Nanaji Deshmukh Krushi Sanjeevani Prakalp

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

Prepared by

Agricultural Technology Management Agency (ATMA), Amravati

and

Project Management Unit

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INTRODUCTION

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

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

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Chapter 1: General Profile of the District

1.1 Geographical area and location of the district

Amravati district comprising 14 tehsils and 1997 Villages, Total geographical area of the district is 12.21 lakh Ha. The tehsils are Amravati, Bhatkuli, Nandgaon Kh., Chandur railway, Dhamangaon, Achalpur, Daryapur, Chikhaldara, Dharni, Anjangaon, Morshi, Tiosa, Warud, Chandur Bazar. The latitude & longitude of the districts is 20°55′33″N to 77°45′53″E. The Purna and Wardha are the main rivers. The soils are mostly formed from basalt rocks and are black, medium black, shallow types having different depths and profiles, Agriculture is mainly dependent on monsoon rainfall. The average normal rainfall of the district is 862.00 mm. Chandur bazar tehsil records highest rainfall of 728.00 mm. Whereas Achalpur tehsil registered lowest rainfall of 458.40 mm. The highest temperature goes up to 42°C in summer, whereas minimum temperature is observed up to 8°C in winter.

The district falls in the *Assured Rainfall* zone. The crops are taken in all three seasons in a year: Kharif, Rabbi and Summer. The main crops are Cotton (35%), Cereals (5%), Pulses (15%) and Oil Seeds (35%), Sugarcane and Fruit crops. There is much scope for Agro-Forestry and Agri-Horticulture plantation in the district.

(Source: GSDA | District Amravati, Government of Maharashtra | India)

1.2 Tehsils details

Sr. No.	Name of the block / Tehsil/ Mandal	Geographical Area	No. of Gram Panchayats	No. of Revenue Villages
1	Chikhaldara	247704	53	193
2	Dharani	149601	63	156
3	Achalpur	66630.1	68	171
4	Chandur bazar	68600.6	68	169
5	Anjangaon	53114.9	49	127
6	Morshi	80200.8	67	166
7	Amravati	90471.7	60	129
8	Nandgaon kh.	78194.3	69	161
9	Tiwasa	55915.4	45	95
10	Daryapur	78470.9	74	150
11	Bhatkuli	58111.4	49	137
12	Warud	74300.7	66	139
13	Chandur rly	56090	49	92
14	Dhamangaon	64360	62	112
	District	**1221763.93**	**842**	**1997**

(Source: Census 2011 and SREP)

1.3 Demographic Information

Tehsil	Total Population	Male Population	Female Population	Total SC population	SC Male Population	SC Female Population	Total ST population	ST Male Population	ST Female Population
Dharni	**184665**	93898	90767	**7908**	4005	3903	**142191**	72022	70169
Chikhaldara	**118815**	60723	58092	**8170**	4200	3970	**93050**	47291	45759
Anjangaon Surji	**160903**	82679	78224	**32612**	16567	16045	**3927**	2056	1871
Achalpur	**279479**	143866	135613	**46986**	24244	22742	**27416**	13949	13467
Chandur bazar	**196258**	100729	95529	**37381**	19132	18249	**14970**	7697	7273
Morshi	**182484**	93783	88701	**29221**	15108	14113	**18399**	9436	8963
Warud	**224984**	115687	109297	**32019**	16503	15516	**33212**	16934	16278
Teosa	**104728**	53811	50917	**18136**	9398	8738	**3986**	1994	1992
Amravati	**788327**	403226	385101	**144976**	73698	71278	**24777**	12828	11949
Bhatkuli	**113109**	58015	55094	**28252**	14491	13761	**9298**	4855	4443
Daryapur	**175061**	89680	85381	**48496**	24806	23690	**12529**	6456	6073
Nandgaon-Khande	**129810**	66661	63149	**30494**	15715	14779	**5597**	2845	2752
Chandur Railway	**96907**	49727	47180	**19294**	10000	9294	**4875**	2484	2391
Dhamangaon	**132915**	68283	64632	**22429**	11531	10898	**9901**	4987	4914
Total Amravati	**2888445**	**1480768**	**1407677**	**506374**	**259398**	**246976**	**404128**	**205834**	**198294**

(Source: Census 2011 and SREP)

1.4 Annual Average rainfall & Temperature

The climate of this district is hot and dry. The year is divided into three seasons, cold season is from November to February, hot season is from March to May and the monsoon season is from June to October. The district receives rainfall during the southwest monsoon. The average rainfall is 700-800 mm. The maximum temperature during summer goes up to 46°C. While the minimum temperature during winter drops to 20°C. Chandur bazar Tehsil records highest rainfall of 728 mm whereas Achalpur Tehsil registered lowest rainfall of 458.40 mm. The highest temperature goes up to 42°C in summer in Bhatkuli Tehsil, whereas minimum temperature is observed up to 8°C in winter in Dharani taluka.
(Source https://www.worldweatheronline.com)

1.5 River Network in the District

There are three main rivers Tapi, Purna and Wardha. The Purna rises in the southern slopes of Gawilgarh hills and flows southerly & S-E direction till it turns Westward and from a part of the district boundary between Amravati & Akola. Pedhi, Arna, Chandrabhaga and the Shahnur are important tributaries of Purna. The Wardha river rises at Multai in Madhya Pradesh and from the eastern boundary of district and receives a number of short tributaries at its right flowing within district Maru and Charghar are important tributaries that join Wardha. The Tapi flows along the N-W boundary of the district Khardu, Sipna, Dewal & Dhulghat are its tributaries. The area shows dendritic drainage pattern, while Purna alluvium basin cover parallel to sub parallel drainage pattern & is almost plain area.

