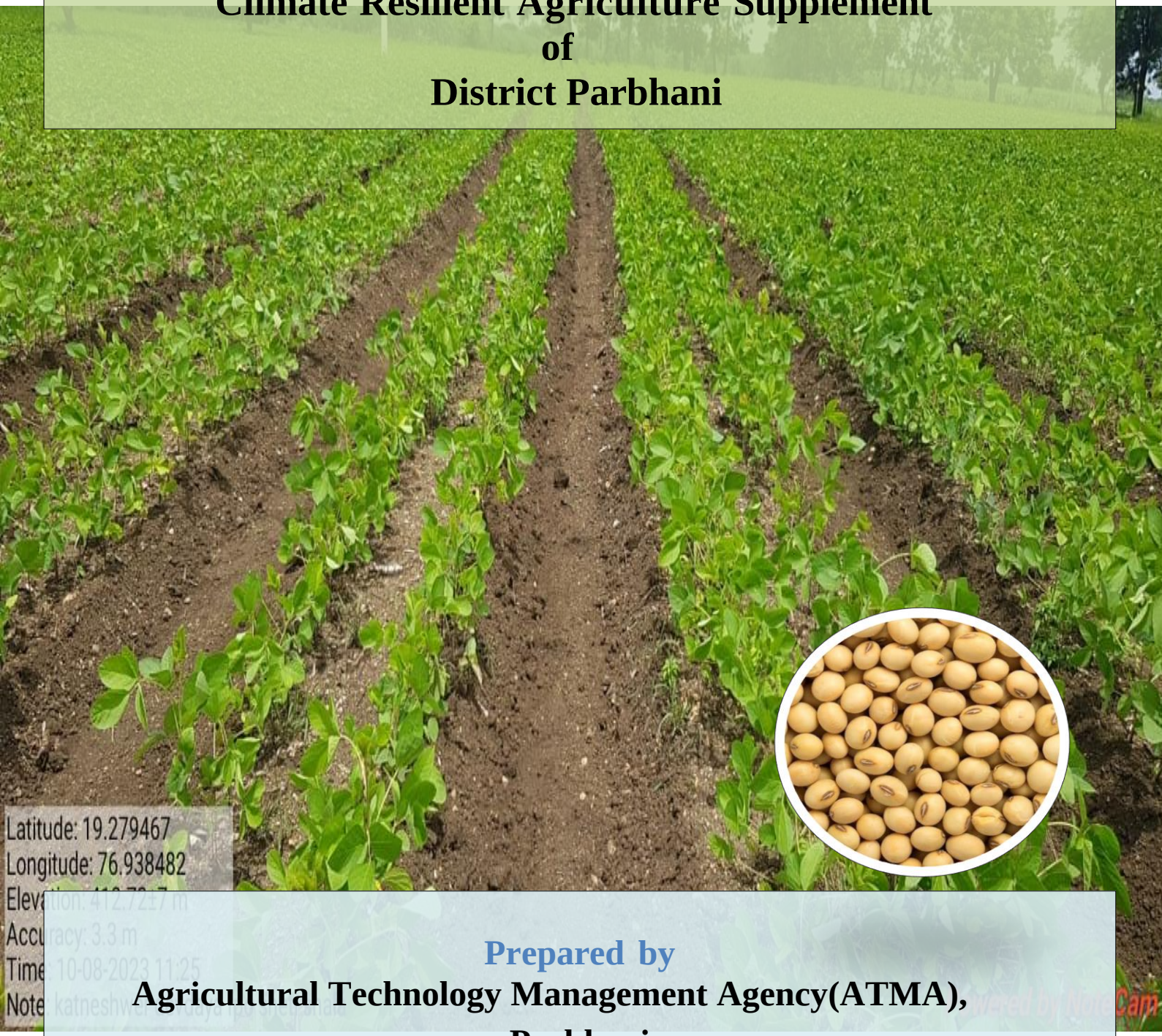
# Nanaji Deshmukh Krushi Sanjeevani Prakalp

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




**Prepared by**

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# INTRODUCTION

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

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

# INDEX

# *Chapter 1: General Profile of the District*

## 1.1 Geographical area and location of the district

Parbhani district formed part of the former Nizam's rule till 1948 it is one of the historical towns of the Marathwada region. It is located in the southern part of Marathwada, between $18^0$ 45 to $20^0$ 10 North latitude and $76^0$ 13' to $77^0$ 39' to East longitudes. it is located about 407 meters above the sea level .it is bounded by Solapur district to the south west by Ahmednagar district to north-west by Parbhani to the north and by Latur district to east.

The total geographical area of Parbhani district is 6311Sq.Kms.

| Sr. No | Name of District | District Code | Latitude | longitude |
|---|---|---|---|---|
| 1 | Parbhani | 802753 | $18^0$ 45' to $20^0$ 10' N | $76^0$ 13' to $77^0$ 39 E |

Parbhani, formerly known as "Prabhavati Nagar", is a district in the Marathwada region of Maharashtra. Parbhani is situated approximately at the center of Maharashtra. The state capital, Mumbai lies to the west of Parbhani. The nearest major city is Nanded and Aurangabad. Parbhani is well connected by road to other major cities in Maharashtra and even in the neighboring state of Andhra Pradesh. Parbhani is an important Railway junction on the Mumbai – Parbhani – Nanded - Secunderabad and Parli – Nanded -Parbhani -Bangalore lines.

There are 9 talukas in the district namely Parbhani, Jintur, Gangakhed, Pathri, Purna, Palam, Sailu, Sonpeth and Manwath. There is one Mahanagar Palika, 7 Municipal councils, 9 Panchayat Samitis and 704 Gram Panchayats in the district with a total number of 848 villages.

It has an average elevation of 347 meters. In the northeast of the district, on the boundary of Hingoli and Parbhani district there is an extension of Ajanta ranges called Nirmal Hills. The main river in the district is Godavari which flows from Pathri, Manwath, Sonpeth, Gangakhed, Purna taluka of Parbhani district. Other rivers are Purna and Dudhana which are tributaries of Godavari.

**Agro-Climatic zone**: Parbhani district lies on the central part of Marathwada region of Maharashtra. Climatologically it comes under semi-arid Sub-Tropical region and agro climatologically is identified as plain zone of Maharashtra. The geographical location of Parbhani is located between 18.450 and 20.010 North Latitude and 76.130 to 77.290 East Longitudes. The Ajanta hill ranges run through Jintur taluka of Parbhani district and Balaghat hill ranges run through Gangakhed taluka of the district. The district comes under Godavari and Dudhana river Valley. Parbhani district is located about 457 meters above the sea level.

## 1.2 Tehsil details the number of villages

| Sr. No. | Tehsil | No. of Villages |
|---|---|---|
| 1 | Parbhani | 131 |
| 2 | Gangakhed | 106 |
| 3 | Pathri | 58 |
| 4 | Jintur | 168 |
| 5 | Purna | 95 |
| 6 | Palam | 82 |
| 7 | Selu | 94 |
| 8 | Sonpeth | 60 |
| 9 | Manwath | 54 |
| | Total | 848 |

## 1.3 Demographic information of Parbhani

According to the census Report 2021 the total population of Parbhani district is 18.36 lakhs of which males are 9.42 while female Population is 8.94 lakhs. The Sex ratio of the district is observed to be 947 females per thousand, males as against the state average of 992 females per 1000 males urban-Rural: The Rural population of Parbhani district is 12.48 lakhs (or 67.9%) indicating a dominance of rural sector; the urban population is 5.88 lakhs (or 32.1%) of total population of district; at the state level the urban population forms about 42% of total population.

## Demography of the district

| Name of Block | Villages Covered | Population | | | SC | | ST | | General | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | M | F | Total | Household (No.) | Members (No.) | Household (No.) | Members (No.) | Household (No.) | Members (No.) | Household (No.) | Members (No.) |
| Parbhani | 131 | 275285 | 262525 | 537810 | 13863 | 69316 | 1470 | 7348 | 9229 | 461146 | 107562 | 537810 |
| Purna | 95 | 144882 | 137874 | 282756 | 6267 | 31336 | 3163 | 15816 | 47121 | 235604 | 56551 | 282756 |
| Palma | 82 | 86633 | 82541 | 169174 | 4031 | 20156 | 406 | 2031 | 29397 | 146987 | 33835 | 169174 |
| Gangakhed | 106 | 59745 | 57072 | 116817 | 3012 | 15060 | 285 | 1427 | 20066 | 100330 | 23363 | 116817 |
| Sonpeth | 60 | 71482 | 67564 | 139046 | 4077 | 20387 | 327 | 1634 | 23405 | 117025 | 27809 | 139046 |
| Pathri | 58 | 46250 | 43332 | 89582 | 2606 | 13032 | 201 | 1005 | 15109 | 75545 | 17916 | 89582 |
| Manwath | 54 | 104857 | 98010 | 202867 | 5925 | 29627 | 867 | 4333 | 33781 | 168907 | 40574 | 202867 |
| Selu | 94 | 59737 | 55645 | 115382 | 3172 | 15862 | 867 | 4335 | 19037 | 95185 | 23076 | 115382 |
| Jintur | 168 | 93999 | 88653 | 182652 | 6506 | 32532 | 517 | 2585 | 29507 | 147535 | 36530 | 182652 |
| Total | 848 | 942870 | 893216 | 1836086 | 49462 | 247308 | 8103 | 40514 | 309653 | 1548264 | 367217 | 1836086 |

*(Source: DIC, Parbhani 2021-2022)*

## 1.4 Annual Average rainfall of the district with segregation of tehsils receiving highest and lowest rainfall

Average Normal Rainfall of the district is 755 mm and in the year June to October 2023 actual rainfall is 520 mm. In June 2023 to October 2023 highest rainfall i.e. 573.1 mm – 76.8% in Palam taluka. In June 2023 to October 2023 Lowest rainfall i.e. 415 mm – 60.2% in Sonpeth taluka ***(Source**: www.maharain.com)*

## 1.5 Max. and Min. temperature of the district

| | | |
|---|---|---|
| Maximum Temperature | Summer | 43-45$^0$ C |
| | Winter | 10-12$^0$ C |
| Minimum temperature | Summer | 43-45$^0$ C |
| | Winter | 10-12$^0$ C |

## 1.6 River network in the district

Godavari is the most important river. Dudhna and Purna are other two major rivers of the district. Godavari River runs through Pathri, Gangakhed and Palam talukas of the district for about 79 kilometers and then enters into Nanded district towards East. Dudhana River runs through Selu, Jintur, Parbhani and Purna Tehsil and then enters into Hingoli district to the East. There is one major irrigation dam at Yeldari in jintur taluka on Purna River in Parbhani district.

## 1.7 Irrigation potential of the district

"Gross cultivated area is 572758 Ha. Out of Total Geographical area of Parbhani 6,31,115 Ha. area under kharif crop in kharif crop area 524900 Ha. are under irrigated crops and 16165ha.Area under rainfed crops. There is 508700 Ha. area under rabi crops in Parbhani district 319500 Ha. In Which 43197 Ha. Area under Irrigated crops and 276340 Ha. area under rainfed crop. 44264 Ha. area under summer crop in which 4461 Ha. area under horticulture crop in Parbhani district."

**Irrigation based Classification**

| Sr. No | Source of irrigation | Area Covered by the Source (Ha.) |
|---|---|---|
| 1 | Dams | 203236 |
| 2 | Wells | 38494 |
| 3 | Bore wells | 4975 |
| 4 | Farm Ponds | 4163 |
| 5 | Rivers | 80025 |

| Sr.no | Name of the Block | Irrigated Area (Ha.) | |
|---|---|---|---|
| | | Gross Irrigated Area | Net Irrigated Area |
| 1 | Parbhani | 49166 | 47304 |
| 2 | Purna | 47502 | 36847 |
| 3 | Palam | 13654 | 7422 |
| 4 | Gangaked | 22356 | 23396 |
| 5 | Sonpeth | 17957 | 20519 |
| 6 | Pathri | 21689 | 35563 |
| 7 | Manwath | 29938 | 14846 |
| 8 | Selu | 26899 | 4979 |
| 9 | Jintur | 24097 | 16746 |
| **Total** | | **253258** | **207622** |

*(Source: Jalsampada department District, Parbhani)*

## 1.8 Different types of soils of the districts

**Information on Soils of Parbhani District**

| Sr. No. | Block | Heavy Black Soils | Medium Black Soils | Shallow Black Soils | Light Soils |
|---|---|---|---|---|---|
| 1 | Parbhani | 11108 | 1780 | 2233 | 2497 |
| 2 | Purna | 4327 | 2149 | 1554 | 3556 |
| 3 | Palam | 24475 | 4275 | 6552 | 11194 |
| 4 | Gangakhed | 10253 | 3028 | 6743 | 22731 |
| 5 | Sonpeth | 0 | 0 | 0 | 9442 |
| 6 | Pathri | 20919 | 8152 | 14173 | 15643 |
| 7 | Manwath | 0 | 0 | 0 | 7120 |
| 8 | Selu | 37177 | 7393 | 8964 | 7596 |
| 9 | Jintur | 14988 | 2452 | 5453 | 10662 |
| | Total | 123247 | 29229 | 45672 | 90441 |

(*Source: Soil Testing and soil Survey Lab, Parbhani)*

## 1.9 Different zones according to prevailing agro-ecological situations

Identification of agro ecological situation prevailing in the district is a major consideration for studying the different farming system being followed by farmers in each agro ecological situation. This is important from the perspective of identification of different gaps and problems and issues with respect to different crops, enterprises and commodities for preparation of location specific strategies. Parbhani district is divided into six prominent agro ecological situations on the basis of the soil types, rainfall, topography and irrigation. The description of each agro ecological situation, its coverage in different blocks and the representative villages selected for each agro ecological situation for formation of strategies on participatory management practices are given below.

## Spread of AES in the District –Parbhani

| Sr. No | Name of the AES | Area (ha) | Geographical Area % | Parbhani (Area & %) | Gangakhed (Area & %) | Palam (Area & %) | Sonpeth (Area & %) | Jintur (Area & %) | Selu (Area & %) | Manwath (Area & %) | Pathri (Area & %) | Purna (Area & %) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AES 1 | Hilly Dry land | 139720 | 22 | 0 | 7066 (50) | 40459 (28) | 0 | 73701 (50) | 18493 (17) | 0 | 0 | 0 |
| AES 2 | Plateau dry land with medium soil type | 222599 | 36 | 61276 (28) | 11784 (5) | 0 | 0 | 48195 (24) | 52730 (25) | 32904 (12) | 15709 (6) | 0 |
| AES 3 | Medium soil type with unassured irrigation | 25051 | 4 | 6000 (24) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 195051 (6) |
| AES 4 | Medium soil type with unassured irrigation | 144097 | 23.4 | 44286 (33) | 12307 (9) | 0 | 26655 (17) | 0 | 0 | 16517 | 21351 | 19981 (14) |
| AES 5 | Medium plateau along with Godavari basin region with assured irrigation | 67690 | 11 | 5070 (8) | 16891 (23) | 10457 (17) | 0 | 0 | 0 | 5327 (9) | 0 | 23944 (43) |
| AES 6 | Hilly medium Light soil type with unassured irrigation | 26067 | 4.23 | 0 | 18543 (71) | 7524 (29) | 0 | 0 | 0 | 0 | 0 | 0 |

*(Source: SREP ATMA 2021-2022)*

# *Chapter 2: Agriculture Profile of District*

## 2.1 Land use classification of the district

There are 848 villages present in the district. Total Geographical area of Parbhani district is 6,33,628 ha. Out of which 5,72,578 Ha. area under gross cropped area, 4,85,953 Ha. area is net sown area and 7,41,092 Ha. area sown more than once, 166% is cropping intensity occurred in Parbhani district.

### 2.1.a Forest land, barren and uncultivable, cultivable waste land etc.

| Sr. No. | Name of Talukas | No. of village | Total geographical Area | Area Under Forest | Area Under Non-agricultural use | Area under Cultivable Waste Land | Permanent Pastures | Current Fallow | Area Under Other Use |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Parbhani | 131 | 115947 | 32 | 0 | 950 | 220 | 540 | 282 |
| 2 | Purna | 95 | 61295 | 0 | 116 | 40 | 370 | 1522 | 156 |
| 3 | Palam | 82 | 49682 | 242 | 219 | 2195 | 105 | 890 | 1095 |
| 4 | Gangakhed | 106 | 67194 | 0 | 685 | 1880 | 1600 | 659 | 1035 |
| 5 | Sonpeth | 60 | 37271 | 0 | 603 | 325 | 215 | 790 | 325 |
| 6 | Pathri | 58 | 53042 | 0 | 1035 | 1080 | 524 | 10 | 520 |
| 7 | Manwath | 54 | 49457 | 0 | 1140 | 100 | 0 | 0 | 200 |
| 8 | Selu | 94 | 68586 | 0 | 2750 | 65 | 20 | 75 | 345 |
| 9 | Jintur | 168 | 130732 | 9906 | 0 | 7626 | 1230 | 2230 | 3206 |
| | Total | 848 | 633206 | 10180 | 6548 | 14261 | 4284 | 6716 | 7164 |

*(Source: DIC, Parbhani 2021-2022)*

### 2.1.b Net area sown, area sown more than once, gross cropped area and cultivable area

| Sr. No. | Name of Talukas | No. of villages covered | Area Under Agriculture | | | |
|---|---|---|---|---|---|---|
| | | | Gross Cropped Area | Net Sown Area | Area Sown More than once | Cultivable area |
| 1 | Parbhani | 131 | 121576 | 107482 | 75711 | 142518 |
| 2 | Purna | 95 | 58653 | 52267 | 94318 | 89149 |
| 3 | Palam | 82 | 43401 | 34207 | 68253 | 62839 |
| 4 | Gangakhed | 106 | 51687 | 50407/ | 51621 | 91415 |
| 5 | Sonpeth | 60 | 37347 | 16110 | 76462 | 51603 |
| 6 | Pathri | 58 | 51687 | 42807 | 72228 | 61884 |
| 7 | Manwath | 54 | 45415 | 32895 | 75711 | 65223 |
| 8 | Selu | 94 | 59782 | 63193 | 110394 | 88413 |
| 9 | Jintur | 168 | 103359 | 86585 | 116394 | 144666 |
| | Total | 848 | 572907 | 435546 | 741092 | 797710 |

*(Source: DIC Parbhani,2021-2022)*

## 2.2 Agriculture land holdings- its distribution according to sizes

| Sr. No | Land Holding | No. of. Farmers | Percentage (%) |
|---|---|---|---|
| 1 | Below 1.00 Ha. (Marginal Farmers) | 176114 | 45.36% |
| 2 | 1.00 Ha to 2.00 Ha. (Small Farmers) | 125717 | 32.38% |
| 3 | 2.00 to 4.00 Ha (Semi Medium Farmers) | 68008 | 17.51% |
| 4 | 4.00 to 10 Ha (Medium Farmers) | 17188 | 4.42% |
| 5 | More than 10 Ha (Large Farmers) | 1260 | 0.3% |
| | Total | 388287 | 99.97% |

*(Source: DIC Parbhani 2021-2022)*

## 2.3 Irrigation and water lifting facility in the district

| Sr. No. | Source of irrigation | Area Covered by the Source (Ha) |
|---|---|---|
| 1 | Dams | 203236 |
| 2 | Wells | 38494 |
| 3 | Bore wells | 4975 |
| 4 | Farm Ponds | 4163 |
| 5 | Rivers | 80025 |
| | Total | 330893 |

## 2.4 Type of crops grown, cropping pattern, cropping intensity and farming systems.

### 2.4.a Different types of Crops grown in district:

| Sr. No | Name of Crop | Area |
|---|---|---|
| 1 | Rice | 0 |
| 2 | Jowar | 2654.33 |
| 3 | Bajara | 223.00 |
| 4 | Maize | 999.1 |
| 5 | Other Cereals | 42 |
| | **Total Cereals** | **3918.43** |
| 6 | Tur | 39488.90 |
| 7 | Moong | 13171.00 |
| 8 | Udid | 4616.50 |
| 9 | Other Pluses | 5 |
| | **Total Pluses** | **57281.4** |

*(Source: Statistic data district superintendent agriculture office Parbhani)*

| | | |
|---|---|---|
| 10 | Groundnut | 0 |
| 11 | Sesame | 238.90 |
| 12 | Soybean | 269800.72 |
| 13 | Sunflower | 0 |
| 14 | Other oil Seeds | 51 |
| | **Total Oil seeds** | **270090.62** |
| 15 | Cotton | 179447.79 |
| 16 | Sugarcane | 48757 |
| 17 | Turmeric | 400 |
| | **Total** | **228604.79** |
| | **Grand Total** | **559895.24** |

**Cropping Pattern, Cropping Intensity**

The Cropping Intensity of the district is 166% which is comparatively less. The total land area available for Cultivation is 90 % to total geographical area but actually cultivated area is less than the availability. This showed the under-utilization of land.

