरणी करून जमीन भुसभुशीत ठेवावी व पिक तणमुक्त ठेवावे. ज्याभागात रब्बी ज्वारीची पेरणी होऊन दोन आठवडे पूर्ण झाली आहेत अशा ठिकाणी शेतकऱ्यांनी विरळणी करावी, विरळणी करताना रोगग्रस्त, किडग्रस्त रोपे काढून टाकावीत.
सोयाबीन	शेतकरी बंधूंनी सोयाबीनची साठवण तागाच्या पोत्यामध्ये करण्यास प्राधान्य द्यावे व एकावर एक असे सोयाबीनचे पोते ५ फूट उंचीपर्यंतच ठेवावे. साठवणूक केलेली सोयाबीनची पोती खाली वर करावी जेणेकरून सर्व पोत्यातील सोयाबीनमधील ओलावा १०-१२ % राहण्यास मदत होईल.
गहू	गहू पिकाची बागायती पेरणी करण्यासाठी नोव्हेंबर महिन्याचा पहिला पंधरवडा सुयोग्य आहे. पेरणी करताना जमिनीतील पुरेशा ओलाव्याची खात्री करून घ्यावी. तसेच पेरणीपूर्वी बियाण्यास थायरम किंवा व्हीटावॅक्स ७५ टक्के २.५ ग्रॅम प्रती किलो या प्रमाणांत बीजप्रक्रिया करावी व नंतर पीएसबी व अॅझॅटोबॅक्टर २५० ग्रॅम प्रती १० किलो बियाण्यास लावावे.

फळे आणि भाजीपाला पिक निहाय सल्ला:

फळे आणि भाजीपाला पिक	फळे आणि भाजीपाला पिक निहाय सल्ला
कागदी लिंबू	लिंबू फळबागेतील फळझाडांच्या वाळलेल्या फांद्या व फुटवे काढून टाकावेत. तसेच आळ्यामध्ये पालापाचोळ्याचे आच्छादन करावे.
वांगे	वांगी पिकातील शेंडे आणि फळे पोखरणाऱ्या अळीच्या व्यवस्थापनासाठी क्लोरॅन्ट्रॅनिलीप्रोल १८.५ एस.सी. ४ मिली किंवा क्लोरपायरीफॉस २० % प्रवाही २० मिली किंवा सायपरमेथ्रीन १० % प्रवाही ११ मिली प्रती १० लिटर पाण्यात मिसळून फवारणी करावी.
मिरची	मिरची पिकातील भुरी या रोगाच्या व्यवस्थापनासाठी सल्फर (गंधक) ८० % डब्ल्यू.पी. २५ ग्रॅम किंवा मायक्लोब्यूटॅनील १० % डब्ल्यू.पी. १० ग्रॅम प्रती १० लिटर पाण्यात मिसळून फवारणी करावी.
पेरू	पेरू फळबागेत फळकुज किंवा फळांवरील डाग आढळून आल्यास मॅन्कोझेब ३५ % डब्ल्यू.जी. या बुरशीनाशकाची २० ग्रॅम प्रती १० लिटर पाण्यात मिसळून फवारणी करावी. फळमाशीच्या नियंत्रणासाठी रक्षक सापळ्यांचा वापर करावा.
संत्रा	संत्रा फळबागेत खताचे निर्धारित केलेल्या व्यवस्थापनानुसार १०८ ग्रॅम युरिया व ४५ ग्रॅम म्युरेट ऑफ पोटॅश प्रती झाड असे १ वर्ष वयाच्या झाडांसाठी द्यावे. चार किंवा त्यापेक्षा जास्त वयाचे झाडासाठी चौपट खतांची मात्रा द्यावी.
कांदा	कांदा रोपवाटिकेत तणांचा प्रादुर्भाव होऊ नये म्हणून पेरणीनंतर लगेच उगवणपूर्व तणनाशक म्हणून पेंडीमेथॅलीनची ०.२ % याप्रमाणात फवारणी करावी. तसेच पेरणीपूर्वी बियाण्याला कार्बनडेन्झीमची १ते २ ग्रॅम प्रती किलो बियाणे याप्रमाणात बीजप्रक्रिया करावी.

पशुधन विषयक निहाय सल्ला:

पशुधन विषयक	पशुधन विषयक निहाय सल्ला
बकरा किंवा बकरी	हिवाळ्यातील थंडीमुळे शेळ्यांना न्युमोनिया हा आजार होऊ शकतो.त्यामुळे त्यांच्या शरीराचे तापमान वाढते व त्यांचे खाणे –पिणे कमी होते. यासाठी शेळ्यांचे थंडीपासून संरक्षण करावे.

8.1.5 Utilization of agro-met advisory by farmers in changing climatic conditions

Agricultural production depends upon many factors, of which weather is the major factor. Weather varies with space and time, hence, its forecast can help to minimize the farm losses through proper management of agricultural operations. Weather is one of the most important factors determining the success or failure of agricultural production. It affects every phase of growth and development of plants. Any variability in the weather during the crop season, such as delay in the monsoon, excessive rains, flood, droughts, spells of too-high or too-low temperatures would affect the crop growth and finally the quality and quantity of the yield. The losses in crops can be reduced by doing proper crop management in time by timely and accurate weather forecasts.

Weather forecast also provides guidelines for selection of crops best suited to the anticipated climatic conditions. The objective of the weather forecasting is to advise the farmers on the actual and expected weather and its impact on the various day-to-day farming operations i.e. sowing, weeding, time of pesticides spray, irrigation scheduling, fertilizer application etc. and overall crop management. Weather forecasts help to increase agriculture production, reduce losses, risks, reduce costs of inputs, improve quality of yield, increase efficiency in the use of water, labor and energy and reduce pollution with judicious use of agricultural chemicals. The complete avoidance of all farm losses due to weather factors is not possible but it can be minimized to some extent by making adjustments through timely and accurate information of weather forecasts. Weather forecast and weather based agromet advisories help in increasing the economic benefit to the farmers by suggesting to them the suitable management practices according to the weather conditions.

8.2 Advisory Base on Pest Surveillances Agriculture activity

8.2.1 Implementation status of CROPSAP

Sr. No.	Crop Name	2023-24				Total
		NFSM	ATMA	CROPSAP	SMART	
1	Cotton	0	0	50	56	106
2	Soybean	21	13	0	17	51
3	Maize	0	0	10	0	10
4	Red Gram	0	0	35	0	35
5	Soya+ Red gram	32	0	0	0	32
6	Green Gram	13	0	0	0	13
7	Black Gram	13	0	0	0	13
8	Bajra	0	13	0	0	13
9	Nachani	0	13	0	0	13
10	Jowar	22	0	0	0	22
Total		101	39	95	73	308
Women's FFS		30	12	32	23	97

(Source: District Superintendent agriculture officer, Extension section.)

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

9.1 Existing marketing scenario in the district

Major food grains in the Buldhana district are jowar, pearl millet, wheat, red gram, moong, udid and Bengal Gram. Major oilseeds are soybean, sunflower and groundnut while cotton and maize are the major cash crops. Cotton is by far the most important commercial crop in Buldhana district. Khamgaon is the biggest cotton market in this district, and is said to be one of the most important cotton markets in Maharashtra. Khamgaon, followed by Malkapur, is an important exporting centre of cotton and maize. Malkapur followed by Shegaon, Nandura, Chikhli, Deulgaon raja, Mehkar and Jalgaon jamod are centers of cotton trade. The entire cotton produced in the district is exported after ginning and pressing. The cost of ginning and pressing comes to about Rs. 19 and Rs. 16, respectively, per cotton bale.