1.6 Irrigation Potential of the district

The area under irrigation is 80,543 ha in the district, which is 8.5% of the total cultivated area. The main source of irrigation is dug well. About 84473 dug wells facilitate the irrigation to an area of 62992 ha (91.5%) of the net irrigated land. An area of 17550 ha is irrigated by other sources like canals and lift irrigation schemes etc.

Upper wardha is the major irrigation project of the district having the command area in Morshi, Tiwasa, and Chandur rly tehsils. The perennial and seasonal irrigation provided by the project is about 1671 ha and 11097 ha respectively. The medium irrigation projects are Shahanur in Anjangaon tehsils imparting perennial irrigation to an area of 218 ha and seasonal to an area 854 Ha. Malkhed in Chandur rly tehsil, Shekhadari in Warud tehsil and Dhargad in Chandur bazar tehsil are the other minor irrigation projects in the district providing perennial and seasonal irrigation in their command area to the land of 161 ha, 728 ha and 275 ha respectively.

In addition to above projects minor irrigation projects under State and Zillah Parishad sector are providing irrigation to an area about 19,917 Ha.

1.7 Soil formation in the district and types of soils

The major portion of the earth crust of the district has been synthesized from the rock ‘Basalt’ hence the majority soil of the district in general is black and fertile. However, these soils are divided into medium black (4.58 lakh Ha.). Followed by shallow (1.84 lakh Ha.) distributed in Dharani, Chikhaldara, Chandur rly and Nandgaon Kh. tehsils. About 1.21 lakh Ha. soils are deep black and are spread over in Daryapur, Anjangaon Surji, Bhatkuli and some soils of Anjangaon, Achalpur and Amravati tehsils are problematic as depicted below.