**Land Use Pattern**

| Sr. No. | Name of Talukas | No of villages covered | Total Geographical Area | Area Under Agriculture | | | |
|---|---|---|---|---|---|---|---|
| | | | | Gross Cropped Area (1) | Net Sown Area (2) | Area Sown More than once (1-2) | Cropping Intensity (%) |
| 1 | Parbhani | 131 | 125331 | 121576 | 107482 | 75711 | 200 |
| 2 | Purna | 95 | 63173 | 58653 | 52267 | 94318 | 200 |
| 3 | Palam | 82 | 50884 | 43401 | 34207 | 68253 | 200 |
| 4 | Gangakhed | 106 | 51981 | 75981 | 50407 | 51621 | 100 |
| 5 | Sonpeth | 60 | 35623 | 0 | 16110 | 76462 | 100 |
| 6 | Pathri | 58 | 54029 | 91984 | 42807 | 72228 | 200 |
| 7 | Manwath | 54 | 42917 | 0 | 32895 | 75711 | 200 |
| 8 | Selu | 94 | 81455 | 77804 | 63193 | 110394 | 200 |
| 9 | Jintur | 168 | 125722 | 103359 | 86585 | 116394 | 100 |
| | **Total** | **848** | **631115** | **181163** | **485953** | **741092** | **166** |

### Farming Systems:

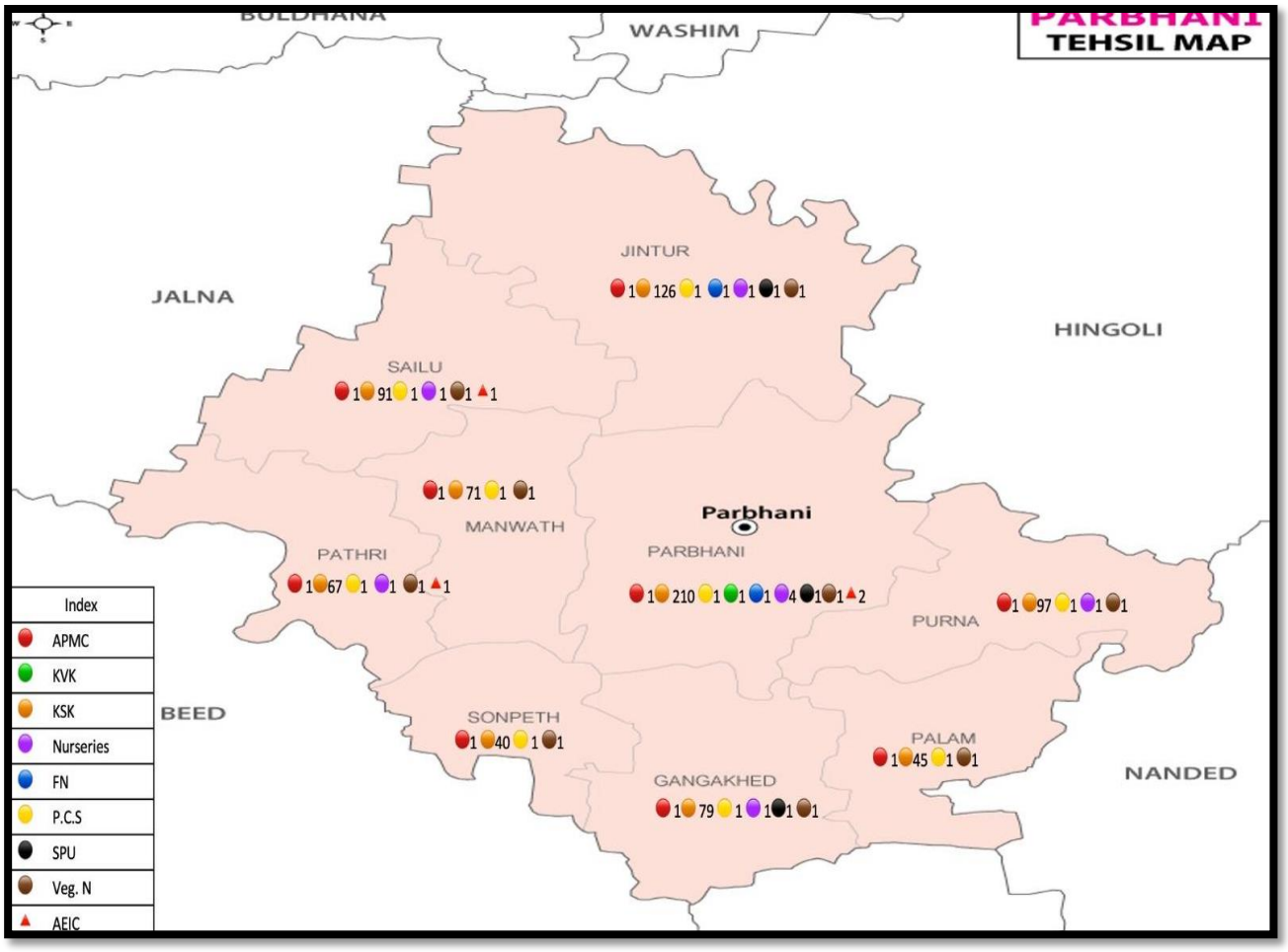
In Parbhani District, a semi-Commercial type of farming system is adopted in which the majority of farmers adopt a crop-based cropping system. In a Cotton-based system and soybean-based system. In the cotton-based farming system, the majority of farmers cultivate the sole cotton crop while 30 -40 % farmers adopt cotton + Tur intercultural cropping system. In soybean, the majority of farmers cultivate the sole Soybean crop while 25 % take the Soybean + Tur intercultural cropping system. In Rabi Jowar + Safflower and Wheat & Gram. In a mixed Cropping system Agro-Horti cropping system. Agro-dairy system, now a days some farmers are adopting Agro-Silviculture. For commercial Horticulture crops are grown and also livestock ranching

## 2.5 Year wise area, Production and Productivity of major Crops for last 5 years.

| Sr. No. | Crops (Kharif/Rabi/Summer) | Area (ha) | Production (Qtl) | Productivity (Qtl/ha) |
|---|---|---|---|---|
| 1 | Jowar | 2654.33 | 2423.51 | 913.04 |
| 2 | Tur | 39488.9 | 36474.32 | 923.66 |
| 3 | Moong | 13171 | 10833.94 | 822.56 |
| 4 | Soyabean | 269800.7 | 421547.4 | 1562.44 |
| 5 | Cotton | 179447.8 | 92627.36 | 516.18 |
| 6 | Wheat | 33871.00 | 84735.08 | 2501.70 |
| 7 | All millets | 265 | 0 | 0 |

*(Source: Statistician, District Superintending Agriculture Office, Parbhani)*

## 2.6 Other Facilities




- APMC - Agriculture Primary Market Committee.
- KVK- Krushi Vidyan Kendr
- KSK-Krushi Seva kendra
- Nurseries
- FN-Fruit Nursery
- PCS – Primary Credit Society
- SPU – Seed Processing Unit
- Veg. N - Vegetable Nursery
- AEIC – Agriculture Education Institute Centre

# *Chapter 3: Weather trend of district*

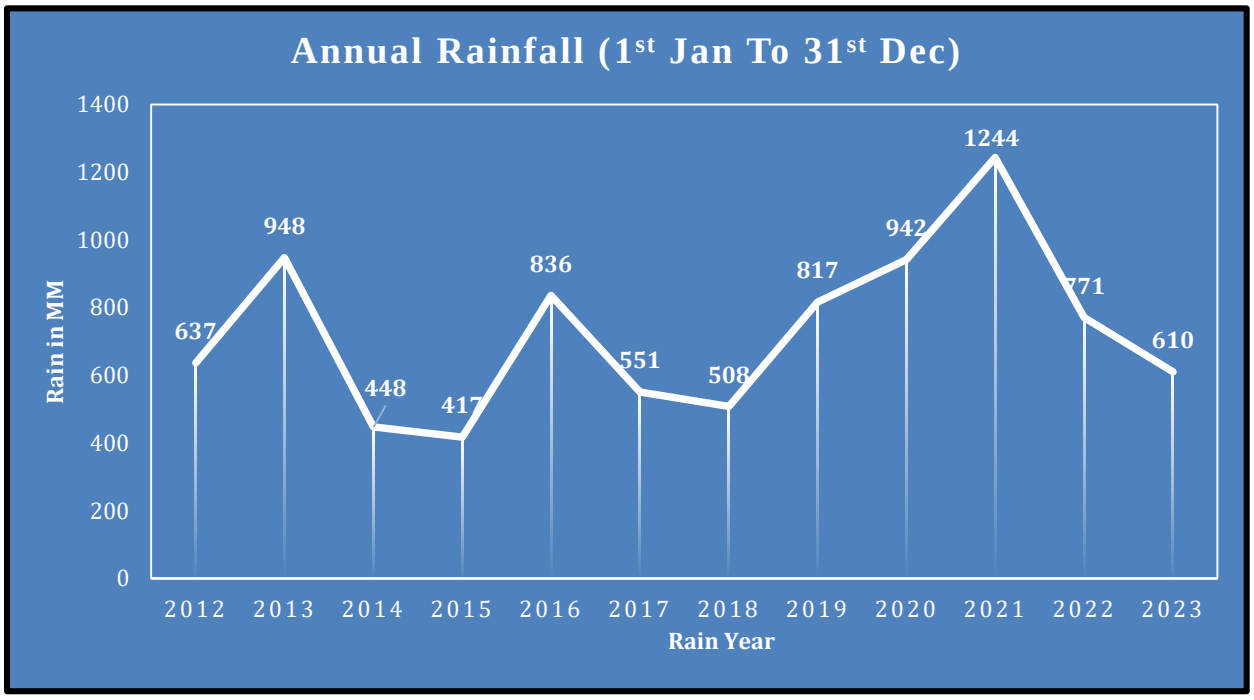
## Introduction

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 ( https://www.researchgate.net/publication/316855640_AICRPAM_at_a_glance ) crop calendars, PoCRA's automated systems craft pest and disease advisories to enhance agricultural decision-making.

### 3.1 Annual average rainfall of last twelve years.

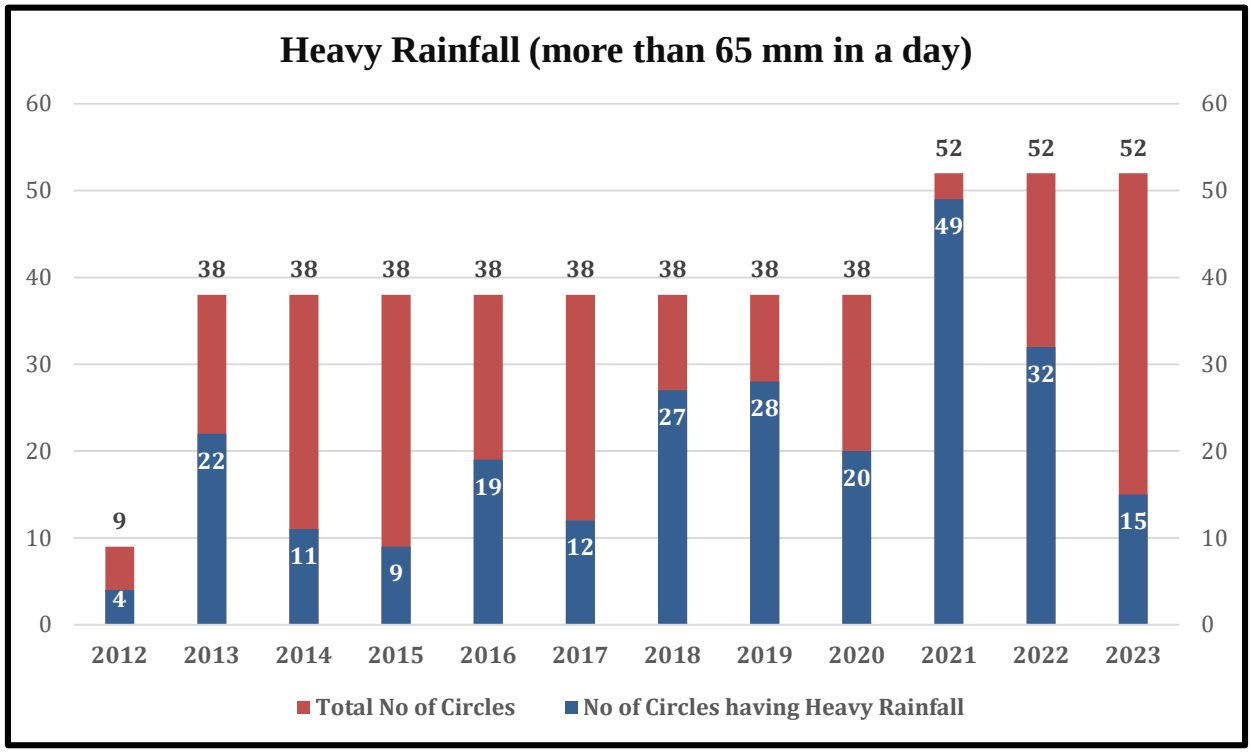
Normal or average rainfall is the amount of precipitation that we expect per year (in a given area). It is obtained and set by calculating the average (mean) of precipitation recorded in an area. Annual rainfall or precipitation is the sum of daily rainfall in a year.




The graph 3.1 re-presents annual rainfall data of Parbhani district from 2012 to 2023, highlighting fluctuations in precipitation. Notably, the lowest recorded rainfall was in year 2015 at 417 mm, while the highest occurred in year 2021 with a total of 1244 mm annual average rainfall.

## 3.2 Heavy rainfall.

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



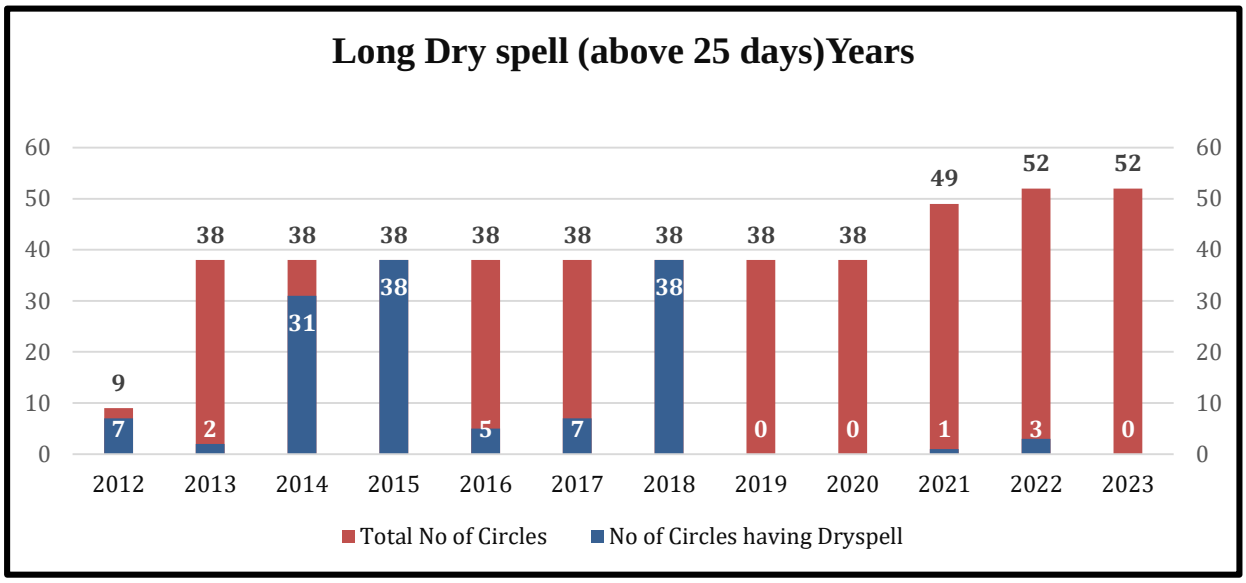

The provided graph 3.2 illustrates occurrences of heavy rainfall in 38 circles within the Parbhani district from year 2013 to 2020 and in 52 circles from year 2021 to 2023. Notably, in year 2021, heavy rainfall affected the maximum number of circles, with 49 circles out of the 52 circles experiencing such conditions. Conversely, the year 2015 recorded a lower incidence of heavy rainfall, with only 9 circles out of the 38 circles being affected in Parbhani District.