The other commodities exported from the district are chilli, cotton seed, ground-nut oil and banana. Malkapur is the principal centre of exports of chilli, maize and banana which are sent to Nagpur, Akola and Amravati. Cotton seed is exported from most of the centers of cotton ginning and pressing industry, the major among them being Khamgaon, Malkapur, Shegaon and Nandura. With the expansion of the Vanaspati oil industry, the demand for cotton-seed oil has increased considerably.

Though Buldhana seems to be a major producer of cotton, maize and soybean, it has not grown into a processing hub until now. There is a tremendous scope to develop Buldhana as a processing market as most of the produce is sold to processors coming from Gujarat, Madhya Pradesh, Andhra Pradesh, Tamil Nadu and rest of India.

9.1.1 Year wise marketable surplus of major crops.

Sr. No.	Name of the Crops	Year				
		2017-18	2018-19	2019-20	2020-21	2021-22
		Yield (MT)	Yield (MT)	Yield (MT)	Yield (MT)	Yield (MT)
1.	Soybean	311327	218589	242367	72471	144614
2.	Red Gram	62258.9	18970	25204	25350	79936
3.	Jowar	17036.2	8070	15287	3686	3107
4.	Green Gram	10262	5043	7400	2265	9116
5.	Black Gram	391743	7663	10951	4826	4130
6.	Wheat	12632.7	8536	13115	13769	20785
7.	Gram	40243	51640	42224	25305	57965

9.1.2 Year wise price variation of major crops. (Table/Graph)

Sr. No.	Name of the Crops	Year									
		2017-18		2018-19		2019-20		2020-21		2021-22	
		Yield (MT)	Price/ qtl (Rs.)	Yield (MT)	Price/ qtl (Rs.)	Yield (MT)	Price/qtl (Rs.)	Yield (MT)	Price/ qtl (Rs.)	Yield (MT)	Price/ qtl (Rs.)
1	Soybean	311327	3475	218589	3476	242367	3224	72471	4367	144614	5508
2	Red Gram	62258.9	5111.24	18970	4927	25204	4530	25350	5610	79936	5611
3	Jowar	17036.2	1175.46	8070	1806	15287	1655	3686	1564	3107	1563
4	Green Gram	10262	4355.57	5043	4873	7400	5146	2265	4913	9116	4913
5	Black Gram	391743	3464.62	7663	4179	10951	5104	4826	5366	4130	5366
6	Wheat	12632.7	1585.91	8536	1962	13115	2059	13769	1589	20785	2137
7	Gram	40243	3425.82	51640	4038	42224	4065	25305	4273	57965	4240

(source: https://agmarknet.gov.in/)

9.1.3 Markets available in the district with commodities handled (e-NAM, e-MARKETS, APMC/ Kharedi Vikri Sangh)

There are 13 APMCs in the district, one in each taluka. The study of APMC in Buldhana has been done for project development objectives such as analysing present marketing condition, structure, constraints, farmer's issues, traders issues, development in APMCs in relation to farmers and traders, arrivals of major commodities, marketing situation of various commodities, marketing efforts taken by APMCs, SWOT analysis of APMCs, facilities given by APMCs to the farmers such as Auction Hall, Electronic Weighing Balance, Sanitation, Canteen, Loan & transaction facilities, Grading & Cleaning of Farm Produce, Credit facility, Technical guidance, fertilizers & pesticides Procurement, Contract farming scenario, understanding competitors of APMCs and many other issues which were previously not covered. In Buldhana, 13 APMCs are there, namely Buldhana, Motala, Malkapur, Khamgaon, Jalgaon Jamod, Sangrampur, Lonar, Sindkhedraja, Deulgaon Raja, Chikhli, Mehkar, Nandura and Shegaon.

Sr. No.	Name Of APMC	Major commodities sold
1	Buldhana	Maize, Soybean, Cotton, Sunflower, Gram, Wheat, Red Gram, Green Chilli
2	Chikhli	Wheat, Maize, Toor, Gram, Moong, Soya, Chilly, Cotton
3	Deulgaon Raja	Sorghum (Jowar), Pearl Millets (Bajra), Wheat, Split Green Gram, Black gram (Urad), Red Gram (Tur), Maize, Soybean
4	Jalgaon Jamod	cotton, jowar, wheat, udid, mung, gram, red gram, maize, til, sunflower, ground nut, lemon, onion, banana, vegetable etc.
5	Khamgaon	Sorghum (Jowar), Wheat, Maize, Gram, Soybean, Horsebean (Udid), Split Green Gram (Moong), Pigeon Pea (Toor), Sunflower
6	Lonar	Pearl Millet (Bajra), Udad, Split green Gram (Moong), Red Gram, Soybean, Wheat, Gram, Sunflower, Sorghum (Jowar), Cotton
7	Malkapur	Wheat, Sorghum (Jowar), Maize, Pearl Millet (Bajra), Gram, Pigeon Pea/Redgram (Tur), Split Green Gram (Moong), Horsebean/Black Gram (Urad), Sesame (Til), Soybean, Dry Chilly, Green Chilly, Onion, Cotton
8	Mehkar	Green Gram (Moong), Black Gram (Urad), Gram, Soybean, Sorghum (Jowar), Wheat, Split Red Gram (Tur), Maize
9	Motala	Jowar, Wheat, Chilly, Red Gram, Green gram, Maize, Green chilly
10	Nandura	Jowar, Wheat, Maize, Gram, Soybean, Onion, Vegetable
11	Sangrampur	Cotton, Bajra, Wheat, Jowar, Maize, Gram, Moong, Red Gram, Urad, Groundnut, Soybean, Sunflower seeds, Banana, Onion, Rice
12	Shegaon	Soybean, Jowar, Cotton, Udid, Red Gram, Wheat
13	Sindkhed Raja	Soybean, Jowar, Cotton, Udid, Red Gram, Wheat

(source: https://agmarknet.gov.in/)

There are around 350 Rural Haats (RHs) in the Buldhana district. Around 75% of the produce from the rural haats is bought by wholesalers, and 25% by processors.

Taluka	Rural Haat
Buldhana	Chandol
Motala	Motala
Nandura	Chandurbiswa
Jalgaon-jamod	Pimpalgaon Kale, Asalgaon
Khamgaon	Pimpalgaon Raja
Chikhli	Amdapur
Mehkar	Dongaon, janefal
Sindkhedraja	Sakhar kherda, Shendurjan, malkapur pan
Deulgaon-Raja	Deulgaon-Mahi
Lonar	Sultanpur

9.2 Constraints in existing value chain

- Farmers are having limited access to various markets
- Limited infrastructure & facilities at APMC markets.
- Exploitation by Middleman
- Absence of Bargaining Power due less volume & Uniform Quality.
- Complex & Bureaucratic Procedures for Judging Cost of Farm Produce.
- Absence of Collective efforts in selling.
- Limited transparency in pricing & transactions.
- Lack of Standard procedure in Brokerage.
- Always act opposite favour of Farmer.