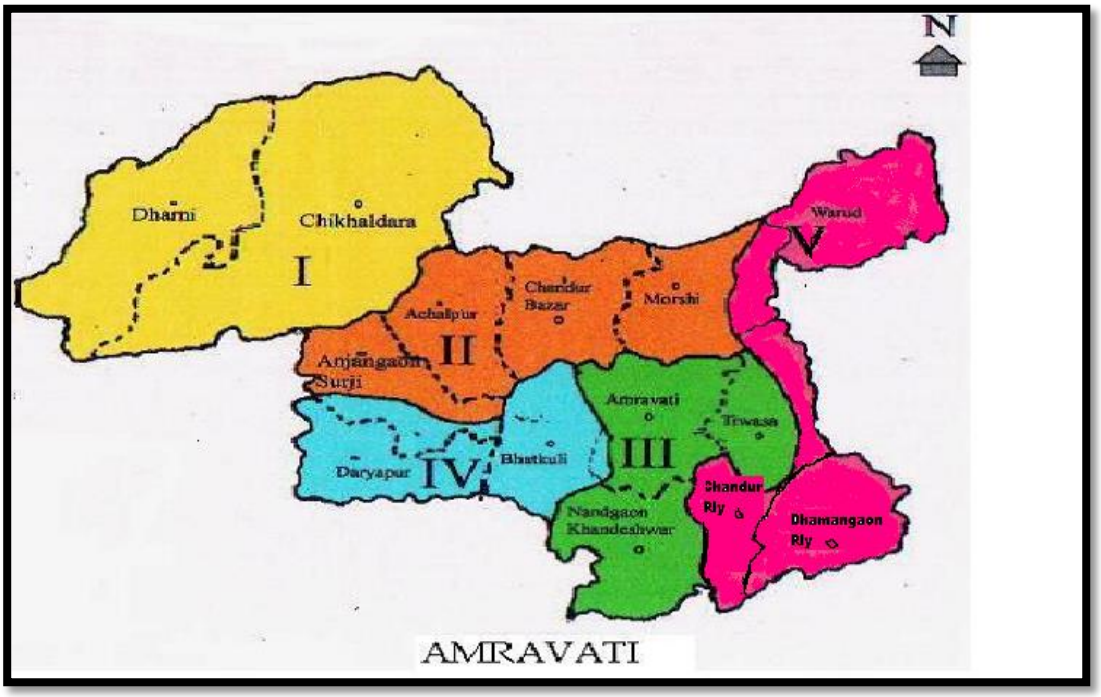
1.8 Agro-Ecological Situations

Sr. No.	Name of the block	Black		Red Soil		Sandy Soil		Sandy loam Soil		Others (Light / Shallow)		Total
		Area	%	Area	%	Area	%	Area	%	Area	%	
1	Chikhaldara	768	3	-	-	-	-	-	-	26661	97	27429
2	Dharni	16634	32	-	-	-	-	-	-	35834	78	52468
3	Achalpur	78622	85	-	-	-	-	-	-	13698	15	92320
4	Chandur bazar	28604	86	-	-	-	-	-	-	4665	14	33269
5	Anjangaon surji	35109	100	-	-	-	-	-	-	151	0	35260
6	Morshi	54436	68	-	-	-	-	-	-	25357	32	79793
7	Amravati	55069	67	-	-	-	-	-	-	27585	33	82654
8	Nandgaon KHa.	35160	50	-	-	-	-	-	-	35035	50	70195
9	Teosa	25749	51	-	-	-	-	-	-	24343	49	50092
10	Daryapur	83326	97	-	-	-	-	-	-	2651	3	85977
11	Bhatkuli	51272	99	-	-	-	-	-	-	766	1	52038
12	Warud	42533	64	-	-	-	-	-	-	23495	36	66028
13	Chandur Rly	39997	66	-	-	-	-	-	-	20752	34	60748
14	Dhamangaon Rly	41669	68	-	-	-	-	-	-	19363	32	61033
	Total	**588948**	69	-	-	-	-	-	-	260356	**474**	**849304**

Amravati district was divided into six zones according to Agro–ecological situations prevailing in different parts of the district. These situations are based on rainfall, topography, soil type, etc., the situation wise survey helped in understanding the situation specific research and extension priorities and needs for strategic planning of the district.

Agro-Ecological Situations including their characteristics and coverage.

Agro Ecological Situations	Characteristic	Block Covered
AES-I	Hilly Topography, Marginal Land, High Rainfall, Deep Forest	Chikhaldara, Dharni
AES-II	Plain Topography, Medium to deep Soil, Assured Rainfall	Achalpur, Anjangaon Surji, Chandur Bazar, Part of Morshi
AES-III	Plain Topography, Shallow to medium Soil, Assured	Morshi ,Warud
AES-IV	Plain Topography, Shallow to medium Soil, Assured Rainfall, Command Area with Irrigation	Chandur Railway, Dhamangaon Railway, Tiwasa Part of Morshi
AES-V	Plain Topography, Shallow to Medium Soil, Assured Rainfall, Irrigated Situation	Nandgaon Khandeshwar, Amravati, Part of Chandur Railway, Part of Tiwsa
AES-VI	Plain Topography, Deep Soil, Rainfed Area, Assured Rainfall, Saline Track	Bhatkuli, Daryapur Anjangaon Surji



Amravati District Agro Ecological Situation map

Agro Ecological Situation	Colour
AES-I	
AES-II	
AES-III	
AES-IV	
AES-V	
AES-VI	

Chapter 2: Agriculture Profile of District

2.1 Land use classification of the district

Land is classified as below in the district as per their uses.

Sr. No.	Particulars	Area in Ha.
1	Land under forest	309800
2	Land not available for cultivation	64300
	(a) Land put to non-agriculture use	44700
	(b) Barren and uncultivable land	19600
3	Land not cultivable other than barren land	45000
	(a) Permanent pasture and other grazing land	20000
	(b) Land under mischievous tree crops	5000
	© Cultivable waste	11000
4	Fallow land	46500
	(a) Current fallow	32400
	(b) Other fallow	14100
5	Area under crop	984100
6	Net area sown	781203
7	Area sown more than once	203100
8	Total Geographical area	1221763

(Source: Census 2011 and SREP)

Information on Land use pattern in the district

Sr. No.	Name of block	Geographical area	cultivable area	cultivated area	cultivable waste	current Fallow	Forest		Pasture	Land put to Non-Agri. Use	Land under misc. plantation	Barren And uncultivable land (waste land)
							Reserved	open				
1	Dharni	81173.61	53920.98	48187.85	5733.13	1636.87	26105.13		7002.57	120.37	1.3	2992.81
2	Anjangaon	50174.86	46540.43	41001.15	3208.94	202	0	900.1	334.81	263.34	1758.28	3159.35
3	Bhatkuli	57941.41	53602.34	46625.62	26118.12	1927.29	--	381.6	254.69	1795	175.91	1340.67
4	Chandur rly	54990	46661.61	38346.61	1164.34	472.61	4515.94		1776.8			231.46
5	Chandur Bazar	68343.63	62648	58300	2525	1823	0	814	1303	127	4239	369
6	Dhamangaon rly	63237	57520	53500	1392	3524	0	0	3745	1795	0	1001
7	Amravati	87871.73	62705.69	62007.14	6075.77	3055.94	9887.93	--	1173.37	1965.61	--	4582.61
8	Chikhaldara	56723.57	29937.53	28151.56	1460.74	1785.95	15753.67		1348.57	23656.04	1574	1556
9	Daryapur	81070.90	75297	71926	2299.69	0	0	80.15	648.71	354.85	74594	1586.56
10	Warud	74664.68	59198.66	56483	2715.66	115	10584.26		743.37	386.53	110	2750.62
11	Tiwasa	55915.42	54942	43176.76	2229.81	2396.74	6410.80	340.2	751.69	300.32	108.25	2229.81
12	Achalpur	64630.05	54368	54050	361	2103	0	2528	1953.89	562.46	1653.33	870.66
13	Morshi	80220.76	62841	1352.8	2167.33		7120.24		828.33	2662.76	1352.8	2.82
14	Nandgaon Kh.	78194.31	64500	63534	1192	1162	0	1097	1171	2129	350	1425.84

(Source: Census 2011 and SREP)

2.2 Agriculture land holdings

Land use pattern:

The total geographical area of the district is 12.21 lakh Ha. And a perusal of land indicates that almost 63% area is under cultivation while 34% under forest. The potential of about 50011 Ha. fallow land is still available for production activity. The forest area carries tremendous potential for employment and income generation through the proper exploitation of medicinal and aromatic plants and herbs.