## 3.3 Dry spells.

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

### 3.3.1 Long Dry spell

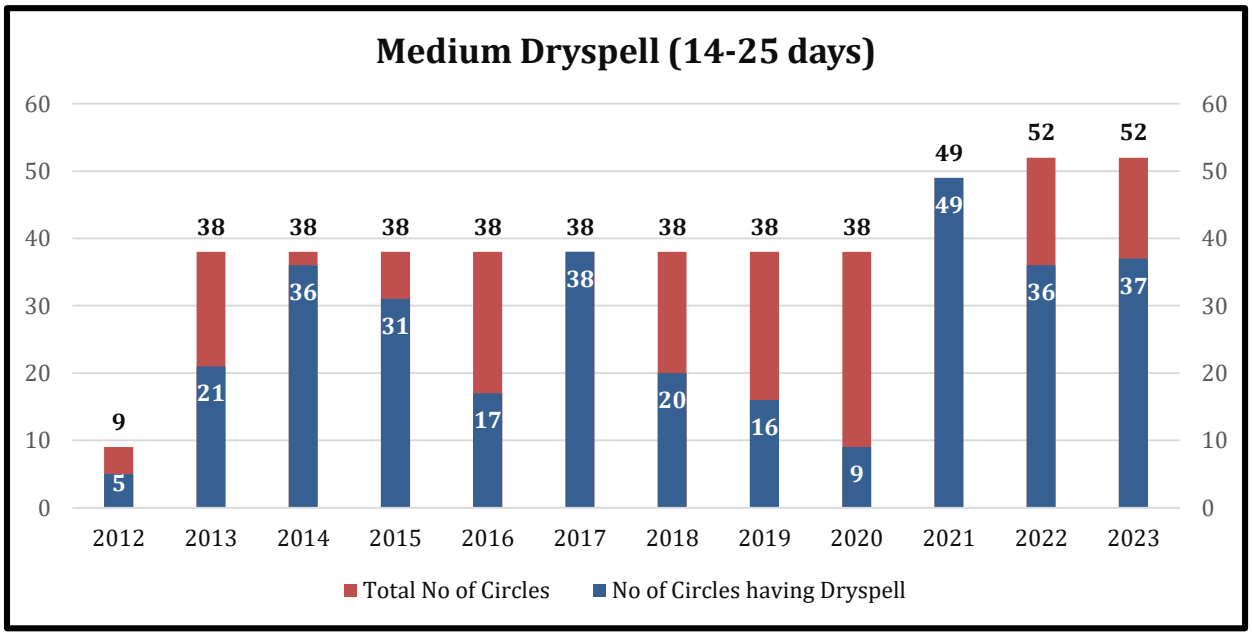
Long Dry spell is a prolonged period above 25 days of dry days in monsoon period




A graph (Graph 3.3.1) that shows the trend of long dry spells observed in a Parbhani district. The data covers the total number of circles and the circles that affected 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 2019 to 2020, there was no long dry spell, across all 38 circles in the district.

### 3.3.2. Medium Dry spell

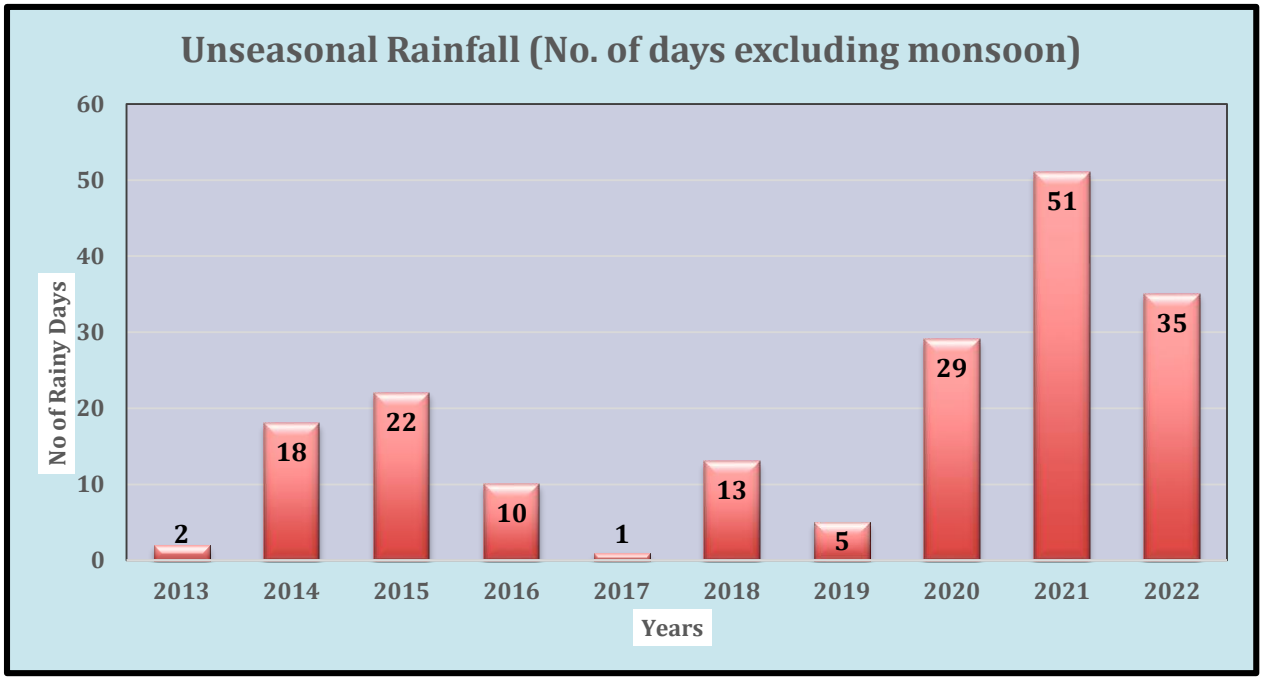
Medium Dry spell a period of 14-25 days of dry weather.



A graph (Graph 3.3.2) that shows the trend of medium dry spells observed in a Parbhani district. The data covers the total number of circles and the circles that affected medium dry spell (14 to 25 days) in Parbhani district from the year 2012 to 2023. The graph shows that in year 2021, all 49 circles in the district experienced medium dry spells. Conversely, in year 2020, there was only 9 circles out of 38 circles experienced medium dry spell in the district.

## 3.4 Unseasonal rainfall

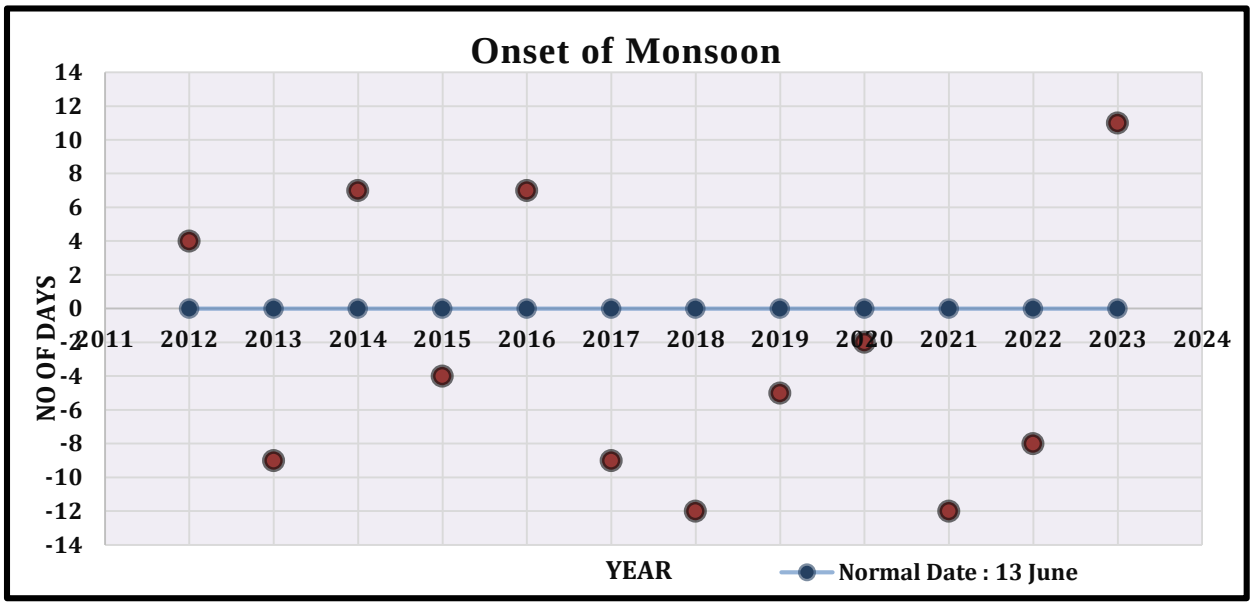
Rainfall received during non mosoon days is treated as unseasonal rainfall. Unseasonal rains- when there is a sudden change in atmospheric pressure, it can result in precipitation, even during non-monsoon seasons.




The graph 3.4 illustrates the annual occurrences of unseasonal rainfall in the Parbhani district from year 2013 to 2022. The data reveals a variation ranging from 1 days to 51 days of unseasonal rainfall.

## 3.5 Monsoon onset delay

The onset of the southwest monsoon refers to the time when the southwest monsoon winds begin to establish over a region, bringing widespread rainfall. The onset of the monsoon in Maharashtra typically occurs around early June. However, the exact timing can vary slightly from year to year. According to the document published by IMD dated 15$^{th}$ May, 2020 (CRS research report), Normal monsoon onset date is 13$^{th}$ June in Parbhani district.

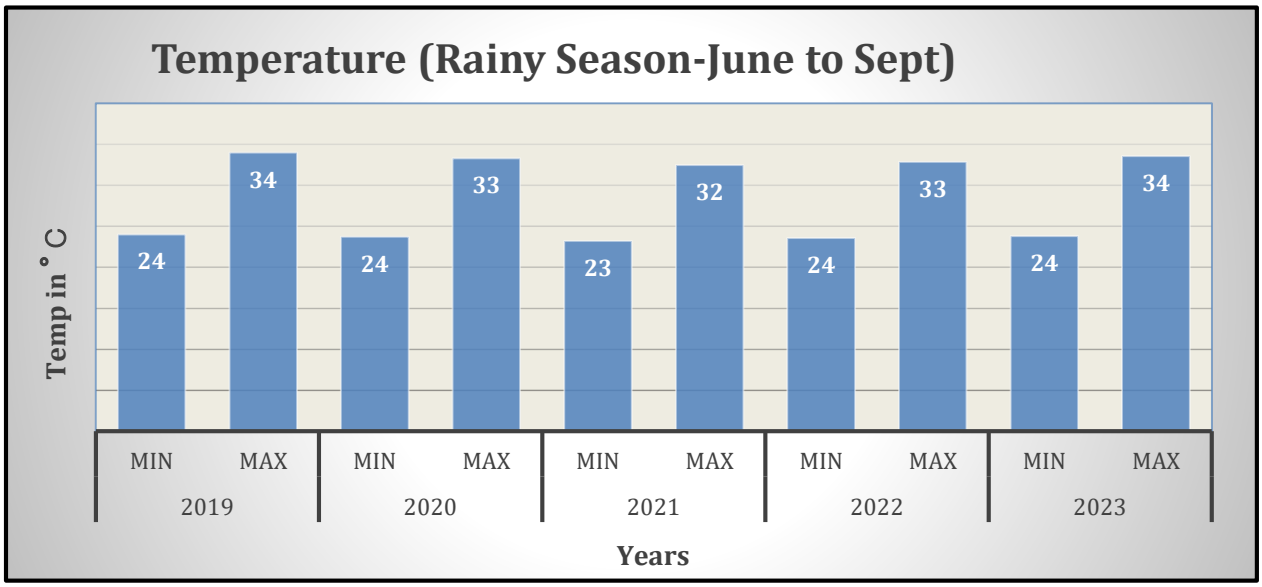



The graph 3.5 depicts the annual onset of the monsoon. The blue line represents the normal day of onset of monsoon. The onset days show variations ranging from -12 to 11 days. Notably, in year 2012, 2014, 2016 and 2023 the monsoon arrived delayed than the normal onset date. However, in remaining years the monsoon was notably arrived earlier

## 3.6 Temperature.

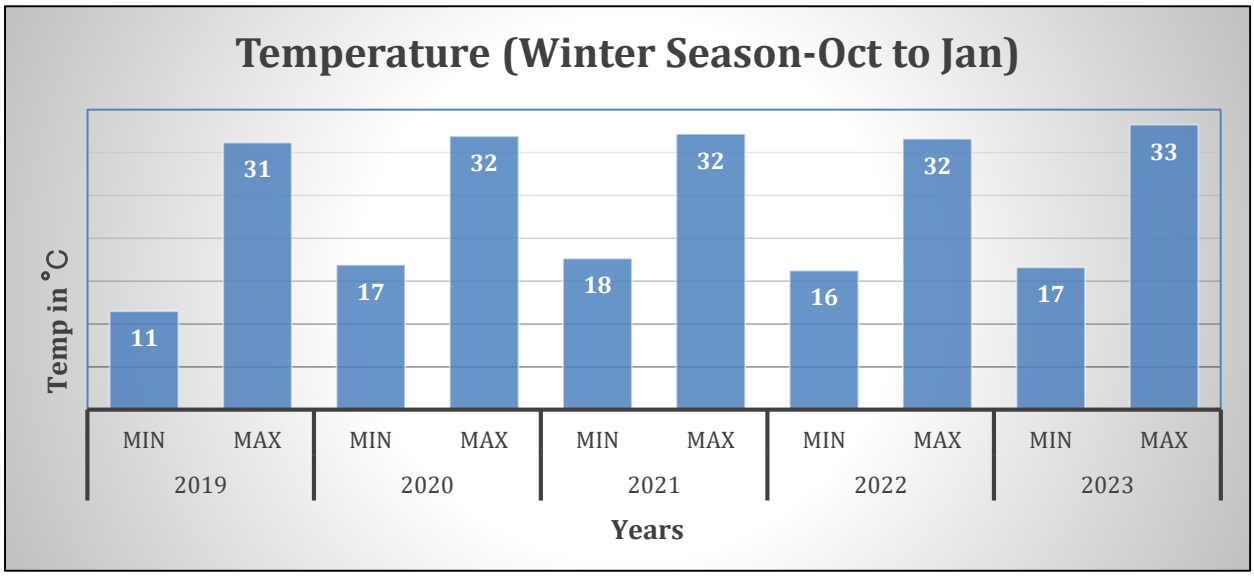
Temperature is a physical quantity that quantitatively expresses the attribute of hotness or coldness. The average temperature is 27.7 °C, with a minimum of 20.5°C and a maximum of 35.2°C. the temperature usually drops to around 11°C, On the coldest nights. On the warmest days, the temperature usually reaches around 40°C.

### 3.6.1 Temperature (Rainy Season-June to Sept)



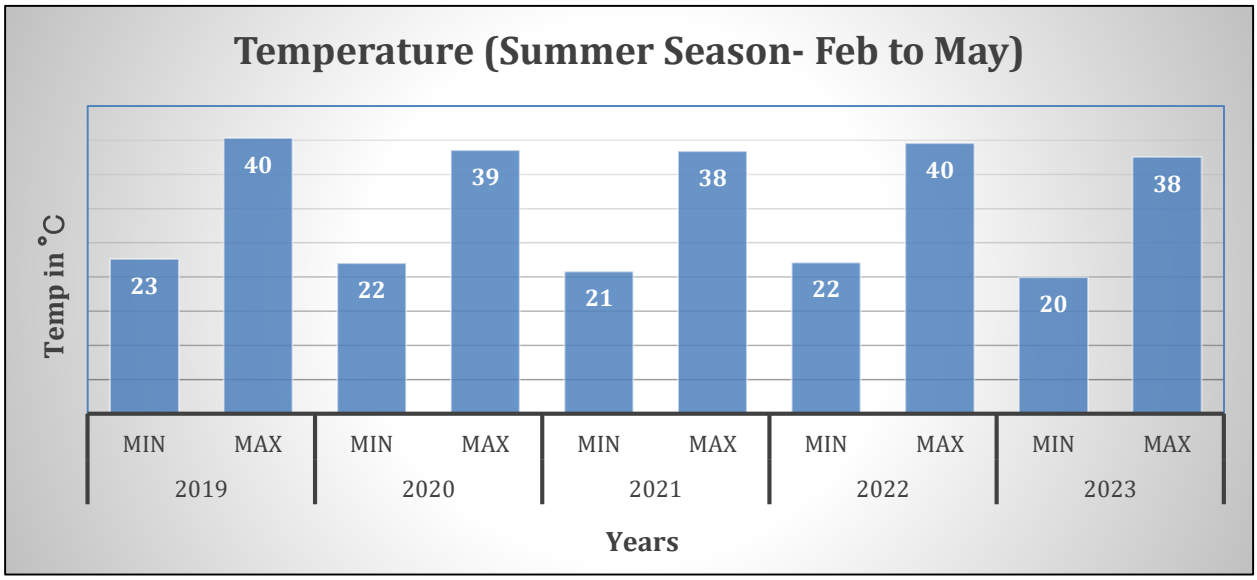
The graph 3.6.1 presents the temperature in the Parbhani district during the rainy season from year 2019 to 2023 exhibited a consistent range, with minimum temperatures fluctuating between 23-24 °C and maximum temperatures ranging from 32-34 °C.

### 3.6.2 Temperature (Winter Season-Oct to Jan)




The graph 3.6.2 presents the temperature in the Parbhani district during the winter season from year 2019 to 2023 exhibited a consistent range, with minimum temperatures fluctuating between 11-18 °C and maximum temperatures ranging from 31-33 °C.

### 3.6.3 Temperature (Summer Season- Feb to May)

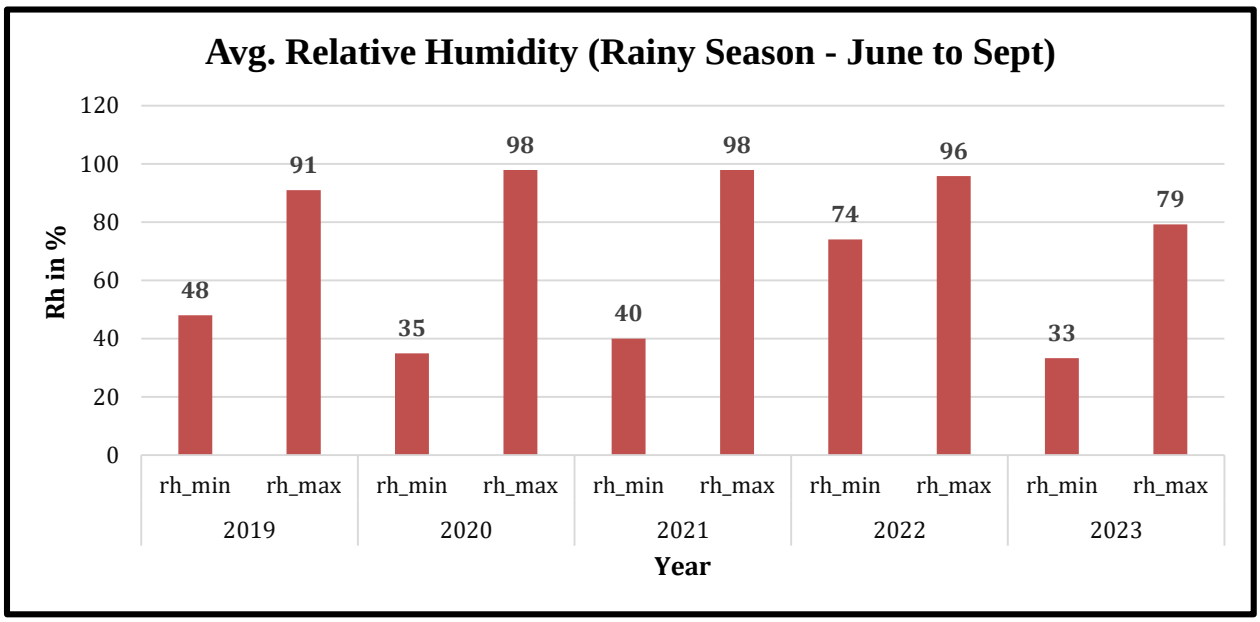



The graph 3.6.3 presents the temperature in the Parbhani district during the summer season from 2019 to 2023 exhibited a consistent range, with minimum temperatures fluctuating between 20-23 °C and maximum temperatures ranging from 38-40 °C.