9.3 Potential for strengthening of commodity wise value chains

- In Buldhana District total 93 FPC are registered, they have applied for various activities like CHC, Warehouse, Cleaning & grading Units, Dal Mills, Cold Pressed Oil Units, Food Processing units.
- Till Date 33 FPC are provided with Financial Assistance with amount of 5.59 Cr.
- Project and department have given training for developing value chain for different commodities.
- In SMART project emphasis has been given in developing value chain

9.4 FPCs' contribution in value chain development

9.4.1 Status of FPCs in the district

Sr. No.	Activity	Count
1	Warehouse	6
2	Cleaning & grading Unit	4
3	Cold Press Oil Unit	7
4	Food Processing	2

(Source: District Superintendent Agriculture officer, statistics section.*)*

Sr. No.	Taluka	Village	Name of Farmer Group	Activity
1	Lonar	Bhiwapur	Sonpaul Agro Producer Company Limited	Warehouse
2	Mehkar	Mehkar	Ruj Agrotech Producer Company Limited	Warehouse
3	Buldhana	Sawali	Chandol Farmer Producer Company Limited	Cleaning/Sorting/Grading Unit
4	Mehkar	Deulgaon Mali	Sant Tejaswi Farmer Producer Company Limited	Cleaning/Sorting/Grading Unit
5	Deolgaon Raja	Pimpalner	Organic Essense Farmers Producer Company Limited	Custom hiring center
6	Deolgaon		Matritirth Hi-Tech Agritech Producer Company Limited	Custom hiring center
7	Chikhli	Chikhali	Dharti Samrudhi Farmers Producer Company Limited	Oil Extraction Unit
8	Malkapur	Malkapur	Jay Sardar Krushi Vikas Farmers Producer Company Limited	Warehouse
9	Nandura	Shemba	Shemba Kranti Agro Producer Company Limited	Oil Extraction Unit
10	Chikhli	Sawargaon Dukare	Kulbhushan Farmers Producer Company Limited	Oil Extraction Unit
11	Chikhli	Sawana	Chandanshesh Farmers Producer Company limited	Silage Unit
12	Sangrampur	Manardi	Muktai Krushi Vikas Va Gramin Prashikshan Shetkari Utpadak Producer Company Limited	Warehouse

13	Mehkar	Warwand	Veedarbha Samruddhi Krushi Producer Company Limited	Warehouse & Cleaning/Sorting/Grading Unit
14	Khamgaon	Konti	Rajmuktai Agro Producer Company limited	Custom hiring center
15	Malkapur	Malkapur (Rural)	Malkapur Taluka Krushi Vikas Farmer Producer Company Limited	Oil Extraction Unit
16	Chikhli	Antri Khedekar	Yashoday Farmers Producer Company Limited	Grain Processing Unit (Cleaning/Sorting/Grading Unit)
17	Mehkar	Sonargavhan	Prakashparva Farmtech Producer Company imited	Oil Extraction Unit
18	Buldhana	Malwandi	Krushisankalp Farmer Producer Company Limited	Warehouse
19	Buldhana	Buldhana	Vidharbha Agro Genius Producer Company Limited	Oil Extraction Unit
20	Buldhana	Buldhana	Vidharbha Agro Genius Producer Company Limited	Refrigerated Van or Vegetable/Fruit carrier/ vehicle
21	Chikhli	Konad	Abhalmaya Agro Producer Company Limited	Construction of Godown/ Small Warehouse
22	Lonar	Lonar	Panchganga Agro Seed Producer Company Limited	Oil Extraction Unit
23	Chikhli	Mera Bk	Krusham Farmer Producer Company Limited	Vegetable/Fruit carrier/ vehicle
24	Buldhana	Moundhala	Rudrajay Agrotech Producer Company Limited	Custom hiring center
25	Motala	Wadgaon Pr.Rohinkhed	Abheeraj Farmer Producer Company Limited	Custom hiring center

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 124 Farmer Producer Companies with the help of parameters. The parameters were further assigned performance scores on the basis of efficiency and effectiveness with the help of Automatic Rating Meter.
- On the basis of assessment report, suggesting the measures for strengthening of FPCs e.g. capacity building, climate resilience adaptation.

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

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

Scoring Method of Evaluation

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

$$\text{Score}=\frac{\textit{Maximum Obtained Score}}{\textit{Maximum Obtainable Score}}\times 100$$

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.

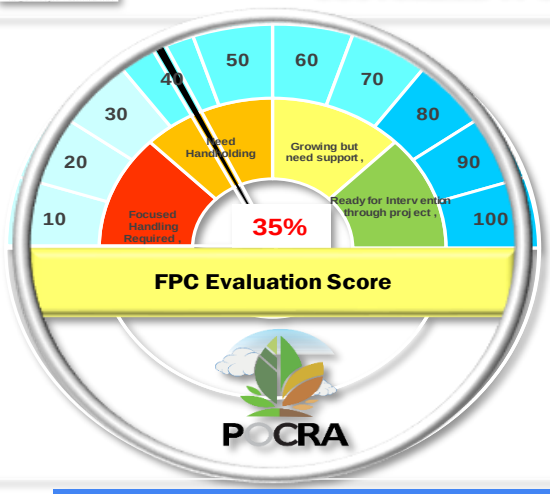
Customized FPC Evaluation Report

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

Vandai Farmer Producer Company Ltd.

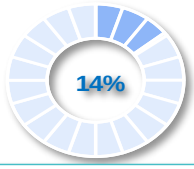
Address

Ward No. 3 , Sonar Galli. Deulgaon Mahi.,Ta. Deulgaon Raja, Dist- Buldhana, Pincode- 443206

Score Report

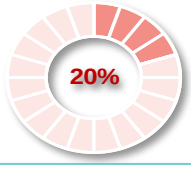
Criteria	Max. Score	Score Obtained
Organization & Adminstration (Core Foundation Strength)	21	12
Governance (Control Systems in Place)	11	9
Management (Decision making processes)	8	3
Infrastructure (Assets and resources)	5	1
Finance (Financial base and health)	25	5
Business & Market Linkages (Resource quality)	21	3
Capacity Building (Resource quality)	5	1
Climate Resilience (Adaptability to climate risk)	4	1
Final Score	100	35

What could improve your FPC?