Land holding pattern:

There are 4.70 lakh land holders covering an area of 7.81 lakh Ha. Of this about 15 percent area holding the land below 1.00 Ha. While 85% are small and large landholders.

Classification of land holders in the district is as following:

(Source: District Statistics Office, Amravati)

Sr. No.	Description	Area (Ha.)	Farmer (No.)
1	Below 1 Ha (marginal)	100595	161108
2	1 to 2 ha (Small)	243101	188756
3	2 to 5 (Medium)	282734	102304
4	5 to 10 (large)	104184	15907
5	Above 10 Ha.	35725	2130
	Total	**766339**	**470205**

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

Irrigation facilities are well and canals. Total direct irrigation available through the canal, well, bore well, farm pond is 223,369 Ha.

Irrigation Source	Area Covered (ha)
Dams (large, medium, small) (72)	105968
Wells, Boor wells,	117364
Farm pond,	37
Total	223,369

2.4 Types of crops grown, cropping pattern

The total net sown area in the district is 7.81 lakh ha of which about 2.04 lakh Ha. is sown more than once including perennial crops. The total area under Kharif crops is 7.15 lakh Ha., while 1.48 lakh Ha is under rabbi crops. The average area under summer crop is about 0.94 lakh Ha. Soybean, Cotton, and Tur cover about 90 % of Kharif area. Gram and Wheat are main rabbi crops.

Crop wise area sown in the last 5 years is given below. Area sown for soybean, gram, and red gram crop is increased while cotton, kharif Sorghum, green gram sown area is reduced.

The area under fruits and vegetables crops is 4.84% and 0.46% respectively of the total cropped area. Out of the total area of 65,900 Ha. is under fruits crop. Santra occupies the major part of

(93%) distributed in Warud, Morshi, Chandur bazar, and Achalpur tehsils. Banana on 1.64% area is mostly grown in Anjangaon-Surji tehsil, Mango on 3.11% and Lemon on 1.51% area.

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

Sr. No.	Crop	2018-19		
		Area (Ha.)	Production(M.T.)	Productivity (Qtl.)
1	Soybean	291642	3426.79	11.75
2	Cotton	209583	1112.88	5.31
3	Mung	22369	96.63	4.32
4	Tur	112813	1251.09	11.09
5	Gram	86310	949.41	11
6	Wheat	26876	454.47	16.91
Sr. No.	**Crop**	**2019-20**		
		Area (Ha.)	**Production(M.T.)**	**Productivity (Qtl.)**
1	Soybean	238726	1864.45	7.81
2	Cotton	276078	828.23	3
3	Mung	12678	17.36	1.37
4	Tur	110012	945.00	8.59
5	Gram	94783	1331.70	14.05
6	Wheat	43046	783.00	18.19
Sr. No.	**Crop**	**2020-21**		
		Area (Ha.)	**Production(M.T.)**	**Productivity (Qtl.)**
1	Soybean	269659	2219.29	8.23
2	Cotton	244002	1076.04	4.41
3	mung	15929	12.10	0.76
4	Tur	106134	999.78	9.42
5	Gram	122316	1405.41	11.49
6	Wheat	50474	862.09	17.08
Sr. No.	**Crop**	**2021-22**		
		Area (Ha.)	**Production(M.T.)**	**Productivity (Qtl.)**
1	Soybean	262883	2473.72	9.41
2	Cotton	226931	869.14	3.83
3	mung	16512	25.09	1.52
4	Tur	123209	1214.84	9.86
5	Gram	132064	1543.82	11.69
6	Wheat	41693	774.23	18.57
Sr. No.	**Crop**	**2022-23**		
		Area (Ha.)	**Production(M.T.)**	**Productivity (Qtl.)**
1	Soybean	252117	1613.54	6.4
2	Cotton	253733	593.73	2.34
3	mung	7739	1.93	0.25
4	Tur	111658	367.35	3.29
5	Gram	139961	1207.86	8.63
6	Wheat	41243	659.88	16

(Source: Agriculture census 2015-16)

2.6 other facilities map

Sr.No	Facilities	Total	Symbol
1	ASC	1627	
2	KVK	2	
3	ACABTC	2	
4	Testing Labs	6	
5	Automatic Weather Station	90	
6	Nurseries	7	
7	FPO	209	
8	Farmer SHG	2725	
9	MAVIM SHG & MSRLM SHG	27076	
10	APMC	12	
11	Agri Education institutions	18	