## 3.7 Relative Humidity

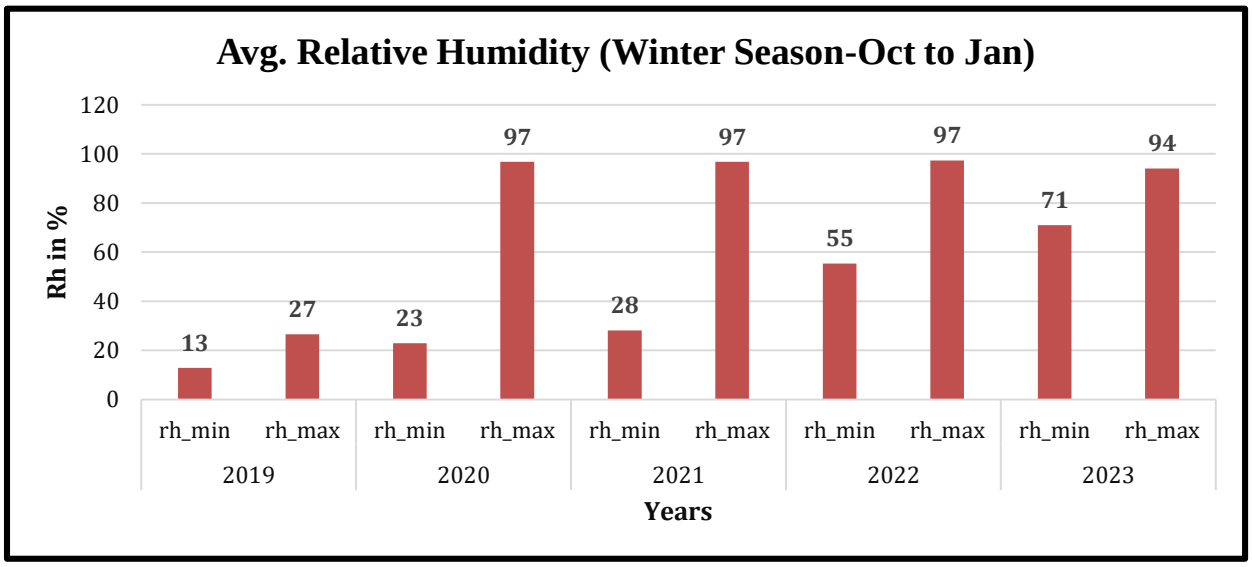
Relative Humidity is the ratio of the actual quantity of moisture at a certain temperature and pressure to the maximum it can hold at the same temperature and pressure. It is usually multiplied by 100 and expressed in percent.

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



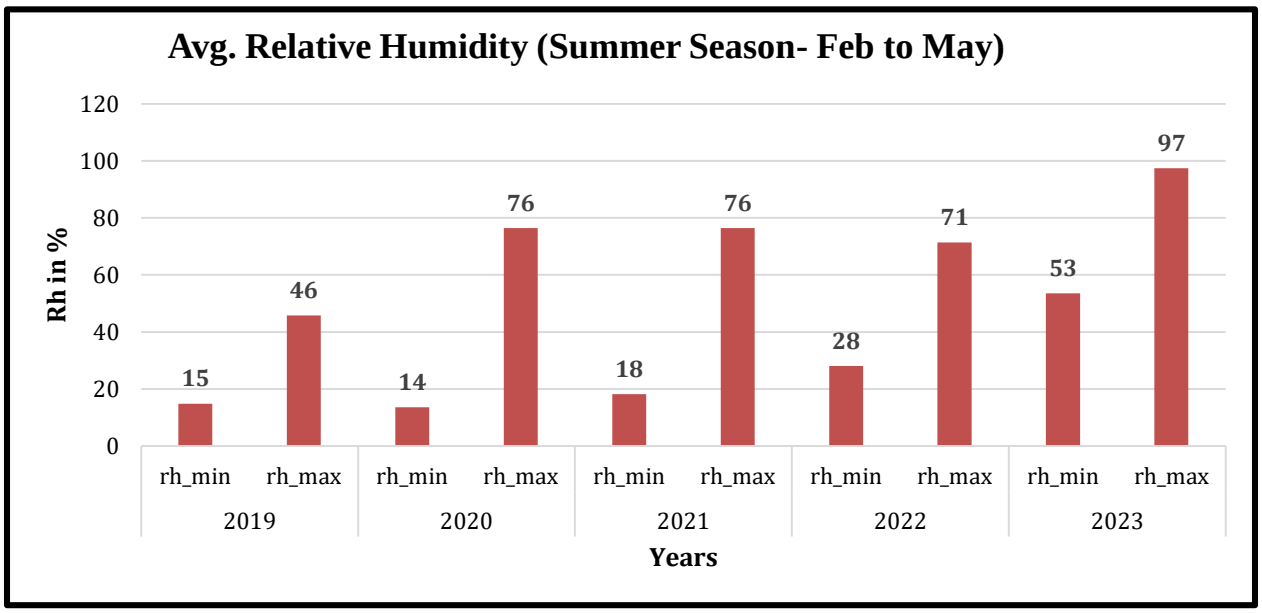

The graph 3.7.1 illustrates humidity levels during the rainy season in the Parbhani district, revealing a variation in minimum humidity from 33% to 74% and maximum humidity ranging between 79% and 98%.

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



The graph 3.7.2 illustrates humidity levels during the winter season in the Parbhani district, revealing a variation in minimum humidity from 13% to 71% and maximum humidity ranging between 27% and 97%.

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




The graph 3.7.3 illustrates humidity levels during the summer season in the Parbhani district, revealing a variation in minimum humidity from 14% to 53% and maximum humidity ranging between 38% and 46%.

# *Chapter 4 - Impact of climate variability on agriculture production*

## 4.1 Impact of Temperature

| Sr. No. | Crop | Crop Growth | Water Availability | Pests and Diseases Infestation |
|---|---|---|---|---|
| 1 | Soybean | Optimum temperature requires for soybean growth is $20^0$C -$30^0$C. for every 1 $^0$C increases, soybean yield decreases by average of 17%. In Kharif there is increase in temperature in august and September soybean crop yield is hamper. | Temperature variation affects agrological cycle. In Kharif 2023 there is only 68% Precipitation & hence soybean average decreases by 30%. | Due to dry spell in August & September infestation of whitefly on soybean act as virus vector and result in spread of yellow vein mosaic virus |
| 2 | Cotton | Temperature for ideal functioning of metabolism and associated enzyme should be 23.5 $^0$C to 30 $^0$C. Exposure to high temperature > than 32$^0$ C. Limits the growth and development of cotton. High temperature affects fiber quality and strength. | Availability of water play important role in various growth stage of water but in Parbhani kharif 2023 total 68% specification and it is uneven with dry spell affects growth and yield of cotton. | Typical effect of elevated temperature is causes increase in consumption rate and therefore decrease the time of pupation making them less apparent to natural enemies and in some cases increasing the potential no of generations.it happened in 2023 kharif Parbhani for increase in sucking pest complex. |
| 3 | Tur | Require to 26 $^0$C to 30 $^0$C in raining season and 17 $^0$C. TO 22$^0$C in post rainy season. Tur crop is extremely Susceptible to low radiation at the time of pod development | Water availability during flowering and pod formation increases yield. Post Monsoon rain is beneficial to yield of tur. | Cloudy weather in October caused an infestation of leaf mining insects and *heliothis* infestation. |
| 4 | Wheat | High temperature, even for a short period, affects crop growth especially in temperature crops like wheat. In wheat, temperature higher than 27°C caused under- | In order for wheat to which physiological maturity and its potential yield it needs on average 350-600 ml of water. In Parbhani district 95% of wheat sown as irrigated crop. Pathari, Gangakhed, Sonpeth, Parbhani taluka come under command of | No measures insects and pest found on wheat crop since last 5 years, |

| | | | | |
|---|---|---|---|---|
| | | development of anthers and loss of viability of pollen. | Jayakwadi while Purna taluka commands under Siddeshwar project. Jayakwadi project status is shown at end of 15 October 2023 is 46% and Siddeshwar 25.35 % lower than Dudhana 25.50%, hence water availability for the command area is less and due to high temperature evaporation and soil moisture losses occurs which affects the frequency of scheduling irrigation. That's impact on wheat production. | |
| 5 | Gram | Both High & Low temperature at or exceeding $35^0$c affected male reproductive tissue function on pod set | Gram crop normally requires 25 cm of water. It is important to give adequate water i.e. 7 to 8 cm every time. Less or high-water application causes yield of the crop. | Hot ($>30^0$ and dry atmospheric condition lead to profligate loss of flower, birds and open flowers in gram high temperature (≥ 35◦ C) During reproductive development reduces grain yield temperature (≥ 35◦ produced yield losses up to 39%. In Parbhani district due to 68 % precipitation soil moisture is very low, hence area and yield of gram will lower. |

## 4.2 Impact of Rainfall

| Sr.No. | Crop | Crop Growth | Irrigation Supply | Pests and Diseases Infestation | Soil Erosion and Nutrient loss | Harvest and Storage |
|---|---|---|---|---|---|---|
| 1 | Soybean | Insufficient rainfall can lead to drought conditions and negatively impact crop growth and yields. Drought conditions can lead to moisture stress, causing plants to wilt, and reducing crop yields. This condition occurred in Kharif 2023. Inadequate rainfall can also be harmful to crop health.<br>Rainfall has a significant impact on crops as it provides the necessary moisture for plant growth and development.<br>Excessive rainfall can cause soil erosion, and waterlogging, and increase the risk of plant diseases | 1. Drought is also an extreme situation, which happens due to insufficiency of precipitation over a longer period causing damages to crops.<br>2. Heavy rainfall mainly causes flooding in an area when the natural watercourse fails to channelize the excess water. Places without a proper drainage system also get flooded during heavy rainfall. | 1. Unpredictable rains might disrupt the parasitoids' ability to track their caterpillar hosts.<br>2. Rain drops can physically dislodge beneficial insects from their plants and their behavior patterns can be disrupted.<br>4. Some pest species outbreak occurs as congenial climatic conditions are arising due to rainfall. | 1. Rainfall intensity and slope gradient affect runoff and sediment, ultimately leading to soil nutrient loss. It shows a positive correlation between rainfall intensity and nutrient loss.<br>2. There are two main ways in which soil nutrients are lost. At low rainfall intensities, soluble nutrients migrate with runoff, while at high rainfall intensities, soil nutrients migrate with runoff in sediment form.<br>3. Soil nutrient loss rises with the increase in the slope gradient, but when the slope gradient reaches the threshold value, nutrient loss declines with the rise of the slope gradient, indicating that there is a critical slope gradient for nutrient loss. | 1. Farm output is affected when crops that are ready to be harvested or about to ripen, get soaked in excessive rainfall.<br>2. Untimely rain can make it difficult or impossible to harvest the crops, and can also cause damage to the crops that have already been harvested. The moisture from the rain can cause the crops to become wet and heavy, making them more difficult to handle and transport. |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | Cotton | 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 like this year. Effects kharif crop production | Heavy rainfall causes water logging resulting into wilting of cotton | 1. Unpredictable rains might disrupt the parasitoids' ability to track their caterpillar hosts.<br>2. Rain drops can physically dislodge beneficial insects from their plants and their behavior patterns can be disrupted.<br>4. Some pest species outbreak occurs as congenial climatic conditions are arising due to rainfall.<br><br>. | 1. Rainfall intensity and slope gradient affect runoff and sediment, ultimately leading to soil nutrient loss. It shows a positive correlation between rainfall intensity and nutrient loss.<br>2. There are two main ways in which soil nutrients are lost. At low rainfall intensities, soluble nutrients migrate with runoff, while at high rainfall intensities, soil nutrients migrate with runoff in sediment form.<br>3. Soil nutrient loss rises with the increase in the slope gradient, but when the slope gradient reaches the threshold value, nutrient loss declines with the rise of the slope gradient, indicating that there is a critical slope gradient for nutrient loss. | 1. Farm output is affected when crops that are ready to be harvested or about to ripen, get soaked in excessive rainfall.<br><br>2. Untimely rain can make it difficult or impossible to harvest the crops, and can also cause damage to the crops that have already been harvested. The moisture from the rain can cause the crops to become wet and heavy, making them more difficult to handle and transport. |
| 3 | Tur | Rainfall in October damaged standing tur crop which is likely to reduced yield by 20% | Irrigation supply during intention of flower bird, flowering and pod formation will result in higher yield and vice versa | 1. Unpredictable rains might disrupt the parasitoids' ability to track their caterpillar hosts.<br>2. Rain drops can physically dislodge beneficial insects from their plants and their | 1. Rainfall intensity and slope gradient affect runoff and sediment, ultimately leading to soil nutrient loss. It shows a positive correlation between rainfall intensity and nutrient loss.<br><br>2. There are two main ways in which soil nutrients are | 1. Farm output is affected when crops that are ready to be harvested or about to ripen, get soaked in excessive rainfall.<br>2. Untimely rain can make it difficult or impossible to harvest |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | behavior patterns can be disrupted.<br>4. Some pest species outbreak occurs as congenial climatic conditions are arising due to rainfall.<br><br>. | lost. At low rainfall intensities, soluble nutrients migrate with runoff, while at high rainfall intensities, soil nutrients migrate with runoff in sediment form.<br><br>3. Soil nutrient loss rises with the increase in the slope gradient, but when the slope gradient reaches the threshold value, nutrient loss declines with the rise of the slope gradient, indicating that there is a critical slope gradient for nutrient loss. | the crops, and can also cause damage to the crops that have already been harvested. The moisture from the rain can cause the crops to become wet and heavy, making them more difficult to handle and transport. |
| 4 | Wheat | If untimely rainfall in harvesting stage of wheat deteriorates quality of wheat | Irrigation during period of high wheat demand has significant effects on wheat growth, grain yield and WP. The soil water status and different growth stages have different effects on photosynthetic physiological characteristics and grain yield | 1. Unpredictable rains might disrupt the parasitoids' ability to track their caterpillar hosts.<br>2. Rain drops can physically dislodge beneficial insects from their plants and their behavior patterns can be disrupted.<br>4. Some pest species outbreak occurs as congenial climatic conditions are arising due to rainfall. | 1. Rainfall intensity and slope gradient affect runoff and sediment, ultimately leading to soil nutrient loss. It shows a positive correlation between rainfall intensity and nutrient loss.<br>2. There are two main ways in which soil nutrients are lost. At low rainfall intensities, soluble nutrients migrate with runoff, while at high rainfall intensities, soil nutrients migrate with runoff in sediment form.<br>3. Soil nutrient loss rises with the increase in the slope gradient, but when the | 1. Farm output is affected when crops that are ready to be harvested or about to ripen, get soaked in excessive rainfall.<br><br>2. Untimely rain can make it difficult or impossible to harvest the crops, and can also cause damage to the crops that have already been harvested. The moisture from the rain can cause the crops to become wet and heavy, |

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| | | | | . | slope gradient reaches the threshold value, nutrient loss declines with the rise of the slope gradient, indicating that there is a critical slope gradient for nutrient loss. | making them more difficult to handle and transport. |
| 5 | Gram | Being of crop in determinate growth habit, drought condition will hasten maturity in gram by stopping growth, while late season rains will cause plants to green back up | Irrigation effect on Parameter like number of primary and secondary branches for plant height, No. of nodules biomass per plant, days to maturity and yield component increases in gram | 1. Unpredictable rains might disrupt the parasitoids' ability to track their caterpillar hosts.<br>2. Rain drops can physically dislodge beneficial insects from their plants and their behavior patterns can be disrupted.<br>4. Some pest species outbreak occurs as congenial climatic conditions are arising due to rainfall. | 1. Rainfall intensity and slope gradient affect runoff and sediment, ultimately leading to soil nutrient loss. It shows a positive correlation between rainfall intensity and nutrient loss.<br>2. There are two main ways in which soil nutrients are lost. At low rainfall intensities, soluble nutrients migrate with runoff, while at high rainfall intensities, soil nutrients migrate with runoff in sediment form.3. Soil nutrient loss rises with the increase in the slope gradient, but when the slope gradient reaches the threshold value, nutrient loss declines with the rise of the slope gradient, indicating that there is a critical slope gradient for nutrient loss. | 1. Farm output is affected when crops that are ready to be harvested or about to ripen, get soaked in excessive rainfall.<br><br>2. Untimely rain can make it difficult or impossible to harvest the crops, and can also cause damage to the crops that have already been harvested. The moisture from the rain can cause the crops to become wet and heavy, making them more difficult to handle and transport. |