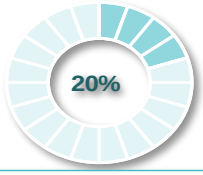
Business & Market Linkages

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



Finance

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



Infrastructure

Better Financial Management can help in improving available infrastructure

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

9.4.2 Information about FPCs supported by SMART/ NDKSP/ MAGNET

NDKSP	33
SMART	9

9.4.3 Details of commodity transacted by the FPCs

Sr. No.	District	Taluka	Village	Name of Farmer Group	Commodity
1	Buldhana	Lonar	Bhiwapur	Sonpaula Agro Producer Company Limited	Soyabean, Chickpea
2	Buldhana	Buldhana	Mehkar	Ruj Agrotech Producer Company Limited	Soyabean, Chickpea
3	Buldhana	Buldhana	Sawali	Chandol Farmers Producer Company Limited	Kabuli Chana
4	Buldhana	Mehkar	Deulgaon Mali	Sant Tejaswi Farmers Producer Company Limited	Red Gram, Wheat, Soyabean, Chickpea,Rajma, Onion Seed, Chia Seed, Green Gram, Black Gram
5	Buldhana	Chikhli	Chikhali	Dharti Samrudhi Farmers Producer Company Limited	Groundnut, Sunflower, Sesame,Safflower,Coconut, Flaxseeds
6	Buldhana	Malkapur	Malkapur	Jay Sardar Krushi Vikas Farmers Producer Company Limited	Maize, Red gram, soybean, wheat, groundnut, cotton
7	Buldhana	Nandura	Shemba	Shemba Kranti Agro Producer Company Limited	Groundnut, Sunflower, Sesame,Safflower,Coconut, Flaxseeds
8	Buldhana	Buldhana	Buldhana	Vidarbha Agro Genius Producer Company Limited	Groundnut, Sunflower, Sesame,Safflower,Coconut, Flaxseeds
9	Buldhana	Buldhana	Buldhana	Vidarbha Agro Genius Producer Company Limited	Chilli,Brinjal, Cabbage, Flower, Bitter Gourd
10	Buldhana	Chikhli	Konad	Abhalmaya Agro Producer Company Limited	Onion Seeds,Red Gram,Soyabean,Jowar
11	Buldhana	Lonar	Lonar	Panchganga Agro Seed Producer Company Limited	Groundnut, Sunflower, Sesame,Safflower,Coconut, Flaxseeds
12	Buldhana	Chikhli	Mera Bk	Krusham Farmer Producer Company Limited	Chilli,Brinjal, Cabbage, Flower, Bitter Gourd

9.4.4 Details of services provided by FPCs

Sr.No.	Taluka	Village	Name of Farmer Group	Services Provided
1	Lonar	Bhiwapur	Sonpaula Agro Producer Company Limited	Storage
2	Buldhana	Mehkar	Ruj Agrotech Producer Company Limited	Storage
3	Buldhana	Sawali	Chandol Farmers Producer Company Limited	Grain Processing Unit (Cleaning/Sorting/Grading Unit) .
4	Mehkar	Deulgaon Mali	Sant Tejaswi Farmers Producer Company Limited	Grain Processing Unit (Cleaning/Sorting/Grading Unit) .
5	Deolgaon Raja	Pimpalner	Organic Essence Farmers Producer Company Limited	Establishment of Custom Hiring Centers .
6	Deulgaon Raja		Matrutirth Hi-Tech Agritech Producer Company Limited	Establishment of Custom Hiring Centers .
7	Chikhli	Chikhali	Dharti Samrudhi Farmers Producer Company Limited	Oil Extraction Unit .
8	Malkapur	Malkapur	Jay Sardar Krushi Vikas Farmers Producer Company Limited	Storage
9	Nandura	Shemba	Shemba Kranti Agro Producer Company Limited	Oil Extraction Unit .
10	Chikhli	Sawargaon Dukare	Kulbhushan Farmers Producer Company Limited	Oil Extraction Unit .
11	Chikhli	Sawana	Chandanshesh Farmers Producer Company Limited	Silage Unit .
12	Sangrampur	Manardi	Muktai Krushi Vikas Va Gramin Prashikshan Shetkari Utpadak Producer Company Limited	Storage
13	Mehkar	Warwand	Vidarbha Samruddhi Krushi Producer Company Limited	Storage &. Grain Processing Unit (Cleaning/Sorting/Grading Unit)
14	Khamgaon	Konti	Rajmuktai Agro Producer Company Limited	Establishment of Custom Hiring Centers
15	Malkapur	Malkapur (Rural)	Malkapur Taluka Krushi Vikas Farmer Producer Company Limited	Oil Extraction Unit
16	Chikhli	Antri Khedekar	Yashoday Farmers Producer Company Limited	Grain Processing Unit (Cleaning/Sorting/Grading Unit)

17	Mehkar	Janephal	Swami Samarth Farmers Producer Company Limited	Establishment of Custom Hiring Centers
18	Mehkar	Sonargavhan	Prakash Parv Farmtech Producer Company Limited	Establishment of Custom Hiring Centers
19	Mehkar	Sonargavhan	Prakash Parv Farmtech Producer Company Limited	Oil Extraction Unit
20	Mehkar	Sonargavhan	Prakash Parv Farmtech Producer Company Limited	Oil Extraction Unit
21	Buldhana	Malwandi	Krushi Sankalp Farmer Producer Company Limited	Construction of Godown/ Small Warehouse
22	Mehkar	Madni	Shaurya Samridhi Farmer Producer Company Limited	Establishment of Custom Hiring Centers
23	Buldhana	Buldhana	Vidarbha Agro Genius Producer Company Limited	Establishment of Custom Hiring Centers
24	Buldhana	Buldhana	Vidarbha Agro Genius Producer Company Limited	Oil Extraction Unit
25	Buldhana	Buldhana	Vidarbha Agro Genius Producer Company Limited	Transportation of Agri Produce to Market
26	Chikhli	Konad	Abhalmaya Agro Producer Company Limited	Construction of Godown/ Small Warehouse
27	Lonar	Lonar	Panchganga Agro Seed Producer Company Limited	Oil Extraction Unit
28	Buldhana	Kherdi	Kherdi Farmer Producer Company Limited	Establishment of Custom Hiring Centers
29	Chikhli	Mera Bk	Krusham Farmer Producer Company Limited	Transportation of Agri Produce to Market
30	Buldhana	Moundhala	Rudrajay Agrotech Producer Company Limited	Establishment of Custom Hiring Centers
31	Malkapur	Dasarkhed	Manudevi Farmer Producer Company Ltd	Establishment of Custom Hiring Centers
32	Deolgaon	Tuljapur	Shrirajyogi Ramdas Maharaj Farmersproducer Company Limited	Establishment of Custom Hiring Centers
33	Motala	Wadgaon Pr.Rohinkhed	Abhiraj Farmer Producer Company Limited	Establishment of Custom Hiring Centers

(Source- Ndksp,Smart And Magnet Unit At District Level)

Chapter 10: Extension strategies for adaptation to climate change

I) Preparation of Village Adaptation Plan

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

❖ **Planning for water security**

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

❖ **Planning for soil health**

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

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

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

❖ **Planning for Carbon sequestration**

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

❖ **Planning for reduction of production cost**

a. Reducing cost on labour intensive operations (by mechanization)
b. Reducing use of chemical fertilizers (by enhancing use of bio/ organic fertilizers)
c. Reducing use of chemical pesticides (by enhancing use of bio/ natural pesticides)
d. Reducing tillage operations (by conservation agriculture)
e. Reducing excessive water usage (by micro-irrigation)

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

a. Identification of CRV.
b. Production programme for Truthful/ Certified/ Foundation seeds- status
c. Conservation of indigenous seed having climate resilient characters- details of such seeds with location and characteristics

❖ **Adoption of climate resilient technologies**

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

b. Plan of demonstration of CRT (FFS, Method/ Result Demonstrations)
c. Most prominently adopted technologies and their impact
d. Innovative technologies adopted
e. Validation of technologies developed by Progressive farmers