Chapter 3: Weather trend of district

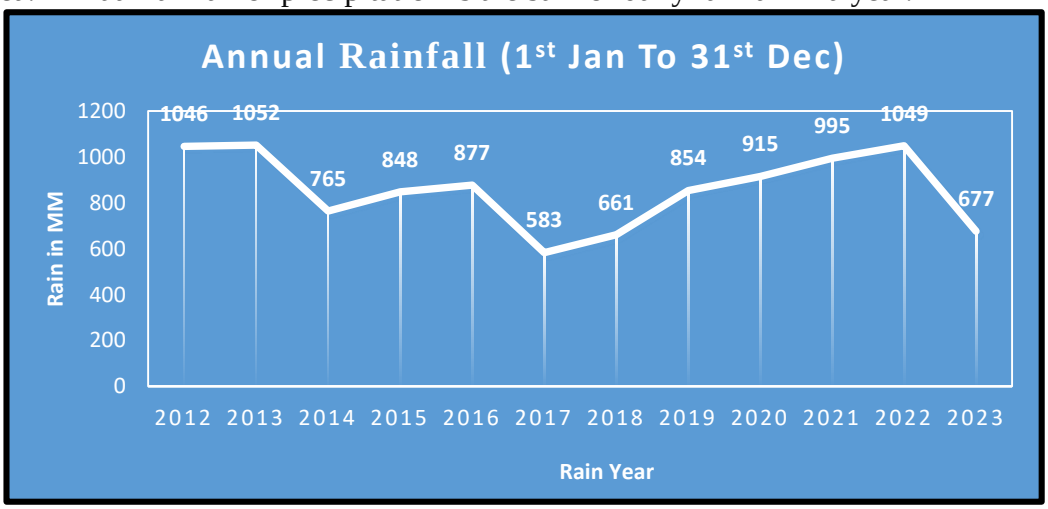
Introduction

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

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

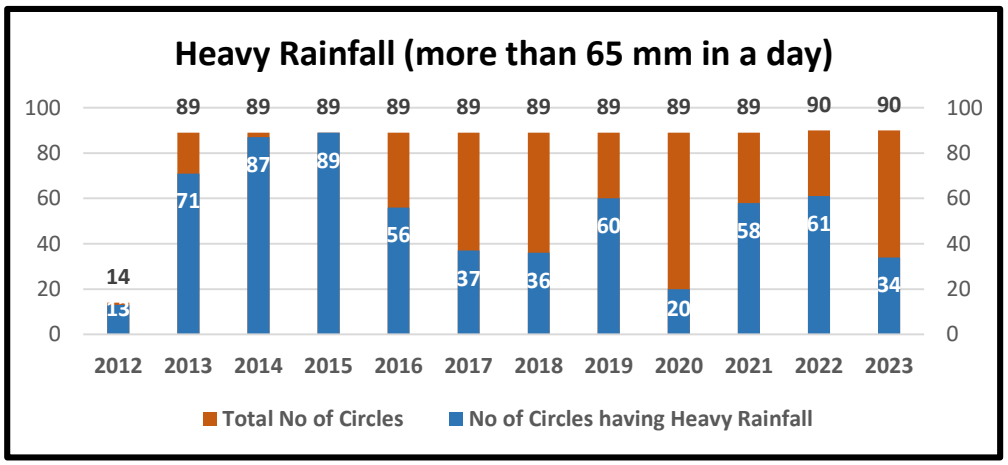
3.1Annual average rainfall of last twelve years

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



The graph 3.1 presents annual rainfall data of Amravati district from 2012 to 2023, highlighting fluctuations in precipitation. Notably, the lowest recorded rainfall was in year 2017 at 583 mm, while the highest occurred in year 2013 with a total of 1052 mm annual average rainfall.

3.2 Heavy rainfall (more than 65 mm in a day)



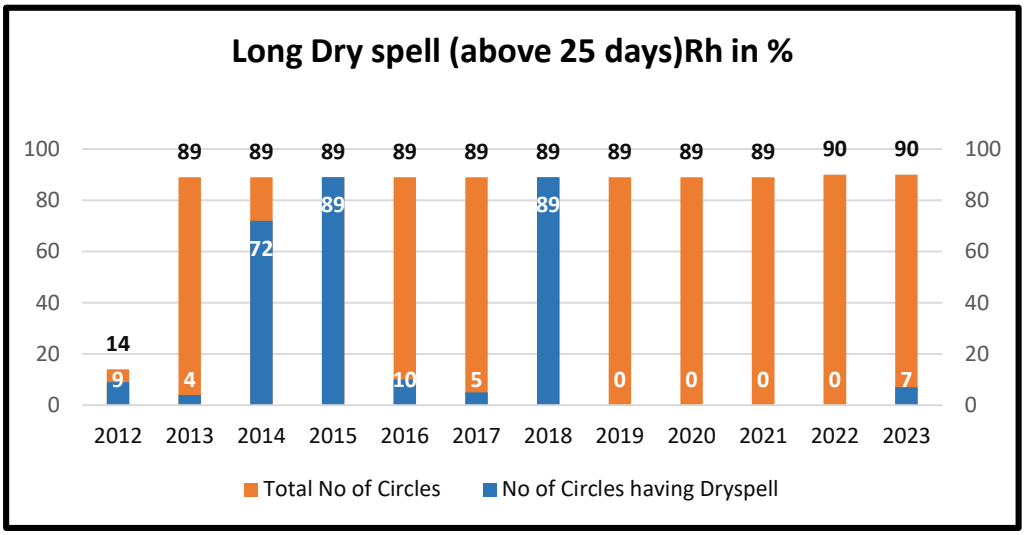
Heavy rainfall is defined as rainfall that exceeds 65 mm in 24 hours.) The provided graph 3.2 illustrates occurrences of heavy rainfall in circles within the Amravati district from year 2012 to 2023. Notably, in year 2015, heavy rainfall affected the all 89 circles, in Amravati district. Conversely, the year 2020 recorded a lower incidence of heavy rainfall, with only 20 circles out of the 89 circles being affected in 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