# *Chapter 5: Measures to cope with climatic variability*

## 5.1 Coping measures for climatic variability by Universities or KVKs

| | | |
|---|---|---|
| Rainfall condition | 1. Heavy rainfall | • Removes excess water during plant growth by better draining the water retained in the soil. In cotton by creating or digging drains<br>• Organic matter applications improve soil structure and avoid soil compaction, in cotton & Soybean<br>• Sub-soiling can break possible hard pans and improve soil aeration.<br>• Raised or Broad Bed method of cultivation, In Soybean it is very helpful proved in Parbhani district<br>• Green manure increases organic matter content, nitrogen content and soil water retention, is applicable for all Kharif Crops<br>• Soil conservation and water conservation structures may reduce water runoff and helps to control soil erosion by graded bunding & drain. |
| | 2. Low rainfall | • Weeding and defoliation reduce soil water losses from plant transpiration in side branches by defoliating.<br>• Cover crops reduce soil erosion by increasing soil organic matter, water, air, and nutrient availability.<br>• Harrowing (breaking the soil into small fragments) can prevent the loss of land moisture by evaporation.<br>• Covering the soil with crop residues (mulching) in combination with no-tillage reduces the exposure of crops to heat-stress conditions. It also increases soil moisture by reducing direct soil evaporation in Horticulture crops like Citrus, Lemon etc.<br>• Use Of micro –irrigation and construction of a farm pond.<br>• Use of Short Duration variety. |
| | 3.Dry Spells / Water Stress | • Drought tolerant crops with low water requirements reduce evapo-transpiration losses during photosynthesis by rapidly closing their stomata and maintaining leaf water potential and photosynthetic rate.<br>• Promote micro irrigation and water budgeting for each crop.<br>• Increase water availability to counteract the impacts of drought shocks through small water reservoirs (Farm ponds)<br>• Foliar spray of nitrogen fertilizers and micronutrients during the dry spell protects and improves the endurance of crops in drought conditions. |
| | 4.Terminal Drought | • Diversification of crops.<br>• Promote short cycle varieties.<br>• Through carbon sequestration, agroforestry has the potential to offset greenhouse gas (GHG) emissions from the agricultural sector.<br>• Undertake rainwater harvesting. Water harvesting practices like farm ponds, community tanks, watersheds and pools can prove a life saver. |

| | | |
|---|---|---|
| | 5. Late onset of monsoon | • Sowing is done only after 70mm to 100 mm rainfall.<br>• Promote intercropping<br>• Prepare a contingency plan in case of late onset of monsoon / dry spells during the season with appropriate cropping patterns.<br>• Crops with short duration and requiring relatively little water need to be encouraged in drought-prone areas; arrange availability of seeds with short duration varieties. |
| Temperature conditions | 1. High Temperature | • Soil covering with mulching and or other materials increases the surface temperature.<br>• Wind breaks redistribute sensible heat that is already present in the air.<br>• Row covers increase downward long-wave radiation at night and reduce heat losses by convection and advection.<br>• Promote protected cultivation. |
| | 2. Cold waves / Low Temperature | • Slight irrigation may reduce the effect of low temperature.<br>• It consists of generating heat through burning the crop residues that prevent the cooling of the air at the crop level. It is not the most recommended method due to environmental pollution and other ecological aspects. |
| Hailstorms | | • Promote Protected cultivation.<br>• Hail protection nets reduce crop damage and loss by buffering the impact of hail on crops. |
| Soil degradation | | • Soil erosion control by-changing agricultural practices and engineering practices. (agricultural practices- crop rotation, strip cropping, contour farming, terrace farming, mulching) (engineering practices- excavation of ditches, terraces construction, check dams, windbreaks)<br>• Water harvesting (watershed approach), terracing and other<br>• Engineering structure like, contour plowing, terracing, wind barrier etc. landslide and mine-spoil rehabilitation.<br>• River bank erosion control intercropping and crop diversification.<br>• Integrated nutrient management and organic manuring reclamation of acid and salt affected soils and drainage (desalinization)<br>• Water management and soil pollution control.<br>• Vegetative barriers and using natural geotextiles, mulching and diversified cropping<br>• Agro forestry and conservation agriculture practices. |

## 5.2 Best practices developed by farmers in the district:

Export oriented Okra production in Palam taluka

Farmer Name: Prashant Shevate
Village name: Shripur
Taluka: Palam
Technology: Residual free export-oriented Okra

- Floriculture in Protected cultivation in Parbhani & Manwath taluka
- Best practices followed by farmers in Citrus production at Jamb Tq. Manwath
- Organic input production centers
- Use of Neem ark and Dashparni ark in Cotton production
- Raised bed method for crop cultivation in soybean increased in districts
- Utilization of farm ponds for protective irrigation for Orchard & cotton.
- Export oriented Custard apple production
- Fruit and vegetable processing at Mangrul, Digras, Turmeric Processing center
- Primary processing, packaging, branding of agricultural commodities through FPO's, at Pathri, Padegaon, Kalgaon.

Farmer Name: Archana Shiral
Village Name: Mandakhali
Taluka: Parbhani
SHG name: Mandavrushi women farmer Producer Company
Their Work: Vermicompost and making different types of spices

# *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 furrows (BBF) method | Resilience to moisture stress, poor soil drainage and 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 to develop optimum microclimate under crop canopy, helps in proper intercultural operations, reduces cost of cultivation. | All field crops both in Kharif and Rabi season. |
| 2. Intercropping | Resilience to risk due to crop failure, moisture stress, pest incidence | Ensures optimum use of soil moisture & nutrients, overcomes risk due to aberrant climatic variability's, 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 & diseases | 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 | Avoid plants abiotic stress and maintains vigour at flowering and boll development | 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 Parbhani 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** | 1766 | 1618 | 441 | 537 | 1327 | 1178 | 1730 | 1607 |
| **2020** | 1463 | 1304 | 1366 | 1186 | 742 | 673 | 1553 | 1414 |
| **2021** | 1655 | 1494 | 1141 | 978 | 737 | 645 | 1592 | 1440 |
| **2022** | 1820 | 1579 | 1332 | 1072 | 703 | 561 | 1475 | 1292 |
| **Average** | **1676.00** | **1498.75** | **1070.00** | **943.25** | **877.25** | **764.25** | **1587.50** | **1438.25** |

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 11.83% 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 13.44% 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 14.79% 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 10.38% compared to the control plot.

## 6.3 Impact of BBF on crop yield

| Sr.no | Taluka | BBF/ ha |
|---|---|---|
| 1 | Parbhani | 1233 |
| 2 | Palam | 450 |
| 3 | Purna | 520 |
| 4 | Pathari | 630 |
| 5 | Manwath | 602 |
| 6 | Selu | 630 |
| 7 | Gangakhed | 576 |
| 8 | Jintur | 1424 |
| 9 | Sonpeth | 712 |

*(Source: DSAO office Parbhani)*

The BBF method improves soil and water conservation of the field. It improves Soil aeration. Reduce insect pest attack on crops. In Deulgaon-Awchar village in Taluka Manwath, the farmer field which was water logged and, in that field, we suggested BBF method. Resulting improvement of soil structure due to well drainage. Due to BBF intercultural operations i.e. weeding, hoeing and spraying is easy in the growing period of Crop. All this results in better growth of crops and higher yield. So, Mr. Ram Awchar from Deulgaon-Awchar practices regularly BBF method from year 2019 till today and due to this area of BBF in Deulgaon-Awchar increases up to 19 Ha. Normal

sowing yield was noticed 12.50 Qtl/Ha. Whereas on BBF yield increased up to 22-25Qtl/ha. In kharif 2023 in soybean crop yellow vein mosaic virus observed at Parbhani district however YVM infestation was less as compared to normal sowing plot. As its crop retention ability is more in BBF method.

## 6.4 Impact of Dibbling Method on crop yield

In Parbhani district farmers adopt dibbling methods in light soil. In villages of Purna taluka a major number of farmers cultivated sugarcane on bed and later on harvesting of sugarcane they continued to dibbled soybean seed. Their average yield is 8-11 Qtl/Ha.

## Dibbling Method Statistics of the district

| Sr. No. | Taluka | Dibbling method/ha |
|---|---|---|
| 1 | Parbhani | 110 |
| 2 | Palam | 80 |
| 3 | Purna | 550 |
| 4 | Pathari | 100 |
| 5 | Manwath | 75 |
| 6 | Selu | 90 |
| 7 | Gangakhed | 70 |
| 8 | Jintur | 250 |
| 9 | Sonpeth | 70 |

*(Source: DSAO office Parbhani)*

## 6.5 Impact of Zero Tillage on crop yield

In Parbhani district farmers adopt zero tillage in light soil and alkaline soil areas. In the Selu and Manwath taluka farmer adopt the zero tillage in Nagar-Jawla village *Vishwanath Dahe* having good yield through that technology average yield in Cotton 11-12 Qtl/Acre, Soybean 18-19.5q/acre, Gram 8-10 Qtl/acre respectively is taken in whole year.



### SRT Plot Cultivation taken in the district

| Sr. No. | Taluka | Zero Tillage(Ha.) |
|---|---|---|
| 1 | Parbhani | 6.4 |
| 2 | Palam | 9.2 |
| 3 | Purna | 4.6 |
| 4 | Pathri | 1.2 |
| 5 | Manwath | 3.6 |
| 6 | Selu | 3 |
| 7 | Gangakhed | 00 |
| 8 | Jintur | 2.6 |
| 9 | Sonpeth | 2 |

*(Source: Sub-division agriculture office, Parbhani)*

## 6.6 Impact of on farm biofertilizer production on crop yield


**Training of Different bio-fertilizer**

Training programme on bio fertilizer at Zari village Parbhani district. The training about information of use and benefits of bio fertilizer.

Seed treatment with *Trichoderma and Rhizobium* before kharif season for protection from fungal diseases and for nutrient incorporation.

## 6.7 Impact of Neem based extracts on yield of crops

*(Source: Sub-divisional Agriculture Officer, Parbhani)*


| Sr. No. | Taluka | Neem Extract (in lit) |
|---|---|---|
| 1 | Parbhani | 150 |
| 2 | Palam | 40 |
| 3 | Purna | 00 |
| 4 | Pathri | 60 |
| 5 | Manwath | 100 |
| 6 | Selu | 00 |
| 7 | Gangakhed | 80 |
| 8 | Jintur | 40 |
| 9 | Sonpeth | 60 |

# *Chapter 7: Plan to cope with weather related contingencies (District: Parbhani)*

**(*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** | **Agronomicmeasures** | **Remarks on Implementation** |
| Delay by 2 weeks **June 4th week** 26th MW | Medium deep to deep blacksoils | Cotton | No change | No change | Linkage with MAU, MSSC and NSC for seed. Linkage with MAIDC for implements. Linkage with MAU, KVK for agro techniques |
| | | Sorghum | No change | No change | |
| | | Soybean | No change | No change | |
| | | Green gram | No change | No change | |
| | | Pigeon pea | No change | No change | |
| | | Black gram | No change | No change | |
| | Shallow soils | Cotton | No change | No change | |
| | | Sorghum | No change | No change | |
| | | Soybean | No change | No change | |
| | | Green gram | No change | No change | |
| | | Pigeon pea | No change | No change | |
| | | Black gram | No change | No change | |

| Condition | Suggested Contingency measures | | | | |
|---|---|---|---|---|---|
| **Early season drought (delayed onset )** | **Major Farming situation** | **Normal Crop/Cropping system** | **Change in Crop/Cropping system** | **Agronomic measures** | **Remarks on Implementation** |
| Delay by 4 weeks (**July 2nd Week 28MW** | **Medium deep to deep black soils** | Cotton | Cotton + Pigeon pea 6:2 (BSMR 736, 853, BDN 708, 711) | Normal package of practices recommended by MAU, Parbhani or adopt 15-20% more seedrate than recommended and reduce fertilizer dose by 25 per cent. | Linkage with MAU, MSSC and NSC for seed. Linkage with MAIDC for implements. Linkage with MAU, KVK for agro techniques |
| | | Sorghum | Sorghum + Pigeon pea 4 : 2 (CSH-9,11, 14, 16 PVK-401, 809) + (BSMR 736, 853, BDN 708, 711) | | |
| | | Soybean | No change / Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81) | Normal package of practices recommended by MAU, Parbhani | |
| | | Green gram | Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) | | |
| | | Pigeon pea | NO change / Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) | | |
| | | Black gram | Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) | | |
| | **Shallow soils** | Cotton | Cotton + Pigeon pea 6:2 (BSMR 736, 853, BDN 708, 711) | Normal package of practices recommended by MAU, Parbhani or adopt 15-20% more | |

| | | | | | |
|---|---|---|---|---|---|
| | | | | seedrate than recommended and reduce fertilizer dose by 25 per cent. | |
| | | Sorghum | Sorghum + Pigeon pea 4 : 2 (CSH-9,11, 14, 16 PVK-401, 809) + (BSMR 736, 853, BDN 708, 711) | | |
| | | Soybean | Soybean+ pigeon pea 4:2 rowproportion ( MAUS 71,81) | Normal package of practices recommended by MAU, Parbhani | |
| | | Green gram | Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) | | |
| | | Pigeon pea | NO change / Soybean + Pigeon pea 4 : 2 (JS-335,MAUS-71,81) | | |
| | | Black gram | Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) | | |

| Condition | | | Suggested Contingency measures | | |
|---|---|---|---|---|---|
| **Early season drought (delayed onset )** | **Major Farming situation** | **Normal Crop/Cropping system** | **Change in Crop/Cropping system** | **Agronomic measures** | **Remarks on Implementation** |
| **Delay by 6 week**<br><br>**July 4th week 30MW** | **Medium deep to deep black soils** | Cotton | Cotton + Pigeon pea 6:2 (BSMR 736, 853, BDN 708, 711) | Normal package of practices recommended by MAU, Parbhani or adopt 15-20% more seed rate than recommended and reduce fertilizer dose by 25 per cent. | Linkage with MAU, MSSC and NSC for seed.<br><br>Linkage with MAIDC forimplements.<br>Linkage with MAU, KVK for agro techniques |
| | | Sorghum | Sorghum + Pigeon pea 4 : 2 (CSH-9, 11, 14, 16 PVK-401, 809) + (BSMR 736, 853, BDN 708, 711) | | |
| | | Soybean | No change / Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81) + (BSMR 736 853, BDN 708, 711) | Normal package of practices recommended by MAU, Parbhani | |
| | | Green gram | Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736 853, BDN 708, 711) | | |
| | | Pigeon pea | NO change / Soybean + Pigeon pea 4 : 2 (JS-335, MAUS-71,81) + (BSMR 736 853, BDN 708, 711) | | |

| | | | | | |
|---|---|---|---|---|---|
| | | Black gram | Soybean + Pigeon pea 4 | | |
| | | | : 2 (JS-335, MAUS-71,81) + (BSMR 736 853, BDN 708, 711) | | |
| | **Shallow soils** | Cotton | Cotton + Pigeon pea 6:2 (BSMR 736, 853, BDN 708, 711) | Normal package of practices recommended by MAU, Parbhani or adopt 15-20% more seed rate than recommended and reduce fertilizer dose by 25 per cent. | |
| | | Sorghum | Pearl millet + Pigeon pea 3 :3 or 4:2 (Shradha, Saburi, Shanti AIMP-92901) + (BSMR 853, BDN 708, 711) | | |
| | | Soybean | Soybean+ pigeon pea 4:2 row proportion (MAUS 71,81) + (BSMR 853, BDN 708, 711) | Normal package of practices recommended by MAU, Parbhani | |
| | | Green gram | Soybean + Pigeon pea 4 : 2 (JS-335, MAUS- 71,81) + (BSMR 853, BDN 708, 711) | **-------do--------** | |
| | | Pigeon pea | NO change / Soybean + Pigeon pea 4 : 2 (JS-335, MAUS- 71,81) + (BSMR 853, BDN 708, 711) | **-------do--------** | |
| | | Black gram | Soybean + Pigeon pea 4 : 2 (JS-335, MAUS- 71,81) + (BSMR 853, BDN 708, 711) | **-------do--------** | |

| Condition | | | Suggested Contingency measures | | |
|---|---|---|---|---|---|
| **Early season drought (delayed onset )** | **Major Farming situation** | **Normal Crop/ Cropping system** | **Change in Crop/Cropping system** | **Agronomic measures** | **Remarks on Implementation** |
| **Delay by 8 week**<br><br>**August 2nd week 33MW** | **Medium deep to deep blacksoils** | Cotton | Pigeon pea (BDN 708, 711) | Prefer early maturing varieties recommended by MAU, Parbhani. Reduce intra-row spacing and adopt 15-20% more seed rate than recommended | Linkage with MAU, MSSC and NSC for seed. Linkage with MAIDC for implements. Linkage with MAU, KVK for agro techniques |
| | | Sorghum | Pearl millet + Pigeon pea 3:3or 4:2 (Shradha, Saburi, Shanti AIMP-92901) + (BDN 708, 711) | | |
| | | Soybean | Sunflower (Morden, SS-56,LSFH-35, BSH-1) | Normal package of practices recommended by MAU, Parbhani | |
| | | Green gram | Pigeon pea (BDN 708, 711) or Keep fallow and plan for Rabbi Crops like Sorghum, Chickpea, Sunflower and Safflower. | | |
| | | Pigeon pea | Pigeon pea (BDN 708, 711) | | |
| | | Black gram | Pigeon pea (BDN 708, 711) or Keep fallow and plan for Rabbi Crops like Sorghum, Chickpea, Sunflower and Safflower. | | |
| | **Shallow soils** | Cotton | Pigeon pea (BDN 708, 711) | Prefer early maturing | |

| | | | | | |
|---|---|---|---|---|---|
| | | Sorghum | Pearl millet + Pigeon pea 3:3or 4:2 (Shradha, Saburi, Shanti AIMP-92901) +(BDN 708, 711) | varieties recommended by MAU, Parbhani. Reduce intra row spacing and adopt 15-20% more seed rate than recommended | |
| | | Soybean | Sunflower (Morden, SS-56,LSFH-35, BSH-1) | Normal package of practices recommended by MAU, Parbhani | |
| | | Green gram | Keep fallow and plan for early Rabbi Crops like Sorghum, Chickpea, Sunflower and Safflower. | | |
| | | Pigeon pea | Keep fallow and plan for early Rabbi Crops like Sorghum, Chickpea, Sunflower and Safflower. | | |
| | | Black gram | Keep fallow and plan for early Rabbi Crops like Sorghum, Chickpea, Sunflower and Safflower. | | |