❖ **Integrated Pest Management Plan**

a. Identification of common pests on major crops based on *CROPSAP*
b. Plan of IPM technologies to be adopted
c. On-farm production of bio-pesticides, natural pesticides etc.
d. Skill training to reduce pesticide hazard

❖ **Integrated farming systems**

a. Potential for crop based and other livelihood activities
b. Households to be engaged in IFS
c. Plan for market linkage for IFS produce

❖ **Preparation of contingency plan**

a. Village level weather forecast mechanism
b. Preparedness for contingencies
c. Crop insurance promotion and status
d. Monitoring of contingencies
e. Assessment of losses due to natural calamities if any

❖ **Strengthening of commodity value chains**

a. Assessing existing commodity value chains
b. Identification of gaps in existing value chains
c. Assessing volume of commodity to be marketed
d. Assessing warehouse availability and available capacity
e. Assessing transportation facilities
f. Plan for infrastructure
g. Plan for market linkage of major commodities
h. Role of Women Self Help Groups, Farmer Groups, FPCs

II. Convergence of Govt. Programs with Extension Plan

Sr. No.	Stages of Extension Plan	Govt. Programs
1	Planning for Water Security	Irrigation Well Program, NDKSP, MGNREGA, Agri Department,Jal Jivan Mission etc. Jalyukt Shivar, Atal Bhujal Yojana.
2	Soil Health	Bamboo Mission, NDKSP, MGNREGA,
3	Carbon Sequestration	MGNREGA, Bamboo Mission, NDKSP, Oxygen Park,
4	Planning Reduction of Production Cost	Seed Production Program, NDKSP, MGNREGA, Jaivik Sheti Mission
5	Planning Climate Resilient Technologies	NDKSP, ATMA, NHM, KVK
6	Integrated Pest Management	NDKSP, CROPSAP, ATMA, KVK

7	Integrated Farming System & Strengthening of commodity value chain	MSRLM, MAVIM, NDKSP, SMART, PMFME, NABARD.

III. Monitoring mechanism for village adaptation progress

Sr. No	Monitoring Mechanism	Objective
1	Knowledge Sharing	To spread knowledge regarding climate resilient technologies and sustainable agricultural practices to create awareness among the community members regarding village adaptation plans.
2	Training and Exposure visits	To organize training and exposure visits to train farmers to practice the climate resilient technologies.
3	Demonstration	To select a few farmers to do demonstration of sustainable agricultural practices and technologies adopted as per the village adaptation plan.
4	Convergence	Convergence with all govt departments to implement the adaptation plan and ensure the entitlement of govt schemes and receive guidance from Krushi Vidnyan Kendra (KVK), Agriculture Technology Management Agencies (ATMA) for technology adaptation.
5	Livelihood Generation	Organize the farmer producer company or farmer/ women group to start group livelihood activities with help of state or central government schemes.
6	Regular Visits and meetings	Organized regular visits and meetings of Village Climate Resilient Management Committee (VCRMC)s members to examine the implementation of the plan.

IV. Strategy for revisiting of 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: Analyse 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 Sample Village Level Micro-Plan

गाव विकास आराखडा प्रपत्र

महाराष्ट्र शासन - कृषि विभाग
नानाजी देशमुख कृषि संजीवनी प्रकल्प

POCRA

गाव विकास आराखडा

गाव समुहाचा क्रमांक- 500_pg-1b_02

गावाचे नाव-	चिखला	सेन्सस कोड-	529293
महसुल मंडळ-	Deulghat	तालुका-	बुलढाणा
उपविभाग-	बुलडाणा	जिल्हा-	बुलडाणा

गावसमुहातील इतर समाविष्ठ गावे

अ. क्र	गावाचे नाव	सेन्सस कोड	अ. क्र	गावाचे नाव	सेन्सस कोड
1	कोळवड	529256	2	इस्माईलपूर	529252
3	दुधा	529297	4	हतेदी बु.	529254
5	हतेदी खु.	529253	6	नांद्राकोळी	529268
7	अवलखेड	529294	8	दिपूर	529292
9	सागवन	529257	10	भाडोळा	529244
11	झरी	529249	12	तांदुळवाडी	529251
13	अंभोडा	529250			

सुक्ष्मनियोजन प्रक्रिया कालावधी	- 18-06-2021 ते 24-06-2021
गाव विकास आराखडा तयार करणा-या कृषि सहाय्यकाचे नाव	- KUSANGITA P KHANDVE
गाव विकास आराखडयाची तांत्रिक तपासणी करणारे कार्यालय	- उपविभागीय कृषि अधिकारी,बुलडाणा
ग्राम कृषि संजीवनी समिती मंजूरी ठराव क्रमांक व दिनांक	- ठराव क्रमांक 14 दि. 30-09-2021
ग्रामसभा मंजूरी ठराव क्र व दिनांक	- ठराव क्रमांक 101 दि. 15-03-2021
जिल्हास्तरीय समन्वय समितीकडील मंजूरीचा दिनांक	- _____

जिल्हा अधिक्षक कृषि अधिकारी,बुलडाणा कार्यालय

चिखला - 529293 1 / 62

अनुक्रमणिका

१) प्रस्तावना व पार्श्वभूमी, प्रकल्पाची गरज

नानाजी देशमुख कृषि संजीवनी प्रकल्पांतर्गत दि.**18.1.2018** च्या शासन निर्णयानुसार मौजे **चिखला** ता. **बुलढाणा** जि. **बुलडाणा** गावाची निवड झालेली आहे. मौजे **चिखला** हे गाव जिल्हा ठिकाणापासून **13** किमी अंतरावर **उत्तर** दिशेला वसलेले आहे. गावाचे प्रक्षेत्र **पाण्याचे दुर्भिक्ष्य** असलेल्या भागात येते. गावाचे भौगोलिक क्षेत्रफळ **674** हेक्टर आहे. गावाची सध्याची लोकसंख्या **1187** असून साक्षरतेचे प्रमाण **55** आहे. हे गाव रीठ गाव **नाही** .