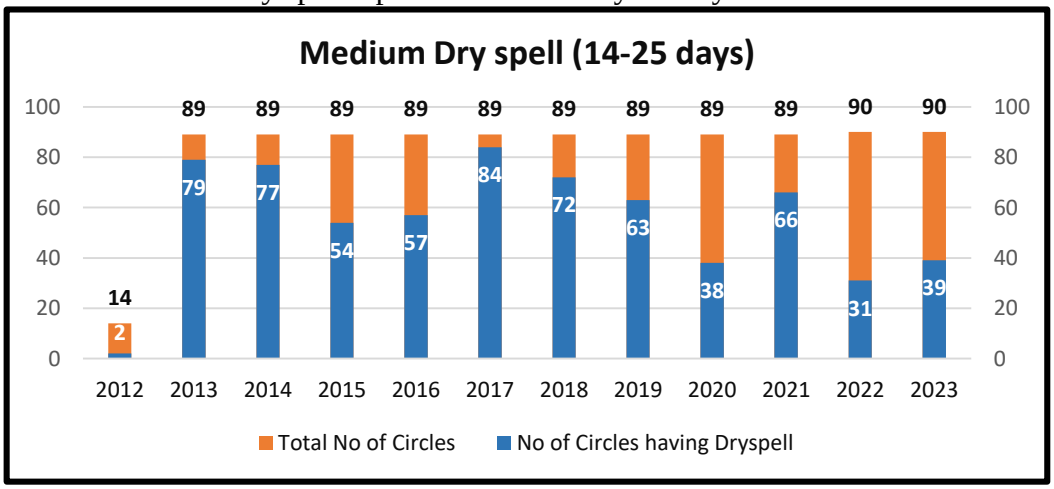
Long Dry spell is a prolonged period above 25 days of dry days in monsoon period



A graph (Graph 3.3.1) that shows the trend of long dry spells observed in Amravati district. The data covers the total number of circles and the circles that affected long dry spell (more than 25 days) from the year 2012 to 2023. The graph shows that in year 2015 and 2018, all circles in the district experienced long dry spells. Conversely, in year 2019 to 2022, there was no long dry spell, across all circles in the district.

3.3.2 Medium Dry spell

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

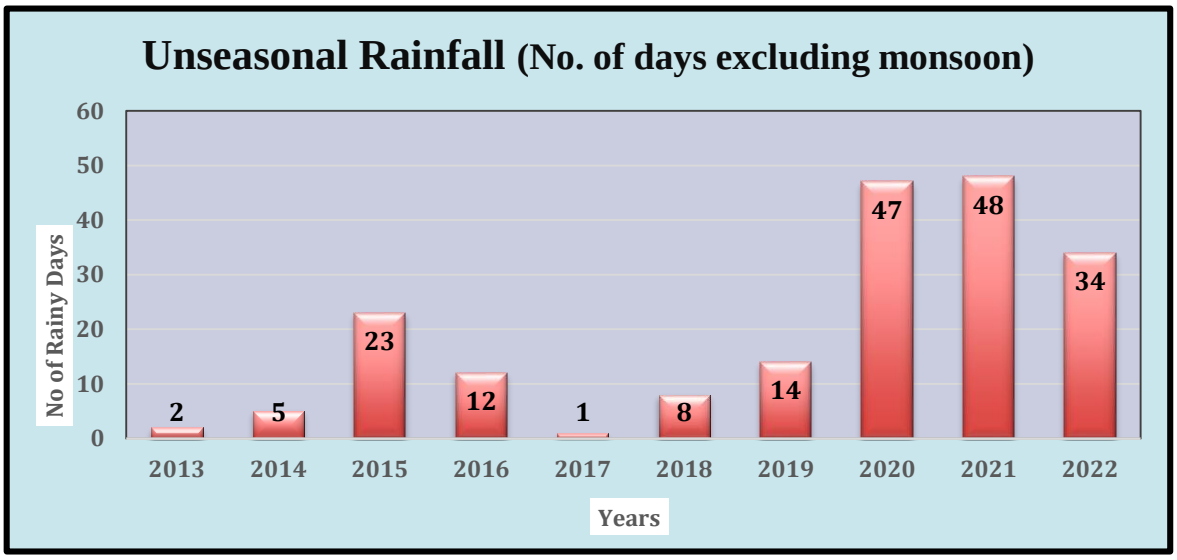


A graph (Graph 3.3.2) that shows the trend of medium dry spells observed in Amravati district. The data covers the total number of circles and the circles that affected medium dry spell (14 to

25 days) in Amravati district from the year 2012 to 2023. The graph shows that in year 2017, highest No. of circle i.e. 84 circles out of 89 circles in the district experienced medium dry spells. Conversely, in year 2022, there was 31 circles out of 90 circles experienced medium dry spell in the district.