### 7.1.1.2. Early season drought (Normal onset)

| Condition | Suggested Contingency measures | | | | |
|---|---|---|---|---|---|
| **Early season drought(Normal onset)** | **Major Farmingsituation** | **Crop/Croppingsystem** | **Crop management** | **Soil nutrient & moisture Conservation measures** | **Remarks on Implementation** |
| **Normal onset followed by 15-20 days dry spell after sowing germination / crop stand etc.** | **Medium deep to deep black soils** | Cotton | Gap filling 7-10 days after sowing by pot watering within the rows with same cultivaror Pigeon pea to maintain at least 75% plant population.<br><br>Raise cotton seedlings in polythene bags and transplant when sufficient soil moisture is available. Give protective irrigation wherever possible | Making of conservation furrows for moisture conservation<br>When the crop is 2 weeksold take up Interculture with harrow.<br>Spray 2 % urea solution or1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition | Linkage with MAU, MSSC and NSC for seed.<br>Linkage with MAIDC for implements.<br>Linkage with MAU, KVK for agro techniques |
| | | Sorghum | Gap filling with pigeon pea | When the crop is 2 weeksold take up Interculture with hoe | |
| | | Soybean | Gap filling within the rows with same or short duration cultivar to maintain at least 75% plant population or if the | Avoid applying fertilizerstill sufficient soil. moisture is available | |

| | | | | | |
|---|---|---|---|---|---|
| | | | plant population is less than 50% re sow the crop | | |
| | | Green gram | If the plant population is less than 75% of optimum, go for resowing of the alternate crops like sunflower / Pigeon pea. If possible give protective irrigation with sprinkler. | When the crop is 2 weeksold take up Interculture with hoe | |
| | | Pigeon pea | Gap filling within the rows with same or short duration cultivar to maintain at least75% plant population | When the crop is 2 weeksold take up Interculture with hoe | |
| | | Black gram | If the plant population is less than 75% of optimum, go for re sowing of the alternate crops like sunflower / Pigeon pea. If possible give protective irrigation with sprinkler | | |
| | Shallow soils | Cotton | Gap filling within the rows with same cultivar or Pigeon pea to maintain at least 75%plant population. Raise cotton seedlings in polythene bags and transplant when sufficient soil moisture is available. | Avoid applying fertilizerstill sufficient soil. moisture is available Making of conservation furrows for moisture conservation Interculture with | |

| | | | | | |
|---|---|---|---|---|---|
| | | | Give protective irrigation wherever possible | harrows | |
| | | Sorghum | Gap filling with pigeon pea | Interculture with hoe | |
| | | Soybean | Gap filling within the rows with same or short duration cultivar to maintain at least 75% plant population | Interculture with hoe | |
| | | Green gram | If the plant population is less than 75% of optimum, go for resowing of the alternate crops like sunflower / Pigeon pea. If possible give protective irrigation with sprinkler. | When the crop is 2 weeksold take up Interculture with hoe | |
| | | Pigeon pea | Gap filling within the rows with same or short duration cultivar to maintain at least 75% plant population | When the crop is 2 weeksold take up Interculture with hoe | |
| | | Black gram | If the plant population is less than 75% of optimum, go for resowing of the alternate crops like sunflower / Pigeon pea. If possible give protective irrigation with sprinkler. | --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** | **Crop/Croppingsystem** | **Crop management** | **Soil nutrient & moisture conservation measures** | **Remarks on Implementation** |
| **At vegetative stage** | **Medium deep to deepblack soils Shallow soils** | Cotton | Give protective irrigationwherever possible Maintain weed free conditions | Avoid applying fertilizers till sufficient soil moisture is available Making of conservation furrowsfor moisture conservation Interculture with harrows Two sprays of 2% MgSO4, Zn, Boron at weekly interval when the crop is encountered reddening symptoms | Linkage with MAU, MSSC and NSC for seed. Linkage with MAIDCfor implements. Linkage with MAU, KVK for agro techniques |

| | | | | | |
|---|---|---|---|---|---|
| | | | | Spray 2 % urea solution or 1% water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition. | |
| | | Sorghum | Avoid top dressing of fertilizers till sufficient soil moisture is available.<br>Intra row thinning<br>Protective irrigation if possible | Opening of alternate furrows with Balaram plough.<br>Interculture with harrows forweeding | |
| | | Soybean | Interculture for weeding andto create soil mulch.<br>Give protective irrigation wherever possible | Opening of alternate furrows with Balaram plough.<br>Spraying of 2% urea and DAP | |
| | | Green gram | Inter culture for weeding<br>Protective irrigation if possible | Spraying of 2% urea and DAP | |
| | | Pigeon pea | Inter culture for | Spraying of 2% | |

| | | | | | |
|---|---|---|---|---|---|
| | | | weeding<br>Protective irrigation if possible | urea and DAP | |
| | | Black gram | Inter culture for weedingProtective irrigation if possible | Spraying of 2% urea and DAP | |
| | | Cotton | Give protective irrigationwherever possible<br>Maintain weed freeconditions | Avoid applying fertilizers till sufficient soil moisture is available<br>Making of conservation furrowsfor moisture conservation<br>Interculture with harrows<br>Two sprays of 2% MgSO4, Zn, Boron at weekly interval when the crop is encountered reddening symptoms<br>Spray 2 % urea solution or 1% water soluble | |

| | | | | | |
|---|---|---|---|---|---|
| | | | | fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition. | |
| | | Sorghum | Avoid top dressing of fertilizers till sufficient soil moisture is available.<br>Protective irrigation if possible<br>Intra row thinning | Interculture for weeding and to create soil mulch to conserve moisture. | |
| | | Soybean | Give protective irrigation wherever possible | Spraying of 2% urea and DAP | |
| | | Green gram | Inter culture for weedingProtective irrigation if possible | Spraying of 2% urea and DAP | |
| | | Pigeon pea | Inter culture for weedingProtective irrigation if possible | Spraying of 2% urea and DAP | |
| | | Black gram | Inter culture for weedingProtective irrigation if possible | Spraying of 2% urea and DAP | |

| Condition | Suggested Contingency measures | | | | |
|---|---|---|---|---|---|
| **Mid season drought( long dry spell )** | **Major Farming situation** | **Normal Crop/ Cropping system** | **Crop management** | **Soil nutrient & moisture conservation measures** | **Remarks on Implementation** |
| **At flowering / fruiting stage orat reproductive stage** | **Medium deep to deep black soils** | Cotton | Give protective irrigationwherever possible | Avoid applying fertilizers till sufficient soil moisture is available<br>Making of conservation furrows formoisture conservation<br>Interculture with harrows.<br>Two sprays of 2% MgSO4, Zn, Boron at weekly interval when the crop is encountered reddening symptoms<br>Spray 2 % urea solution or 1% watersoluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement nutrition. | Linkage with ongoinggovt. scheme to encourage adoption ofmicro irrigation for better water use efficiency (WUE)<br><br>Linkage with M AUand KVK for agro techniques |
| | | Sorghum | Protective irrigation if possible | - - | |
| | | Soybean | Give protective irrigationwherever possible | Opening of alternate furrows withBalaram plough.<br>Spraying of 2% urea and DAP | |

| | | | | | |
|---|---|---|---|---|---|
| | | Green gram | Protective irrigation if possible | -- | |
| | | Pigeon pea | Protective irrigation if possible | Opening of furrows with Balaramplough.<br>Spraying of 2% urea and DAP | |
| | | Black gram | Protective irrigation if possible | -- | |
| | **Shallow soils** | Cotton | Give protective irrigationwherever possible | Avoid applying fertilizers till sufficient soil moisture is available<br>Making of conservation furrows formoisture conservation<br>Interculture with harrows.<br>Two sprays of 2% MgSO4, Zn, Boron at weekly interval when the crop is encountered reddening symptoms<br>Spray 2 % urea solution or 1% watersoluble fertilizers like 19-19-19, 20-20-20, 21-21-21 to supplement<br>nutrition. | |
| | | Sorghum | Protective irrigation if possible | -- | |
| | | Soybean | Give protective | Opening of alternate | |

| | | | | | |
|---|---|---|---|---|---|
| | | | irrigation wherever possible | furrows with Balaram plough.<br>Spraying of 2% urea and DAP | |
| | | Green gram | Protective irrigation if possible or in case of sever moisture stress use as fodder / green Manuring. | -- | |
| | | Pigeon pea | Protective irrigation if possible | Opening of furrows with Balaram plough.<br>Spraying of 2% urea and DAP | |
| | | Black gram | Protective irrigation if possible or in case of sever moisture stress use as fodder / green Manuring. | -- | |

| Condition | Suggested Contingency measures | | | | |
|---|---|---|---|---|---|
| **Terminal drought (Early withdrawal of monsoon)** | **Major Farming situation** | **Crop/ Cropping system** | **Crop management** | **Rabbi Crop planning** | **Remarks on Implementation** |
| | **Medium deep to deep black soils Shallow soils** | Cotton | Give protective irrigation with drip Picking | If possible, adopt relay cropping of chickpea, safflower, rabbi sorghum | Linkage with MAIDC /DSAO for harvesting implements (thresher, harvester).<br><br>Linkage with DSAO for farm ponds and micro irrigation syst emthrough RKVY<br><br>Linkage with MAU, MSSC and NSC for seed.<br>Linkage with MAU, KVK for agrotechniques |
| | | Sorghum | Life saving irrigation or harvest at physiological maturity | Plan for rabbi crops like chickpea and safflower | |
| | | Soybean | Give life saving irrigation or harvest at physiological maturity | Sowing of rabbi crops like sorghum, chickpea, safflower immediately after harvest of soybean with minimum tillage | |
| | | Green gram | Harvest at physiological maturityor in case of severe drought use as fodder/ green manuring | Plan for rabbi crops chickpea / safflower / rabbi sorghum / sunflower | |
| | | Pigeon pea | Life saving irrigation Foliar spray of 2% | - - | |

| | | | | | |
|---|---|---|---|---|---|
| | | | $KNO_3$, urea and DAP | - | |
| | | Black gram | Harvest at physiological maturityor in case of severe drought use as fodder/ green manuring | Plan for rabbi crops chickpea / safflower / rabbi sorghum / sunflower | |
| | | Cotton | Give protective irrigation with drip Picking | If possible, adopt relay cropping of chickpea, safflower, rabbi sorghum | |
| | | Sorghum | Life saving irrigation or harvest at physiological maturity or if no grain setting use as green fodder. | Plan for rabbi crops like chickpea and safflower | |
| | | Soybean | Give life saving irrigation or harvest at physiological maturity | Sowing of rabbi crops like sorghum, chickpea, safflower immediately after harvest of soybean with minimum tillage | |
| | | Green gram | Harvest at physiological maturityor in case | Plan for rabbi crops chickpea / safflower / rabbi sorghum / sunflower | |

| | | | | | |
|---|---|---|---|---|---|
| | | | of severe drought use as fodder/ green manuring | | |
| | | Pigeon pea | Life saving irrigation | Foliar spray of 2% $KNO_3$, urea and DAP | |
| | | Black gram | Harvest at physiological maturity or in case of severe drought use as fodder/ green manuring | Plan for rabbi crops chickpea / safflower / rabbi sorghum / sunflower | |

### 7.1.2. Irrigated situation

| **Condition** | **Suggested Contingency measures** | | | | |
|---|---|---|---|---|---|
| | **Major Farming situation** | **Crop/Cropping system** | **Change in crop / cropping system** | **Agronomic measures** | **Remarks on Implementation** |
| Delayed / limited release of water in canals due to low rainfall | Medium deep to deep blacksoil with assured and high rainfall | Sugarcane<br>Turmeric | No change or prefer<br>Cotton (Irrigated)<br>Wheat | Limited irrigation | Supply of seed through MSSC, MAU, Village seed production programme. |
| | Shallow soil with assuredand high rainfall | Sweet orange<br>Ginger<br>Vegetable crops | Maize<br>Cotton | Alternate furrow irrigation<br>Drip irrigation | |
| Non release of waterin canals under delayed onset of monsoon in | Medium deep to deep blacksoil with assured and high rainfall | Irrigated Cotton | Rainfed Cotton | Recommended spacing (120 x 45 cm) and 80:40:40 NPK Kg/ha | Supply of seed throughMSSC, MAU, Village seed production programme. |

| | | | | | |
|---|---|---|---|---|---|
| catchment | Shallow soil with assuredand high rainfall | Ginger / Turmeric | Cotton and Maize | | |
| Lack of inflows intotanks due to insufficient / delayed onset of monsoon | Medium deep to deep blacksoil with assured and high rainfall | Irrigated Cotton | Rainfed Cotton | Recommended spacing (120 x 45 cm) and 80:40:40 NPK Kg/ha | Release of water at critical growth stages by Irrigation Department |
| | Shallow soil with assured and high rainfall | Ginger / Turmeric | Cotton and Maize | | |
| Insufficient groundwater rechargedue to low rainfall | Medium deep to deep blacksoil with assured and high rainfall | Irrigated Cotton | Rainfed Cotton | Limited irrigation | Supply of seed throughMSSC, NFSM, MAU, Village seed production programme |
| | Shallow soil with assuredand high rainfall | Ginger / Turmeric | Cotton and Maize | Alternate furrow irrigation<br>Drip 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, Sorghum | • Drain excess water<br>• Interculture at optimum soil moisture<br>• Apply 25KgN/Ha to cotton | Drain excess water | Drain out excess water<br>Timely harvest | Protect picked cotton from drenching and soiling<br>Dry wet cotton and market |
| Soybean, Pigeon pea and short duration pulses | Drain out excess water | -do- | -do- | Shift to safer place<br>Dry the produce |
| **Horticulture** | | | | |
| Mango<br>Sweet orange<br>Banana<br>Sapota | Opening of field channels todrain out excess water and avoid surface ponding, Interculture atoptimum soil moisture | Opening of field channels to drain out excess water and avoid surface ponding, Interculture at optimum soil moisture | Collect fallen fruits, grade and market if feasible | Grading, cleaning and marketing of fruits |
| **Heavy rainfall with high speed winds in a short spam** | | | | |
| Cotton, Sorghum | • Drain excess water<br>• Interculture at optimum soil moisture<br>• Apply 25KgN/Ha to cotton | Drain excess water | Drain out excess water<br>Timely harvest | Protect picked cotton from drenching and soiling<br>Dry wet cotton and marketing |
| Soybean, Pigeon pea and short | Drain out excess water | -do- | -do- | Shift to safer place<br>Dry the produce |

| | | | | |
|---|---|---|---|---|
| duration pulses | | | | |
| **Horticulture** | | | | |
| Mango | - | Provide support to prevent lodgingand uprooting in young orchards | Apply multinutrient and hormonal spray to promote flowering | Shift produce to safer place |
| Sweet orange | -do- | -do- | -do- | -do- |
| Banana | -do- | Provide propping and staking | Propping and staking | -do- |
| Sapota | -do- | -do- | -do- | -do- |
| **Outbreak of pests and diseases due to unseasonal rains** | | | | |
| Cotton | Apply soil drench of carbendazim 0.1% or COC @ 3g/liter at base of plants to prevent wilt in low lying patches | Apply foliar spray of streptocycline sulphate @ 6g/60 litre + COC @ 25g/10 litre to prevent bacterial leaf blight<br>Apply Sulphur 25g/10 litre (300mesh) to prevent grey mildew<br>Apply MgSO4 25 kg/ha soilapplication or 1% MgSO4 foliar spray to prevent leaf reddening | Foliar spray of carbendazim 0.1% or Dithane M-45 0.2% toprevent boll rot | - |
| Sorghum | - | - | Apply Dithane M 45 0.2% onear heads immediately | - |

| | | | | |
|---|---|---|---|---|
| | | | after cessation of rains | |
| Soybean | Manually remove infested plants or plant parts from below the girdles<br>Protect against semilooper when density reaches >4 larvae per meter row with foliar spray ofNSKE 5% or dimethoate 30 EC<br>1 ml/litre | - | - | - |
| **Horticulture** | | | | |
| Mango | Spray imidacloprid 0.3 ml or dimethoate 1 ml/liter to control hopper<br>Drench the seedlings with COC 0.25% against root rot | Protect against hopper | Spray Dithane M 45 3g/litre or carbendazim 1g/liter against anthracnose<br>Spray sulphur 0.5% to control powdery mildew | Maintain aeration in storage to prevent fungal infection and blackening or fruits |
| Banana | Soil drenching with COC3g/litre to avoid rhizome rot | Spray Dithane M 45 3g/liter or propiconazole 1 ml/liter 2-3 timesagainst *Cercospora* leaf spot | - | - |
| Sweet orange | Protect against Citrus Psylla with foliar spray of malathion 50 EC 10 ml or quinalphos 25<br>EC 10 ml or cypermethrin 25EC 4 ml per 10 liters | Protect against Citrus Psylla with foliar spray of malathion 50 EC 10 ml or quinalphos 25 EC 10 ml or cypermethrin 25EC 4 ml per 10liters | - | - |

## 7.3Extreme events: Heat wave / Cold wave

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

# *Chapter 8: Agro –Meteorological Advisory*

## 1. Importance /Need of Agro - met Advisory

Agriculture is a gamble of nature all agriculture production depends upon weather, Weather affects on crop growth, diseases and pest's attack, hence agro met advisory has importance in agriculture field. We can judge what type of weather by knowing forecast Agro-met advisory, we can plan of disease pest management and irrigation schedule also by knowing Agro met Advisory

## 2. Forecasts or advisories generated at district level

In Parbhani district there are as follows

a) Advisory by Vasantrao Naik Marathwada Krishi Vidyapeeth (VNMKV)
b) Regional weather station Mumbai
c) Metrological Department of Maharashtra Pune
d) Crop Pest Surveillance System and advisory project (CROPSAP)
e) *Akashwani* Parbhani (Radio station)
f) Weather and Reader Live Forecast.

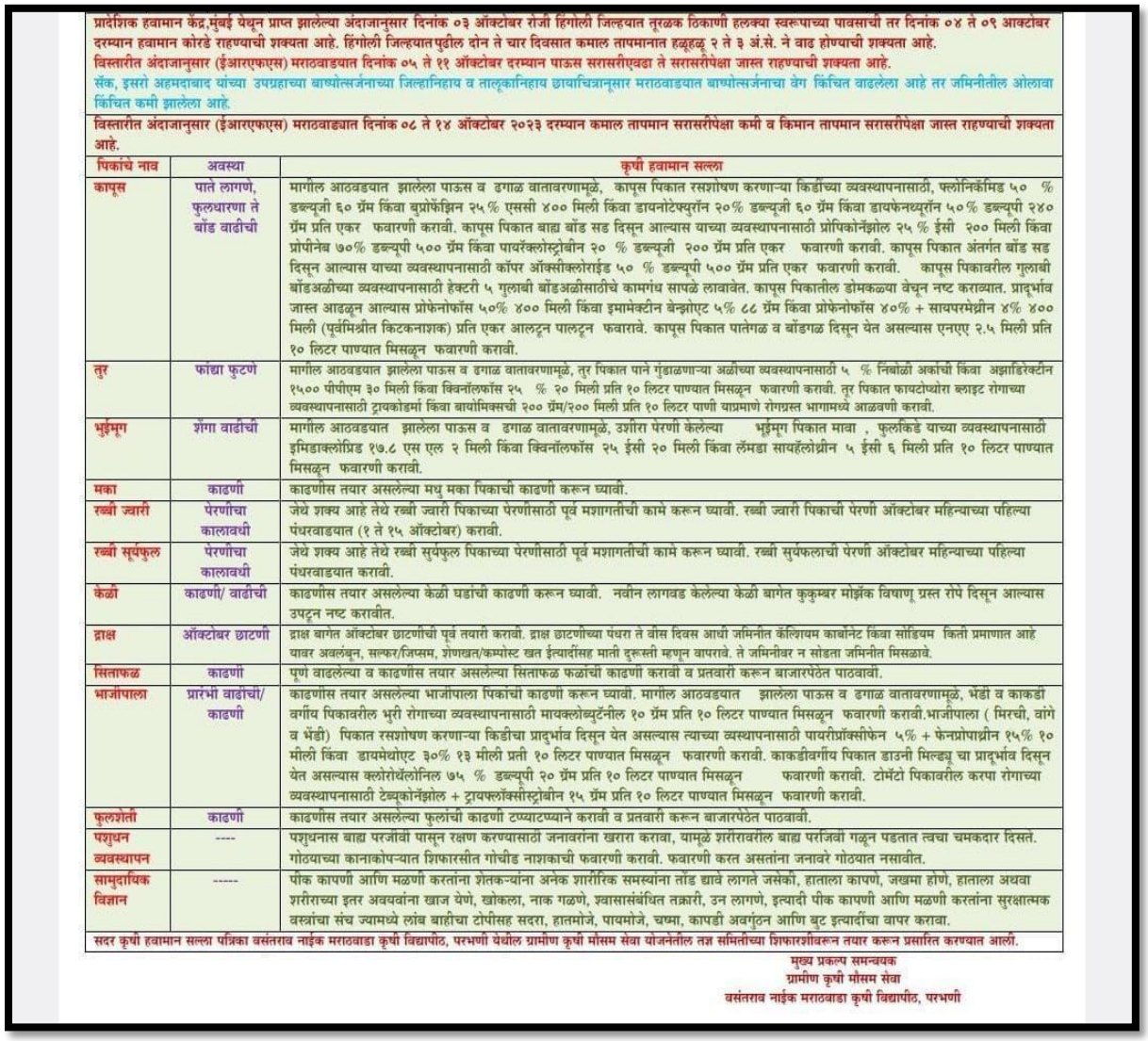
## 3. Other Source/Sources of Agro met Advisory

a) Different Agro-met app which used by a farmer
b) Newspaper like Agrowon.