मौजे **चिखला** गावाचा प्रमुख व्यवसाय शेती यावर आधारीत आहे. गावात पिकाखालील क्षेत्र **550** हे आहे. खरीप हंगामामध्ये **soyabean, mung, udid** ही पिके प्रामुख्याने घेण्यात येतात. रबी हंगामामध्ये **gram, wheat, maize** ही पिके घेतली जातात. त्याव्यतिरिक्त **na, na, na** ही फ़ळपिके आहेत. तर प्रामुख्याने **brinjal, tomato, palebhaji** भाजीपाला घेतला जातो. गावामध्ये उत्पादीत शेतीमालावर आधारीत **1** प्रक्रिया उद्योग आहेत. गावातील शेतीमाल विक्रीकरिता **Buldana** येथे बाजारपेठ उपलब्ध आहे. गावात शेती बरोबरच **दुग्धाव्यवसाय** हे शेतीपुरक व्यवसाय आहेत. सद्यस्थितीत गावाच्या पाण्याच्या ताळेबंदानुसार **61 (कोटी लिटर)** इतका अपधाव शिल्लक आहे. गावात **माती नाला बांध, वैयक्तिक विहिरी, बोरवेल, सिमेंट नाला बांध, सामुदायिक शेततळे - अस्तरीकरणासह (१००X१००X३ मी. पर्यंत), शेततळे - इनलेट व आउटलेट्सह (३० x ३० x ३ मी. पर्यंत), ढाळीचे बांधबंदिस्ती, पाझर तलाव** ही मृद व जलसंधारणाची कामे अस्तित्वात आहेत. गावात मृद व जलसंधारणाची कामे हाती घेण्यास वाव **आहे**. गावात मृद व जलसंधारणाची कामे **CNB** या कारणामुळे हाती घेता येणार नाहीत. गावाचे पर्जन्यमान सरासरी **701** मि मी आहे. पडणारा पाऊस **खरीप** पिकांकरिता पुरेसा असतो. सर्वसाधारणपणे पावसातील **अवेळी पाऊस** घटकांमुळे शेतीचे नुकसान होते. भूजलाचे कमी प्रमाण व पाण्याची साठवण देखील कमी असल्यामुळे गावातील शेतीसाठी पाण्याचे नियोजन करणे क्रमप्राप्त आहे. लहान व मध्यम शेतक-यांची तसेच अनु. जाती/ जमातीतील आणि महिला शेतक-यांचे उत्पन्न वाढविण्याच्या उद्देशाने तसेच बदलत्या हवामानास तोंड देण्यासाठी शेतीमध्ये **sheti prakiya, wearhouse, new technolgy** इ. बाबींना वाव आहे. गावाच्या **trassport** या वैशिष्ठ्यामुळे गावातील **milk production** शेती/ **8** शेती पुरक व्यवसाय/ शेती आधारित व्यवसाय वृद्धींगत करता येणे शक्य आहे. गावामध्ये नानाजी देशमुख कृषि संजीवनी प्रकल्पातील **pump sprinkar drip pipes host farmer** बाबींचा लाभ शेतक-यांनी घेतलेला आहे.

2) गावाचा विकास आराखडा तयार करण्यासाठी राबविलेला कार्यक्रमाचा तपशील

2.1 सुक्ष्मनियोजन प्रक्रिया कालावधी

नानाजी देशमुख कृषि संजीवनी प्रकल्पांतर्गत गाव विकास आराखडा तयार करण्यासाठी लोकसहभागी पद्धतीने सुक्ष्मनियोजन प्रक्रिया दि. 18-6-2021 पासून दि. 24-6-2021 पर्यंत राबविण्यात आली. त्याचा तपशील पुढीलप्रमाणे आहे.

सुक्ष्मनियोजन दिवस	तारीख	कार्यक्रम (सुक्ष्मनियोजन तंत्र / उपक्रम)	उपस्थिती	
			महिला	पुरुष
1	18-6-2021	प्रभात फ़ेरी	6	6
		संसाधन नकाशा	6	6
		संकलित सामाजिक व आर्थिक माहितीवर चर्चा	6	6
		गावातील शेती व निगडीत बाबींसंबंधी ऋतूचक्र, समयरेषा आणि परिस्थिती विश्लेषण विषयी चर्चा	6	6
		-शिवार फ़ेरी व विहीर निरिक्षण		
		-संसाधन नकाशा व अहवाल व त्यावर चर्चा	6	6
2	24-6-2021	-शिवार फ़ेरी व विहीर निरिक्षण		
		लक्ष्य गट चर्चा - शेती मुल्यसाखळी, शेती परिस्थिती विश्लेषण, नैसर्गिक संसाधने व शेतीचे नियोजन ;	6	6
		शेतकरी गट/ कृषि आधारीत उद्योग/ प्रगतीशील शेतकरी माहिती	6	6
		- प्रस्तावित कामांचा मसुदा App द्वारे/ प्रिटद्वारे वाचून दाखविणे	6	6
		महिला सभा	6	--
3	24-6-2021	- पाण्याचा ताळेबंद नुसार जलसंधारण कामे व पिक नियोजन आराखडा अंतिम करणे	6	6
		प्रस्तावित कामांचा मसुदा अंतिम करणे	6	6
		सामाजिक व पर्यावरणीय सुची	6	6
		ग्राम कृषि संजीवनी समिती सभा	6	6
4	24-6-2021	- ग्रामसभा	6	6
		प्रस्तावित कामांच्या मसुद्यास व गाव विकास आराखड्यास मंजूरी देणे	6	6

Annexure II Sample Village Profile

(https://mahapocra.gov.in/village-profile)

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

अहवाल क्रमांक : **नादेकृसप्र/गामाप्र/529293/2023/360** दिनांक : 26/12/2023

ग्राम कृषी संजीवनी विकास दर्शिका

गावाचे नाव : चिखला	गावाचा सांकेतांक : 529293	ग्रामपंचायत: Chikhla
गावाचा (प्रकल्प) टप्पा : 2	गाव खारपान मध्ये येते का ?: नाही	समूह कोड: 500_pg-1b_02
तालुका : बुलढाणा	उपविभाग : बुलडाणा	जिल्हा : बुलडाणा

प्रकल्प कर्मचारी/अधिकारी

पदनाम	पूर्ण नाव	भ्रमणध्वनी क्रमांक
उपविभागीय कृषी अधिकारी	SAWADATKAR DNYANESHWAR BHAGWANRAO	7350229522
तालुका कृषी अधिकारी	Suradkar ASHOK	7276331796
कृषी सहाय्यक	KHANDVE KUSANGITA P	8208945949
समूह सहाय्यक	Patil Dattatraya Subhash	8275233764
शेतीशाळा प्रशिक्षक	NA	NA
कृषीमित्र	NA	NA
कृषीताई	Purbhe Varsha Rajesh	7774010152

ग्राम कृषी संजीवनी समिती

पदनाम	पूर्ण नाव	भ्रमणध्वनी क्रमांक
सरपंच	Wagh Parag Rajendra	9923798483
उपसरपंच	Ingle Parmeshwar Jalindhar	9657750943
ग्रामपंचायत सदस्य	Wagh Aanna Gangaram	9850016634
ग्रामपंचायत सदस्य	Wagh Savita Ganesh	9373111714
प्रगतिशील शेतकरी	Palwe Umesh Tryambak	9673789605
प्रगतिशील शेतकरी	Wagh Aasha Satish	9764641339
महिला शेतकरी	Ingle Mangla Shrikrushna	8605307414
महिला शेतकरी	Wagh Swati Sachin	9552977338
महिला शेतकरी	Wagh Manisha Gajanan	9765486561
शेतकरी उत्पादक कंपनी प्रतिनिधी	Wagh Kaveri Ganesh	8007908277
बचत गट महिला प्रतिनिधी	Ingle Priti Sachin	7499996208
कृषि पूरक व्यावसायिक शेतकरी	Wagh Sachin Niwas	9158202729
कृषि पूरक व्यावसायिक शेतकरी	Wagh Rahul Vilas	9922397643

भौगोलिक तपशील

माहिती उपलब्ध नाही

हवामान अंदाज व पीक सल्ला

माहिती उपलब्ध नाही

वैयक्तिक लाभार्थी तपशील

नोंदणी केलेले शेतकरी - 217	अर्जांची एकूण संख्या - 498
पूर्वसंमती दिलेले अर्ज - 125	लाभ दिलेले अर्ज- 125
लाभार्थी संख्या - 94	लाभार्थी महिला शेतकरी - 31
अनुसूचित जाती लाभार्थी - 0	अनुसूचित जमाती लाभार्थी - 3
वितरीत अनुदान रक्कम - 3199150	बँकेसोबत आधार संलग्न नसलेले शेतकरी - 8