3.4 Unseasonal rainfall.

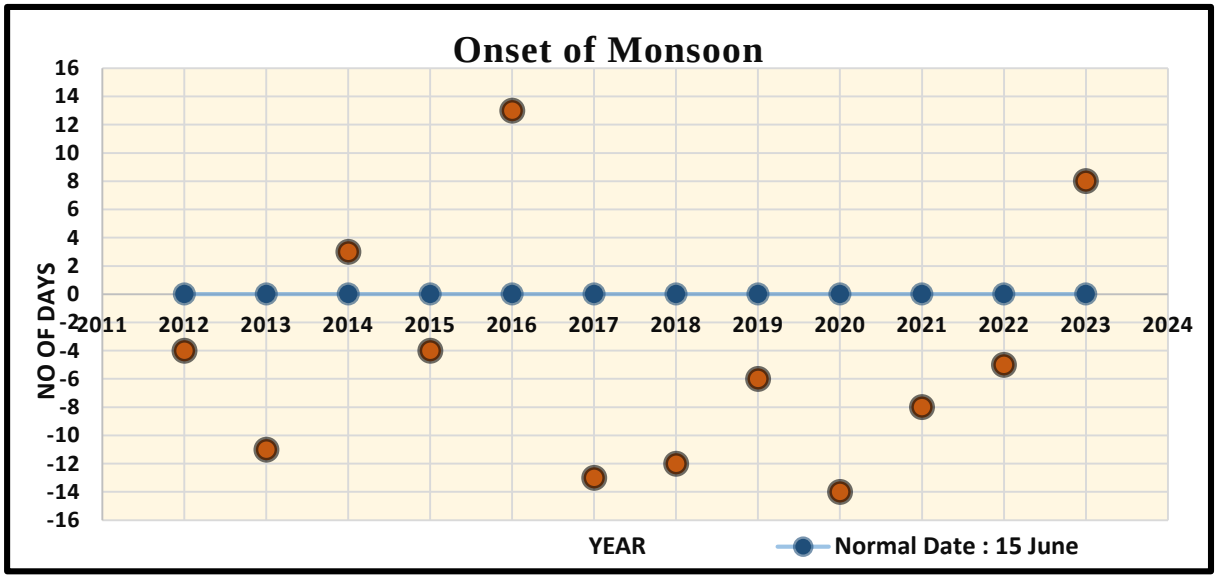
Rainfall received during non mosoon days is treated as unseasonal rainfall. Unseasonal rains-when there is a sudden change in atmospheric pressure, it can result in precipitation, even during non-monsoon seasons.



The graph 3.4 illustrates the annual occurrences of unseasonal rainfall in the Amravati district from year 2013 to 2022. The data reveals a variation ranging from 1 days to 48 days of unseasonal rainfall.

3.5 Monsoon onset delay

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

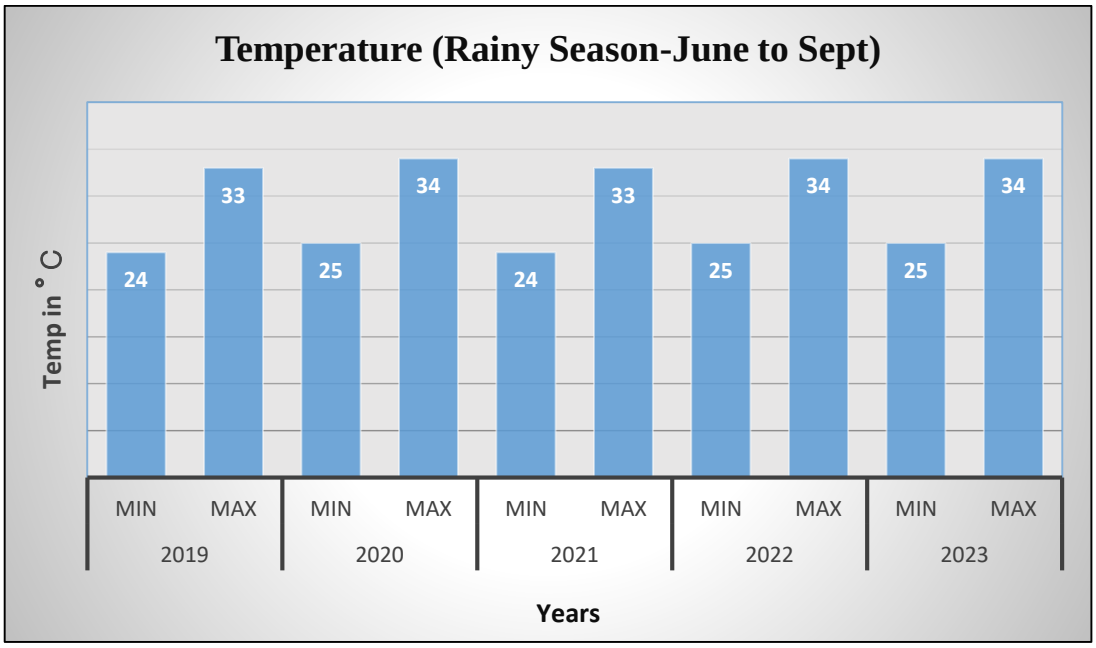


The graph 3.5 depicts the annual onset of the monsoon. The blue line represents the normal day of onset of monsoon. The onset days show variations ranging from -14 to 13 days. Notably, in year 2014, 2016 and 2023 the monsoon arrived delayed than the normal onset date. However, in remaining years the monsoon was notably arrived earlier.