## 4. Utilization of Agromet advisory by farmers in changing climatic condition

In Parbhani district, the majority of farmers utilized rural agriculture weather forecast service by Vasantrao Naik Marathwada Krushi Vidyapeeth, Parbhani. They give weekly weather forecast and Agromet Advisory also, according to advisory farmers plan their field activities such as Intercultural operation, scheduling of irrigation, spraying for insect & pest management & also fertilizer application, Harvesting of Crop in their field.

## Advisory Based on Pest Surveillance Activity…



प्रादेशिक हवामान केंद्र,मुंबई येथून प्राप्त झालेल्या अंदाजानुसार दिनांक ०३ ऑक्टोबर रोजी हिंगोली जिल्हयात तूरळक ठिकाणी हलक्या स्वरूपाच्या पावसाची तर दिनांक ०४ ते ०९ आक्टोबर दरम्यान हवामान कोरडे राहण्याची शक्यता आहे. हिंगोली जिल्हयातपुढील दोन ते चार दिवसात कमाल तापमानात हळूहळू २ ते ३ अं.से. ने वाढ होण्याची शक्यता आहे.
विस्तारीत अंदाजानुसार (ईआरएफएस) मराठवाडयात दिनांक ०५ ते ११ ऑक्टोबर दरम्यान पाऊस सरासरीएवढा ते सरासरीपेक्षा जास्त राहण्याची शक्यता आहे.
सॅक, इसरो अहमदाबाद यांच्या उपग्रहाच्या बाष्पोत्सर्जनाच्या जिल्हानिहाय व तालूकानिहाय छायाचित्रानूसार मराठवाडयात बाष्पोत्सर्जनाचा वेग किंचित वाढलेला आहे तर जमिनीतील ओलावा किंचित कमी झालेला आहे.
विस्तारीत अंदाजानुसार (ईआरएफएस) मराठवाड्यात दिनांक ०८ ते १४ ऑक्टोबर २०२३ दरम्यान कमाल तापमान सरासरीपेक्षा कमी व किमान तापमान सरासरीपेक्षा जास्त राहण्याची शक्यता आहे.

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

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

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

## 5. Implementation Status of CROPSAP

In our district Implementation Status of CROPSAP is scheduled from Agriculture assistant to District Superintendent Agriculture officer

## 6. Impact on crop Pests and diseases management

CROPSAP has played a very important role in Pest and Disease management for the last few years. Advisory generated by CROPSAP Published and given to field level agriculture staff. They regularly used the advisory to farmers & according to that advisory farmers manage Pest & Diseases in their field, hence ETL Level of Pest & Disease doesn't cross.

## Implementation Status of CROPSAP

| Sr.No | District | Post | Target | Total | Achievement (%) |
|---|---|---|---|---|---|
| 1 | Parbhani | Agriculture Assistant | 12078 | 12261 | 101.52 |
| 2 | Parbhani | Agriculture Supervisor | 2838 | 2632 | 92.74 |
| 3 | Parbhani | Circle Agriculture Officer | 1178 | 1000 | 84.89 |
| 4 | Parbhani | Taluka Agriculture officer | 612 | 378 | 61.76 |
| 5 | Parbhani | Sub-division agriculture officer | 62 | 124 | 200 |
| 6 | Parbhani | District Superintendent Agriculture officer | 46 | 31 | 67.39 |

| VNMKV PARBHANI Advisory Report PARBHANI Date 25.08.2023 | | | |
|---|---|---|---|
| **Taluka** | **Crop** | **Brief Advisory (English)** | **Detail Advisory (English)** |
| Gangakhed | Sorghum (Jowar/Great millet) | Installation of pheromone traps @5/acre for monitoring. Spray 5% NSKE or Azadirachtin 1500 ppm @ 50 ml per 10 lit of water | Whorl application of *Metarhizium* anisopliae @50 g or Nomureya relyi @ 50 g per 10 lit of water. spray Thiamethoxam 12.6%+ lambda-cyhalothrin 9.5 zc @2.5 ml or Chlorantraniliprole 18.5sc@ 4 ml per 10 lit of water |
| Jintur | Maize (Maka) Hybrid | Installation of pheromone traps @5/acre for monitoring. Spray 5% NSKE or Azadirachtin 1500 ppm @ 50 ml per 10 lit of water | |
| Jintur | Soybean | Install 10 yellow sticky traps per acre and spray with Flonicamid 50 WG 3 gm/10 lit of water for whitefly | For defoliators spray emamectin benzoate 1.9 EC@ 8.5 ml or for semilooper, stemfly and gridle beetle spray with Chlorantraniliprole 18.5 SC @ 3 ml or Tetraniliprole 18.18 SC @ 5 ml or Chlorantraniliprole 9.3 + Lambda cyhalothrin 4.6 ZC @ 4ml per 10 lit of water |
| Gangakhed | Sugarcane (Noble cane) | Spray 5% or NSKE Azadirachtin 1500 ppm @ 50 ml per 10 lit of water | Installation of pheromone traps @5/acre for monitoring. Whorl application of *Metarhizium anisopliae* talc formulation @ 50 g or *Nomureya rely* 50 g per 10 lit of water. Drenching of Imidacloprid 40 % + Fipronil 40%@ 450 g per 1000 lit. water near the root for white grub |

# *Chapter 9: Commodity wise status of climate resilient agriculture value Chains*

## 9.1 Existing marketing scenario in the district

Marketing scenarios are hypothetical situations that help us plan our strategies and tactics for different possible outcomes. They need to be monitored and updated regularly based on changing conditions in our market, industry and environment.

### 9.1.a Year wise marketable surplus of major Crops

| Sr. No | Commodity | Avg. Annual Production (000 Mt.) | Quantity Required for Consumption | Marketable Surplus | An. Annual sell in AMPCs within District | An. Annual sell in AMPCs out of AMPC |
|---|---|---|---|---|---|---|
| 1 | Cotton | 1611 | 1 | 1610 | 35769 | 17 |
| 2 | Soybean | 886 | 3 | 883 | 482 | 404 |
| 3 | Wheat | 699 | 209 | 490 | 1132 | 0 |
| 4 | Jowar | 1676 | 502 | 1174 | 361 | 0 |
| 5 | Gram | 317 | 95 | 217 | 162 | 814 |
| 6 | Tur | 383 | 115 | 268 | 179 | 89 |
| 7 | Banana | 168 | 4 | 164 | 110 | 54 |
| 8 | Mango | 383 | 5 | 378 | 320 | 58 |
| 9 | Lemon | 597 | 2 | 595 | 585 | 10 |
| 10 | Papaya | 67 | 2 | 65 | 55 | 10 |
| 11 | Onion | 46 | 8 | 38 | 30 | 8 |
| 12 | Tomato | 42 | 0 | 42 | 32 | 10 |

*(Source: ATMA SREP,2019)*

## Agriculture Produce Market Committees (APMCs)

| Sr. No | Name of APMC | APMC/ Kharedi Vikri Sangh | e-NAM | e-Markets |
|---|---|---|---|---|
| 1 | Parbhani | 03 | 01 | - |
| 2 | Jintur | 05 | 01 | - |
| 3 | Purna | 01 | 01 | - |
| 4 | Tadkalas | 01 | 00 | - |
| 5 | Gangakhed | 01 | 01 | - |
| 6 | Palam | 01 | 01 | - |
| 7 | Sonpeth | 01 | 01 | - |
| 8 | Selu | 01 | 01 | - |
| 9 | Pathri | 01 | 01 | - |
| 10 | Manwat | 02 | 01 | - |
| | Total | 17 | 09 | - |

*(Source: ATMA SREP,2019 Parbhani)*

## 9.1.b Year Wise Price Variation of Major Crops

| Commodity | Local Grade Name & Specification | | | | | | Price Range/quintal | | | % Variation in Price with average | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Local name | Specification | Local name | Specification | Local name | Specification | High (Grade 1) | Avg. Low (Grade 2) | Low (Grade 3) | Grade 1 | Grade (3) |
| Soybean | No.o1 JS-335 | Foreign Matter –Nil Moisture-10% No Breakage | No.2 MACS-71 | Foreign Matter –5% Moisture-18% 2% Breakage | No.3 | Foreign Matter–25% Moisture-20%. Breakage 3% to 4% | 7100 | 6500 | 5800 | 16 | 12.14 |
| Cotton | Super | 29 +mm staple Length 3.5 % mike 35kg/Qtl Lint | FAQ | 27 +mm staple Length 2.9 % mike 36kg/Qtl Lint | Fardad | 26 mm staple Length 2.2 % mike 37kg/Qt Lint | 6500 | 5800 | 4500 | 30 | 13 |
| Jowar | Maldandi | Moisture 12 % Damage grain 1% FM-Nil | Dagdi | Moisture 12 % Damage grain 2% FM-0.10% | Hybrid | Moisture 14 % Damage grain 3% FM-0.25% | 2800 | 1600 | 1000 | 25 | 18 |

*(Source: ATMA SREP 2019 Parbhani)*

| Commodity | Local Grade Name & Specification | | | | | | Price Range/quintal | | | % Variation in Price with average | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Local name | Specification | Local name | Specification | Local name | Specification | High (Grade 1) | Avg. Low (Grade 2) | Low (Grade 3) | Grade 1 | Grade (3) |
| Wheat | 2189 | % of Weevilled grains by Weight up to 1% Foreign matter 0.75% clean Grains (High Density) | Lok-1 | % of Weevilled grains by Weight above 1% to 4 % Foreign matter 0.75% Medium Density) | Flour mill | % of Weevilled grains by Weight above 4% to 7 % FM Not more than 1%, Low Density) | 1800 | 1550 | 1100 | 11 | 9 |
| Pigeon Pea/Tur | Red/Lal Tur BDN 708 BSMR736 | No Foreign Matter, Small Size tasty, Deshelled | Yashoda Mahuri | Hard, FM 5 to 8%, Green Grain Content | Nirmal | FM above 10 %, Black Seed Content | 6500 | 5200 | 4200 | 19 | 16 |
| | Black Tur | Clean Tasty, deshelled easily | Gavraan | Small grain size, green grain content | Black tur | 10 TO 12% foreign matter hard | 4200 | 3100 | 2700 | 8 | 05 |

## 9.2 Constraints in the existing value Chain

In Parbhani district Major crops are Soybean, Cotton, Tur, Moong, Jowar, Wheat and Gram. While marketing Constraint in existing value chain are:

**1. No Farmer organized group**: for marketing purpose there is no farmer groups so that farmer didn't go to bigger market they sale their produce in local market and received lower price

**2.** Crop variety fetching good prices, having good productivity, in cotton long staple & short staple length variety mixed, containment cotton production, Immature cotton collection, high moisture percentage

**3. Grading:** due to lack of grading facility at village level for agriculture produce, farmers received lower prices.

**4. Packaging**: In agriculture market price for 10 kg, 5kg packaging get more price then 50kg, 100kg package at village level packaging of small package is not available, so farmer received lower price.

**5.** Preventive measures to protect from stored grain pest: at village level Godowns for storage mostly not available and due to that preventive measure protect from store grain pest.

**6.** Storage: Insufficient storage facility/Capacity at village level

**7.** Value Addition: Lack of knowledge majority farmers have lack of knowledge of value addition and is not easy to individual farmer.

**8.** Access to market information and intelligence: Information not available at village level

**9.** Pledge loan availment due to unavailability of sufficient Storage Facility

**10.** Packaging for retail

**11.** Contract farmer

**12.** Participation in commodity exchange/forward markets**.**

## 9.3 Potential for strengthening of commodity wise value chain

In Parbhani district Major crops are Soybean, Cotton, Tur, Moong, Jowar, Wheat and Gram. While marketing Potential for strengthening of commodity wise value chain mentioned below

1. Farmers should be organized in group CIG, FIGs, PA, and PGs etc.
2. Production of varieties like in soybean *JS-9305, Samruddhi DS228, Phule kimya, Phule sangam, MAUS612, MAUS158, MAUS162*. In cotton Suitable soil for

High yielding and long staple length BT varieties, In Wheat NIA301, HD2329,Lokvan MUAS2496iIn Gram Vijay, Dig Vijay ,Virat, Mexicom.

3. In post-harvest technology while harvesting the crop whole moisture should be 10%.
4.For Packaging of Grain gunning bags of 50 kg should be used for better banding and avoid post-harvest loss.
5. Warehouses for storage and Fumigation for control of insect pest
6. Homestead product, Dal making, Rava & Maida, Besan for value addition
7. For Access to market Use of Agmark, MSAMB website, Newspaper, Radio etc.
8. To avoid distress sell, storage in accredited warehouses & avail pledge loan from bank
9. For retail marketing packaging of 5 & 10 kg should be done

10. Small & marginal farmers should organize in producer groups and aggregate produce.
11. Prompt the Contact farming with public & private partnership
12. Organized in producer groups aggregate produce and use commodity exchange as alternative markets

## 9.4 FPCs contribution in Value Chain Development

### 9.4.1 Assessment of FPCs in the district

#### 9.4.1.1 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 analyzed 27 Farmer Producer Companies with the help of parameters. The parameters were further assigned performance scores on the basis of efficiency and effectiveness with the help of Automatic Rating Meter.
- On the basis of assessment report, suggesting the measures for strengthening of FPCs e.g. capacity building, climate Resilience adaptation.

**Table No. 9.4.1.1.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:

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

## 9.4.1.2 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 analyzed 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.

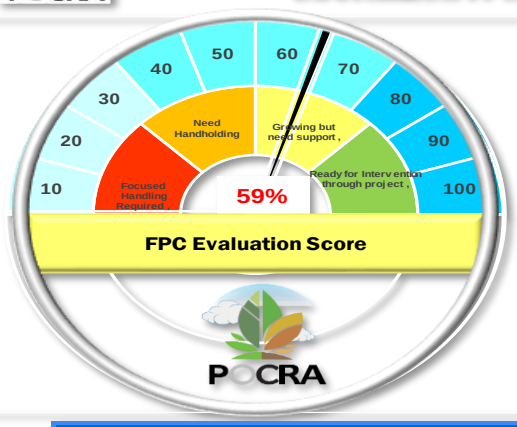
# Customized FPC Evaluation Report

**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**

**Swagati Farmer Producer Company**

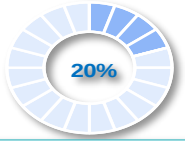
**Address**

Kaulgav Wadi,Purna,Tq-Purna , Dist-Parbhani, Pincode- 431511

**Score Report**

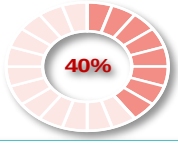
| Criteria | Max. Score | Score Obtained |
|---|---|---|
| **Organization & Adminstration** (Core Foundation Strength) | 21 | 16 |
| **Governance** (Control Systems in Place) | 11 | 10 |
| **Management** (Decision making processes) | 8 | 7 |
| **Infrastructure** (Assets and resources) | 5 | 3 |
| **Finance** (Financial base and health) | 25 | 10 |
| **Business & Market Linkages** (Resource quality) | 21 | 9 |
| **Capacity Building** (Resource quality) | 5 | 1 |
| **Climate Resilience** (Adaptability to climate risk) | 4 | 3 |
| **Final Score** | 100 | 59 |

**What could improve your FPC?**



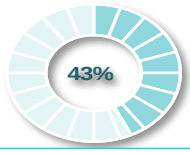

**Capacity Building**

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




**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




**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

**For more Information contact us at Project Director, ATMA, Parbhani**

### 9.4.2 Information about FPCs supported by SMART/ NDKSP/ MAGNET

| Scheme Name | No. of. FPCs | Disbursement |
|---|---|---|
| SMART | 19 | 03 |
| NDKSP | 33 | 14 |
| MAGNET | 00 | 00 |

### 9.4.4 Details of commodity Transacted and Details of Services provided by FPCs

| Sr. No | Name of agro producer company | Service provided |
|---|---|---|
| 1 | Dhan Sanchay Agro Producer Company Ltd. Rahati, Parbhani | Cleaning and grading |
| 2 | Valmikeshwar Agro Producer Company Limited, Pathari | Cleaning and grading |
| 3 | Dattprayag agro producer company limited, Parbhani | Cleaning and grading |
| 4 | Malhari Agro Producer Company Limited, Jintur | Cleaning and grading |
| 5 | Devdaya Farmer Producer Company Limited, Purna | Cleaning and grading |
| 6 | Siddhi Manwat Farmer Producer Company Ltd. | Cleaning and grading |
| 7 | Kisan Jivan Agro Producer Company Ltd. | Cleaning and grading |
| 8 | Nanai farmer Producer Co. Ltd | Cleaning and grading |
| 9 | B.R.Dhage Patil FPC | Cleaning and grading |
| 10 | T.N. Patil Agro Producer Company Limited | Cleaning and grading |
| 11 | Dattaprayg food producer company ltd. | Cleaning and grading |
| 12 | Mangrul Jai Bhadra Farmer Producer Company Limited, Manvath | Cleaning and grading |
| 13 | Tandulwadi Agro Producer Company Limited | Cleaning and grading |
| 14 | Sarvashri Agro Producer Company Ltd | Cleaning and grading |
| 15 | Datta Krupa farmer producer co. ltd Pimpaldari | Cleaning and grading |
| 16 | Sasrapid farmer producer co.ltd Kekarjawala | Cleaning and grading |
| 17 | Bhumikranti Agro pro Com ltd, Asegaon | Cleaning and grading |

# *Chapter 10: Extension Strategies for Adaptation to Climate Change*

## I) Preparation of Village Adaptation Plan

a) Need for participatory micro-planning and pre-season meetings
b) Process for micro-planning and seasonal meetings- agenda, stakeholders, duration, material required, information needed etc.
c) Role of Village Agriculture Development Committee of Gram panchayat
d) 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 labor 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 government Programmes with extension Plan

a) While planning the Nanaji Deshmukh Krushi Sanjivani project in villages, different convergence programs of the government are taken into consideration such as *Prime Minister Fasal bima yojana* for sustainable agriculture.
b) Farm Field school for training of different crop technology at the farm level to improve an adaptation level of new technology such as BBF Technology in soybean.
c) *Jalyukt Shivar*, NREGA, Chief minister agriculture irrigation scheme, Chief minister sustainable irrigation scheme for farm ponds to increase irrigation potential & sustainable irrigation.
d) Village level Farmer meeting for Kharif & Rabi Pre-planning
e) Weather based fruit insurance scheme for fruit production.
f) Demonstration plot from different scheme for increasing adoption level of farmers for new technology
*g) Krushi Sanjeevani Saptah*
*h) Ranbhaji Mahotsav planning at district level*
*i) Vikel-te-pikel*

## II Monitoring mechanism for village adoption progress

i) Climate Resilience in the agriculture production system is the main component under the project.
ii) the activity identified under the compounds have been prioritized thru participatory micro planning
iii) Farmer field school (FFS) is one of the mean activities for Monitoring mechanism.
iv) DBT technology is be used to insure the transparency.
v) Participatory development of many water plants.
vi) Climate-smart agriculture and resilient farming system.
vii) Promoting efficient and sustainable use of water for agriculture.
viii) Fold back activities to support the project.
ix) Benefits, issues and challenges have been recorded.
x) Micro Planning for kharif and Rabi season before starting of season.
xi) Regular monitoring for village adoption progress by taking Review meeting of field staff, Field visit, monthly agriculture university scientist & officers field visit, Exposure visit
xii) Cross verification.