घटकनिहाय वितरित अनुदान

घटक/बाब	एकूण अर्ज	पूर्व समंती प्राप्त अर्ज	नाकारलेल्या अर्जांची संख्या	लाभार्थी शेतकरी	वितरीत केलेला निधी (रू)
Backyard Poultry	3	0	3	0	0
Compost (Vermicompost / NADEP / Organic input production unit)	1	0	1	0	0
Drip Irrigation	42	6	34	6	379380
Farm Mechanization	52	4	48	4	211550
Farm Pond (Individual)	3	0	3	0	0
FFS host farmer assistance / Promotion of BBF technology/ Zero Tillage Technology etc.	9	4	5	2	5600
Horticulture Plantation / Agroforestry	24	2	22	2	42770
Inland Fisheries	1	0	1	0	0
Pipes	43	0	43	0	0
Recharge of open dug wells	8	3	5	3	34190
Saline and Sodic lands (Farm ponds/ Sprinklers / Water pump/ FFS)	72	35	37	25	551460

Seed Production	5	1	4	0	0
Shadenet House	2	0	2	0	0
Small ruminants	39	0	39	0	0
Sprinkler Irrigation	139	65	67	64	1279200
Water Pumps	25	2	22	2	30000
Well	30	3	24	3	665000
Total	498	125	360	111	3199150

कृषी व्यवसाय घटकाचा तपशील

नोंदणी केलेल्या FPC/SHG/Farmer Group ची संख्या - 3	एकूण अर्जांची संख्या - 5
पूर्वसंमती दिलेल्या अर्जांची संख्या - 3	कार्यारंभ आदेश दिलेल्या अर्जांची संख्या - 3
लाभ दिलेल्या FPC/SHG/Farmer Group ची संख्या - 3	अनुदान वितरीत रक्कम, रु. - 1894140

कृषी व्यवसाय घटकांतर्गत घटक/ बाबनिहाय वितरीत अनुदान

घटक/बाब	एकूण अर्ज	पूर्व समंती प्राप्तअर्ज	कार्यारंभ आदेश प्राप्त अर्ज	अनुदान वितरीत FPC/SHG/Farmer Group	वितरीत केलेले अनुदान रक्कम, (रू)
Establishment of Custom Hiring Centers	5	3	3	3	1894140

मृद व जलसंधारण तपशील

पावसाचे प्रमाण (मिमी) - 1049.5	उपलब्ध अपधाव (TCM) - 655.82
अडवलेला अपधाव (TCM) - 366.6	शिल्लक अपधाव (TCM) - 289.22
प्रस्तावित क्षेत्र उपचार (हे.) - 0	प्रस्तावित नाला उपचार संख्या - 2
कामांची एकूण रक्कम - 12.29	तयार अंदाज पत्रकांची संख्या - 2
एकूण तांत्रिक मंजुरींची संख्या - 2	पूर्ण झालेल्या ई निविदा संख्या - 2
सुरु झालेल्या कामांची संख्या - 2	पूर्ण झालेल्या कामांची संख्या - 0
निधी वितरण केलेल्या कामांची संख्या - 0	खर्च झालेली एकूण रक्कम (रू) - 0

कामानुसार झालेला खर्च

उपचार प्रकार	एकूण तांत्रिक मान्यता	एकूण कार्यारंभ आदेश	एकूण पूर्ण झालेलीकामे	निधी अदा केलेल्या कामांची संख्या	एकूण अदायगी (रू)
Construction of Cement Nala Bunds	1	1	0	0	0

Desilting of old water storage structure	1	1	0	0	0
Total	2	2	0	0	0

पिक पद्धतींचा तपशील

माहिती उपलब्ध नाही

भूमी उपयोगिता वर्गीकरण

गावाचे एकूण भौगोलिक क्षेत्र 675.66 हे असून निव्वळ पिकाखाली त्यापैकी 86.73% क्षेत्र आहे. गावाचे भूरूप ढोबळमानाने उंचसखल/ डोंगराळ/ सपाट प्रकारचे आहे. गावातील निव्वळ पिकाखालील क्षेत्रापैकी 63.99% क्षेत्राकरिता सिंचनसुविधा उपलब्ध आहे.

अ.क्र.	तपशील		क्षेत्र (हेक्टर)
1	एकूण भौगोलिक क्षेत्र (Total Geographical Area)		675.66
2	पिकाखालील निव्वळ क्षेत्र (Net Cropped Area)		586
3	दुबार पिकाखालील क्षेत्र (Double Cropped Area)		570
4	एकूण लागवडीखालील क्षेत्र (Gross cropped Area)		586
5	एकुण सिंचित क्षेत्र (Irrigaterd Area)	हंगामी बागायत	350
		बारमाही बागायत	25
6	एकूण वन क्षेत्र (Total Forest Area)		0
7	कायम पड क्षेत्र (Permanent Fallow Area)		52
8	चालू पड क्षेत्र (Current Fallow Area)		26
9	गवत पड व चराऊ कुरणे (Pasture Land)		0
10	इतर पड क्षेत्र (Other Fallow Area)		32
11	बिगर कृषि क्षेत्र (Area put to non-Agricultural use)		24

पिकनिहाय क्षेत्र (क्षेत्र हेक्टर)

अ.क्र.	पिकाचा वर्ग	पिकाखालील क्षेत्र
1	तृणधान्य	22
2	कडधान्य	505
3	गळितधान्य	380

4	नगदी पिके (कापूस,ऊस)	0
5	भाजीपाला पिके	0
6	फळपिके	0
7	चारा पिके	0
8	इतर	0
एकूण		907

निरीक्षण विहिरींची पाण्याची पातळी

सूक्ष्म नियोजन आराखड्यानुसार गावतील सरासरी भुजल पातळी 25 (खोली मी मध्ये) निरीक्षण साठी निवडलेल्या विहिरीचा तपशील

अ.क्र.	पाणलोट क्रमांक	शेतकरी संख्या	भुजल पातळी स्थिती (मी)	दिनांक
1	500_pg-1b_02	150	7	--

शेतमाल निहाय घाऊक बाजारातील आवक व बाजार भाव बाबत माहीती

बाजार समिती - **बुलढाणा** शेतमाल - **गहू** जात/प्रत - **हायब्रीड**

दिनांक	परिमाण	आवक	कमीत कमी दर	जास्तीत जास्त दर	सर्वसाधारण दर
2023-12-20	क्विंटल	26	2000	3000	2500

बाजार समिती - **बुलढाणा** शेतमाल - **तूर** जात/प्रत - **लाल**

दिनांक	परिमाण	आवक	कमीत कमी दर	जास्तीत जास्त दर	सर्वसाधारण दर
2023-12-24	क्विंटल	24	9000	9500	9250
2023-12-22	क्विंटल	24	9000	9500	9250

बाजार समिती - **बुलढाणा** शेतमाल - **सोयाबिन** जात/प्रत - **पिवळा**

दिनांक	परिमाण	आवक	कमीत कमी दर	जास्तीत जास्त दर	सर्वसाधारण दर
2023-12-24	क्विंटल	400	4300	4700	4500
2023-12-22	क्विंटल	200	4500	4600	4550
2023-12-20	क्विंटल	400	4300	4700	4500