## III. Strategy for Revisiting of Village adoption plan

i) The process of mainstreaming adaptation has the potential to improve the resilience of development outcomes, enhance community resilience to climate change impact and safeguard investment.
ii) As climate change impacts become more evident and climate change-induced extreme weather events become more intense and frequent it is important to integrate climate change adaptation in village adoption plans.
iii) Main streaming can have multiple entry points and requires coordination among villagers (Farmers), institutions and extension workers or staff.
iv) Fortnightly evaluation of village adoption plan. According to the need base some changes may take place.

## ANNEXURES I (Sample Village Level Micro-Plan)

# गाव विकास आराखडा प्रपत्र



महाराष्ट्र शासन - कृषि विभाग
नानाजी देशमुख कृषि संजीवनी प्रकल्प


## गाव विकास आराखडा

**गाव समुहाचा क्रमांक- 513_gp-51_03**

| | | | |
|---|---|---|---|
| गावाचे नाव- | ताड बोरगाव | सेन्सस कोड- | 546834 |
| महसुल मंडळ- | Mandal Adhikari Kolha | तालुका- | मानवत |
| उपविभाग- | परभणी | जिल्हा- | परभणी |

## गावसमुहातील इतर समाविष्ठ गावे

| अ. क्र | गावाचे नाव | सेन्सस कोड | अ. क्र | गावाचे नाव | सेन्सस कोड |
|---|---|---|---|---|---|
| 1 | भरलेले नाही | 546691 | 2 | राजूरा | 546820 |
| 3 | इरुखा तर्फे पेडगाव | 546692 | 4 | देऊळगाव आवचर | 546835 |
| 5 | पन्हेरा | 546704 | 6 | भोगाव | 546700 |
| 7 | किन्होळा | 546699 | 8 | काष्टागाव | 546685 |
| 9 | वडगाव तर्फे टाकळी | 546684 | 10 | पेडगाव | 546697 |
| 11 | ब्रम्हापरी तर्फे पेडगाव | 546698 | | | |

## अनुक्रमणिका

## Annexure II Sample Village Profile:

नानाजी देशमुख कृषि संजीवनी प्रकल्प — कृषी विभाग महाराष्ट्र शासन

अहवाल क्रमांक : **नादेकृसप्र/गामाप्र/546701/2023/291** दिनांक : 18/10/2023

### ग्राम कृषी संजीवनी विकास दर्शिका

| | | |
|---|---|---|
| गावाचे नाव : मांडखळी | गावाचा सांकेतांक : 546701 | ग्रामपंचायत: Mandakhali |
| गावाचा (प्रकल्प) टप्पा : 3 | गाव खारपान मध्ये येते का ?: नाही | समूह कोड: 513_gp-59_02 |
| तालुका : परभणी | उपविभाग : परभणी | जिल्हा : परभणी |

### प्रकल्प कर्मचारी/अधिकारी

| पदनाम | पूर्ण नाव | भ्रमणध्वनी क्रमांक |
|---|---|---|
| उपविभागीय कृषी अधिकारी | Harne R | 9022005710 |
| तालुका कृषी अधिकारी | Kale Nityanand | 7219527294 |
| कृषी सहाय्यक | Patil K. B. | 7588017480 |
| समूह सहाय्यक | Kaldate Akshay Bhausaheb | 8080626562 |
| शेतीशाळा प्रशिक्षक | SHAIKH MOBIN | 9552261010 |
| कृषीमित्र | NA | NA |
| कृषीताई | Siral Seema Suresh | 8698491347 |

### ग्राम कृषी संजीवनी समिती

| पदनाम | पूर्ण नाव | भ्रमणध्वनी क्रमांक |
|---|---|---|
| सरपंच | SIRAL NAGORAO UTTAMRAO | 8830968524 |
| उपसरपंच | Shaikh Mosin S | NA |
| ग्रामपंचायत सदस्य | Ghule Pandharinath Shankar | 9823612861 |
| ग्रामपंचायत सदस्य | Lohat Sanjivani Sachin | 9823192153 |
| प्रगतिशील शेतकरी | Shaikh Mobin Shaikh | 9561611386 |
| प्रगतिशील शेतकरी | Kane Arjun Kishan | 9922221483 |
| महिला शेतकरी | Gaikwad Sumanbai Kashinath | 8329838391 |
| महिला शेतकरी | Lohat Rukhminbai Gangadhararo | 9503800838 |
| महिला शेतकरी | Siral Ashwini Nagorao | 9921562836 |
| शेतकरी उत्पादक कंपनी प्रतिनिधी | Sontake Nanadkumar Marotrao | 9921564804 |
| बचत गट महिला प्रतिनिधी | Raut Savitra Ashok | 7058628728 |
| कृषि पूरक व्यावसायिक शेतकरी | Dolse Shivnanada Vithal | 7721945562 |
| कृषि पूरक व्यावसायिक शेतकरी | Siral Kalyan Shesherav | 9960328130 |

## भौगोलिक तपशील

| | |
|---|---|
| एकूण भौगोलिक क्षेत्र (हे.) - 2184.66 | वनक्षेत्र (हे) - 0 |
| निव्वळ पेरणी क्षेत्र (हे.) - 2116.95 | बागायती क्षेत्र (हे.) - 2098.55 |
| एकूण लोकसंख्या - 3388 | एकूण कुटुंब संख्या - 624 |
| शेतकरी संख्या - 1127 | शेतकरी (अनुसूचित जाती) - 568 |
| अल्प व अत्यल्प भूधारक - 1127 | शेतकरी (अनुसूचित जमाती) - 9 |

## हवामान अंदाज व पीक सल्ला

माहिती उपलब्ध नाही

## वैयक्तिक लाभार्थी तपशील

| | |
|---|---|
| नोंदणी केलेले शेतकरी - 728 | अर्जांची एकूण संख्या - 2378 |
| पूर्वसंमंती दिलेले अर्ज - 549 | लाभ दिलेले अर्ज- 449 |
| लाभार्थी संख्या - 342 | लाभार्थी महिला शेतकरी - 69 |
| अनुसूचित जाती लाभार्थी - 0 | अनुसूचित जमाती लाभार्थी - 6 |
| वितरीत अनुदान रक्कम - 15952420 | बँकेसोबत आधार संलग्न नसलेले शेतकरी - 31 |

## घटकनिहाय वितरित अनुदान

| घटक/बाब | एकूण अर्ज | पूर्व समंती प्राप्त अर्ज | नाकारलेल्या अर्जांची संख्या | लाभार्थी शेतकरी | वितरीत केलेला निधी (रू) |
|---|---|---|---|---|---|
| Apiculture | 20 | 0 | 19 | 0 | 0 |
| Backyard Poultry | 9 | 0 | 6 | 0 | 0 |
| Compost (Vermicompost / NADEP / Organic input production unit) | 35 | 0 | 33 | 0 | 0 |
| Drip Irrigation | 407 | 58 | 324 | 40 | 2387447 |
| Farm Mechanization | 90 | 3 | 85 | 3 | 222000 |
| Farm Pond (Individual) | 138 | 20 | 104 | 20 | 2840280 |
| Farm Pond Lining | 6 | 0 | 5 | 0 | 0 |
| FFS host farmer assistance / Promotion of BBF technology/ Zero Tillage Technology etc. | 24 | 1 | 19 | 0 | 0 |
| FPO - Custom Hiring Center (CHC) | 1 | 0 | 0 | 0 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| Horticulture Plantation / Agroforestry | 595 | 243 | 342 | 198 | 5377001 |
| Inland Fisheries | 20 | 1 | 19 | 0 | 0 |
| Pipes | 29 | 0 | 29 | 0 | 0 |
| Planting material in Polyhouse / Shadenet house | 23 | 1 | 22 | 1 | 333043 |
| Polyhouse/ Poly tunnels | 59 | 4 | 44 | 1 | 1367280 |
| Recharge of open dug wells | 28 | 0 | 27 | 0 | 0 |
| Saline and Sodic lands (Farm ponds/ Sprinklers / Water pump/ FFS) | 27 | 0 | 26 | 0 | 0 |
| Seed Production | 59 | 19 | 39 | 3 | 106165 |
| Sericulture | 125 | 0 | 122 | 0 | 0 |
| Shadenet House | 39 | 0 | 35 | 0 | 0 |
| Small ruminants | 4 | 0 | 4 | 0 | 0 |
| Soil and Water Conservation Practices | 2 | 0 | 0 | 0 | 0 |
| Sprinkler Irrigation | 560 | 196 | 326 | 187 | 3319204 |
| Water Pumps | 14 | 0 | 14 | 0 | 0 |
| Well | 64 | 3 | 2 | 2 | 0 |
| Total | 2378 | 549 | 1646 | 455 | 15952420 |

## कृषी व्यवसाय घटकाचा तपशील

| | |
|---|---|
| नोंदणी केलेल्या FPC/SHG/Farmer Group ची संख्या - 2 | एकूण अर्जांची संख्या - 1 |
| पूर्वसंमती दिलेल्या अर्जांची संख्या - 1 | कार्यारंभ आदेश दिलेल्या अर्जांची संख्या - 1 |
| लाभ दिलेल्या FPC/SHG/Farmer Group ची संख्या - 1 | अनुदान वितरीत रक्कम, रु. - 849183 |

## 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 | 1 | 1 | 1 | 1 | 849183 |

## मृद व जलसंधारण तपशील

| | |
|---|---|
| पावसाचे प्रमाण (मिमी) - 826.5 | उपलब्ध अपधाव (TCM) - 1854.5 |
| अडवलेला अपधाव (TCM) - 254.18 | शिल्लक अपधाव (TCM) - 1600.32 |
| प्रस्तावित क्षेत्र उपचार (हे.) - 0 | प्रस्तावित नाला उपचार संख्या - 11 |
| कामांची एकूण रक्कम - 38.5 | तयार अंदाज पत्रकांची संख्या - 7 |
| एकूण तांत्रिक मंजुरींची संख्या - 7 | पूर्ण झालेल्या ई निविदा संख्या - 7 |
| सुरु झालेल्या कामांची संख्या - 7 | पूर्ण झालेल्या कामांची संख्या - 4 |
| 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 झालेली कामे | निधी अदा केलेल्या कामांची संख्या | एकूण अदायगी (रू) |
|---|---|---|---|---|---|
| Desilting of old water storage structure | 7 | 7 | 4 | 0 | 0 |
| Total | 7 | 7 | 4 | 0 | 0 |

## पिक पद्धतींचा तपशील

**खरीप हंगामातील मुख्य पिके तपशील**

| | |
|---|---|
| पीक - सोयाबीन | जमीन (हे) - 992 |
| पीक - कापूस | जमीन (हे) - 742 |
| पीक - तूर | जमीन (हे) - 95 |
| पीक - मुग | जमीन (हे) - 23 |

**रबी हंगामातील मुख्य पिके तपशील**

| | |
|---|---|
| पीक - रबी हरभरा | जमीन (हे) - 508 |
| पीक - रबी ज्वारी | जमीन (हे) - 370 |
| पीक - रबी गहू | जमीन (हे) - 31 |

## भूमी उपयोगिता वर्गीकरण

गावाचे एकूण भौगोलिक क्षेत्र 2184.66 हे असून निव्वळ पिकाखाली त्यापैकी 96.86% क्षेत्र आहे. गावाचे भूरूप ढोबळमानाने उंचसखल/ डोंगराळ/ सपाट प्रकारचे आहे. गावातील निव्वळ पिकाखालील क्षेत्रापैकी 68.53% क्षेत्राकरिता सिंचनसुविधा उपलब्ध आहे.

| अ.क्र. | तपशील | | क्षेत्र (हेक्टर) |
|---|---|---|---|
| 1 | एकूण भौगोलिक क्षेत्र (Total Geographical Area) | | 2184.66 |
| 2 | पिकाखालील निव्वळ क्षेत्र (Net Cropped Area) | | 2116 |
| 3 | दुबार पिकाखालील क्षेत्र (Double Cropped Area) | | 0 |
| 4 | एकूण लागवडीखालील क्षेत्र (Gross cropped Area) | | 2116 |
| 5 | एकुण सिंचित क्षेत्र (Irrigaterd Area) | हंगामी बागायत | 1200 |
| | | बारमाही बागायत | 250 |
| 6 | एकूण वन क्षेत्र (Total Forest Area) | | 0 |
| 7 | कायम पड क्षेत्र (Permanent Fallow Area) | | 0 |
| 8 | चालू पड क्षेत्र (Current Fallow Area) | | 0 |
| 9 | गवत पड व चराऊ कुरणे (Pasture Land) | | 0 |
| 10 | इतर पड क्षेत्र (Other Fallow Area) | | 0 |
| 11 | बिगर कृषि क्षेत्र ( Area put to non-Agricultural use ) | | 0 |

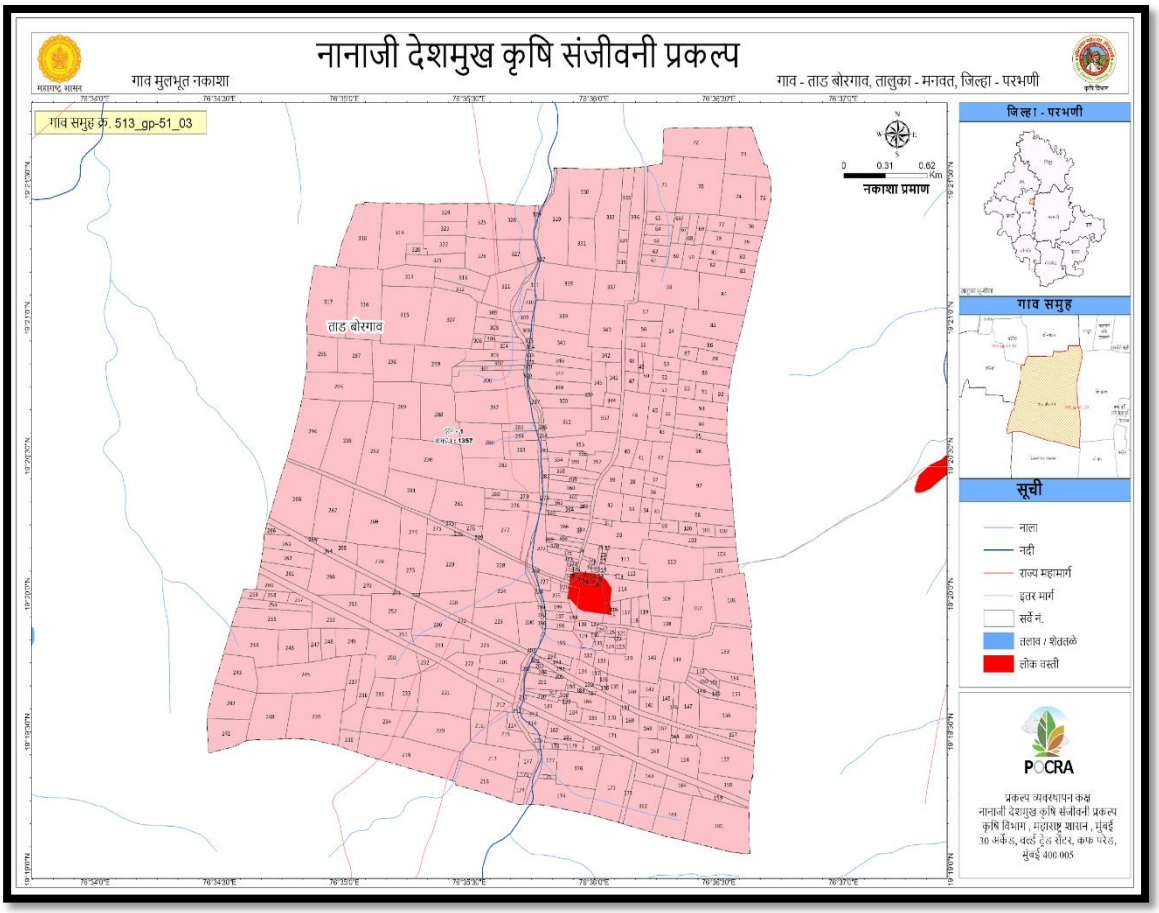
## पिकनिहाय क्षेत्र (क्षेत्र हेक्टर)

| अ.क्र. | पिकाचा वर्ग | पिकाखालील क्षेत्र |
|---|---|---|
| 1 | तृणधान्य | 401 |
| 2 | कडधान्य | 626 |
| 3 | गळितधान्य | 992 |
| 4 | नगदी पिके (कापूस,ऊस) | 742 |
| 5 | भाजीपाला पिके | 0 |
| 6 | फळपिके | 0 |
| 7 | चारा पिके | 0 |
| 8 | इतर | 0 |
| एकूण | | 2761 |

## निरीक्षण विहिरींची पाण्याची पातळी

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

## Annexure III Sample Village Map: Tadborgaon Tq.Manwath



# Annexure IV (Sample Agromet Advisory)