बाजार समिती - **बुलढाणा** शेतमाल - **हरभरा** जात/प्रत - **काबुली**

दिनांक	परिमाण	आवक	कमीत कमी दर	जास्तीत जास्त दर	सर्वसाधारण दर
2023-12-20	क्विंटल	24	10000	12000	11000

बाजार समिती - **बुलढाणा** शेतमाल - **हरभरा** जात/प्रत - **लाल**

दिनांक	परिमाण	आवक	कमीत कमी दर	जास्तीत जास्त दर	सर्वसाधारण दर
2023-12-22	क्विंटल	19	5000	5500	5250

नजिकचे गोदाम / वखारकेंद्रा बाबत माहीती

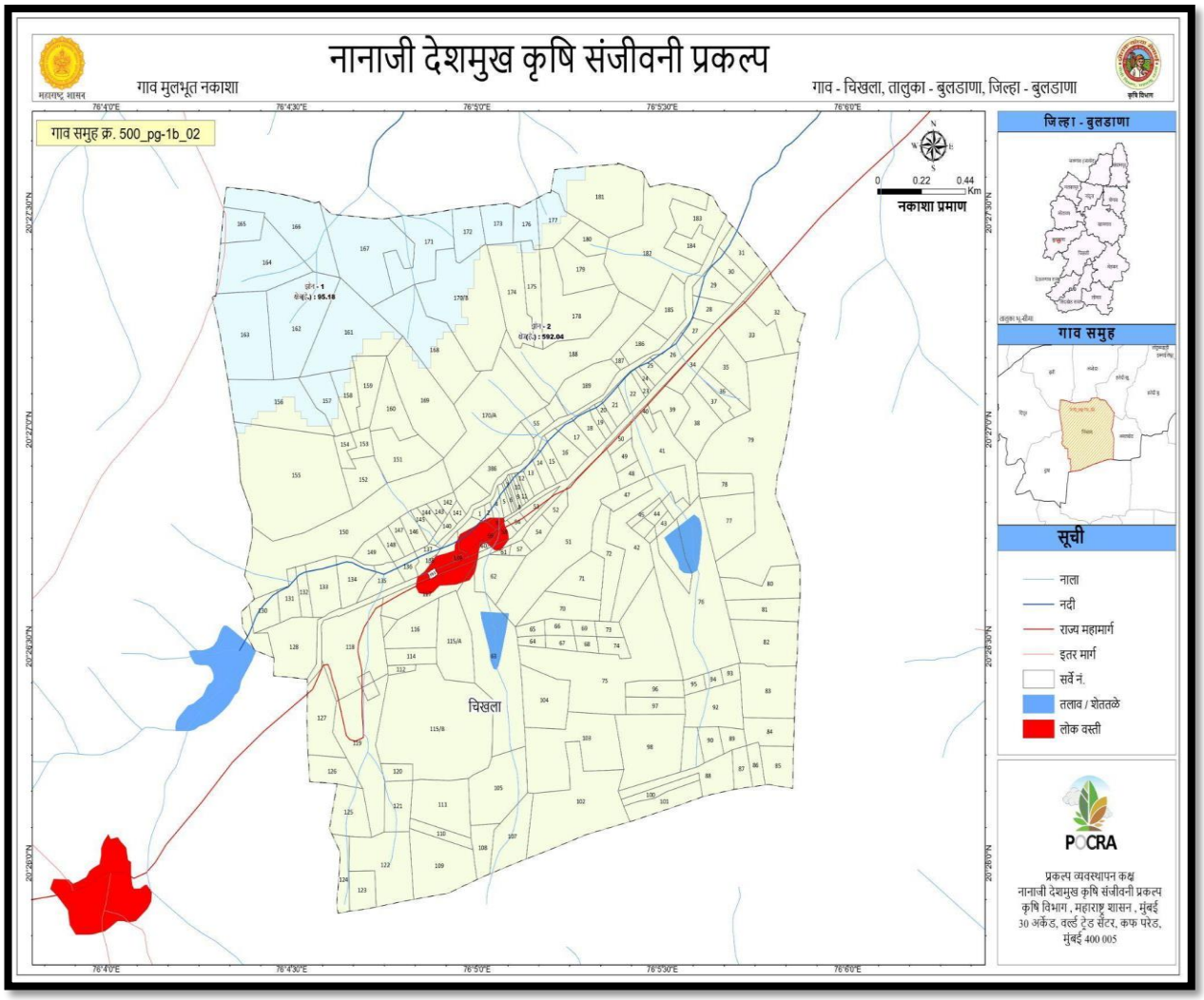
एकूण क्षमता (MT)	उपलब्ध क्षमता (MT)	तारीख
15920	3654	30/11/2023
गोदाम नाव	**ईमेल**	**दूरध्वनी**
CHIKHALI	chikhali.wh@mswc.in	07264-242214

गोदामाचा पत्ता -MSWC, JALNA ROAD ,CHIKHALI - 443201
गावापासून अंतर(कि.मी.) - 20.17

Sources of Information:

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

Annexure III *Sample Village Map* (*गावाचा मुलभूत नकाशा*)



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

https://mahapocra.gov.in/home/taluka_advisory/128

दिनांक	१३/०३/२०२४	१४/०३/२०२४	१५/०३/२०२४	१६/०३/२०२४	१७/०३/२०२४
पाऊस (मिमी)	०.०	०.०	०.०	०.०	०.०
कमाल तापमान (अं.से.)	३६.१	३६.२	३५.६	३६.५	३७.६
किमान तापमान (अं.से.)	१८.६	१७.६	१७.९	१९.५	२१.५
सकाळची सापेक्ष आर्द्रता (%)	३०	२५	१६	१६	३५
दुपारची सापेक्ष आर्द्रता (%)	१६	१०	९	९	१०
वा-याचा वेग (किमी / तास)	१५	१५	१५	१०	७
वा-याची दिशा	पश्चिम - वायव्य	पश्चिम - वायव्य	पश्चिम - वायव्य	पश्चिम - वायव्य	
ढग स्थिती (आकाश)	स्वच्छ	स्वच्छ	स्वच्छ	स्वच्छ	

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

दिनांक	२०२४-०३-१३	२०२४-०३-१४	२०२४-०३-१५
पाऊस (मिमी)	०	०	०
कमाल तापमान (अं.से.)	३८.३	३६.६५	३६.८५
किमान तापमान (अं.से.)	१४.७६	१२.५५	११.९
सकाळची सापेक्ष आर्द्रता (%)	२१.८	१६	१६.१
दुपारची सापेक्ष आर्द्रता (%)	१००	१००	९५.८
वा-याचा वेग (किमी / तास)	८.६७	८.६	८.६२

हवामान अंदाज

हवामान कोरडे राहण्याची शक्यता. आकाश स्वच्छ ते अंशतः स्वच्छ राहण्याची शक्यता. हळुवार वारा असण्याची शक्यता. तापमान १७.६ ते ३७.६ अंश असण्याची शक्यता.

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

हा हवामान सल्ला डाउनलोड करण्यासाठी येथे क्लिक