3.6 Temperature

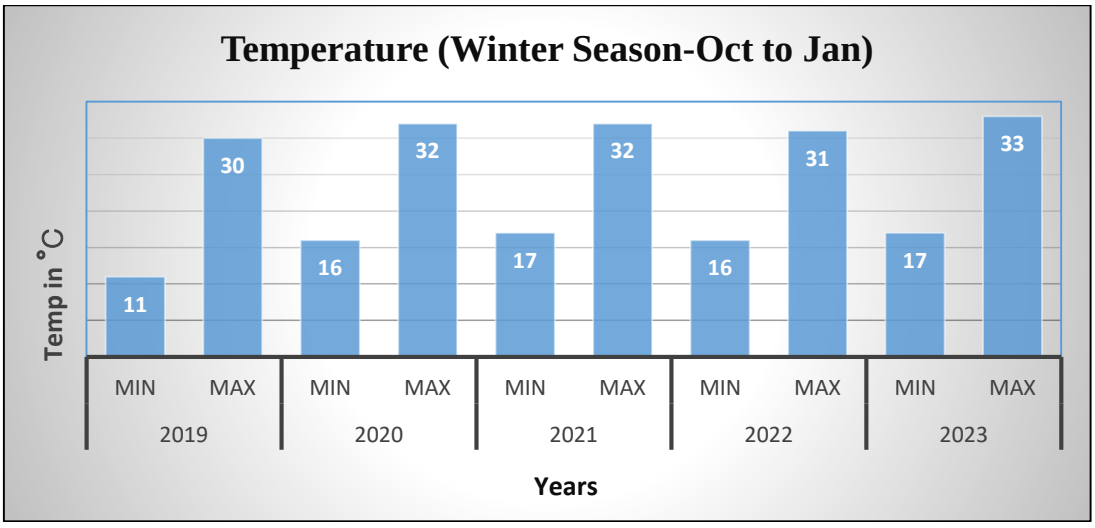
Temperature is a physical quantity that quantitatively expresses the attribute of hotness or coldness. The average temperature is 27°C, with a minimum of 16°C and a maximum of 38°C. On the coldest nights, the temperature usually drops to around 11°C. On the warmest days, the temperature usually reaches around 42°C

3.6.1 Temperature (Rainy Season-June to Sept)



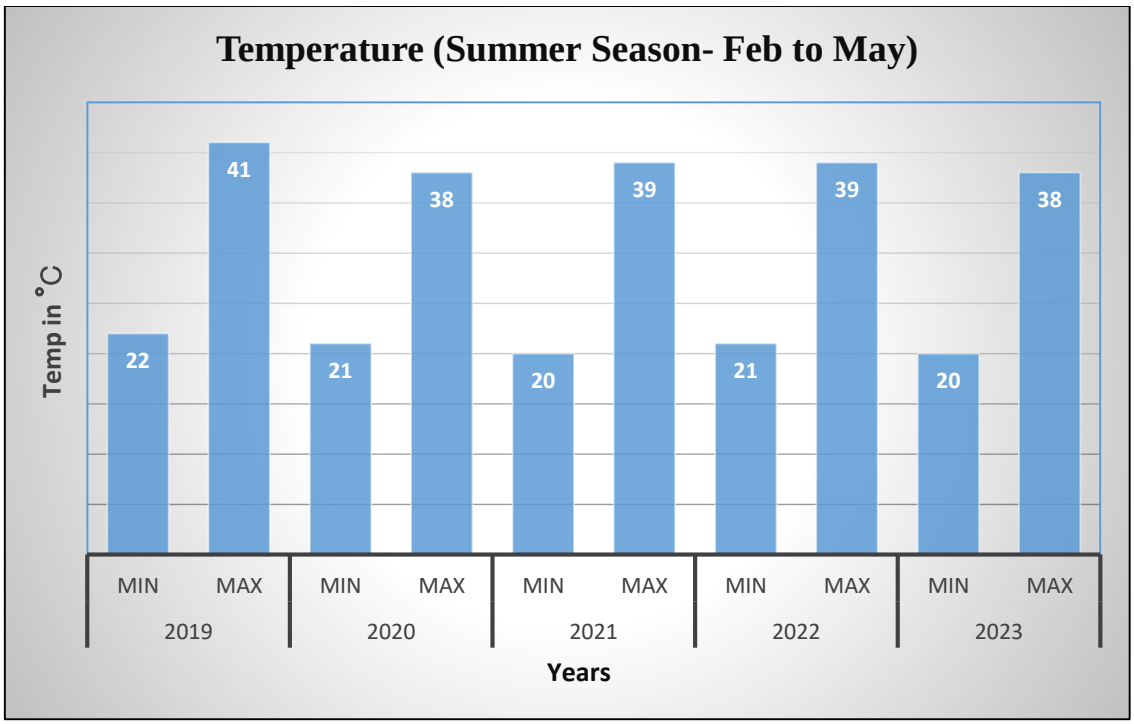
The graph 3.6.1 presents the temperature in the Amravati district during the rainy season from year 2019 to 2023 exhibited a consistent range, with minimum temperatures fluctuating between 24-25°C and maximum temperatures ranging from 33-34°C.

3.6.2 Temperature (Winter Season-Oct to Jan)



The graph 3.6.2 presents the temperature in the Amravati district during the winter season from year 2019 to 2023 exhibited a consistent range, with minimum temperatures fluctuating between 11-17°C and maximum temperatures ranging from 30-33°C.

3.6.3 Temperature (Summer Season- Feb to May)

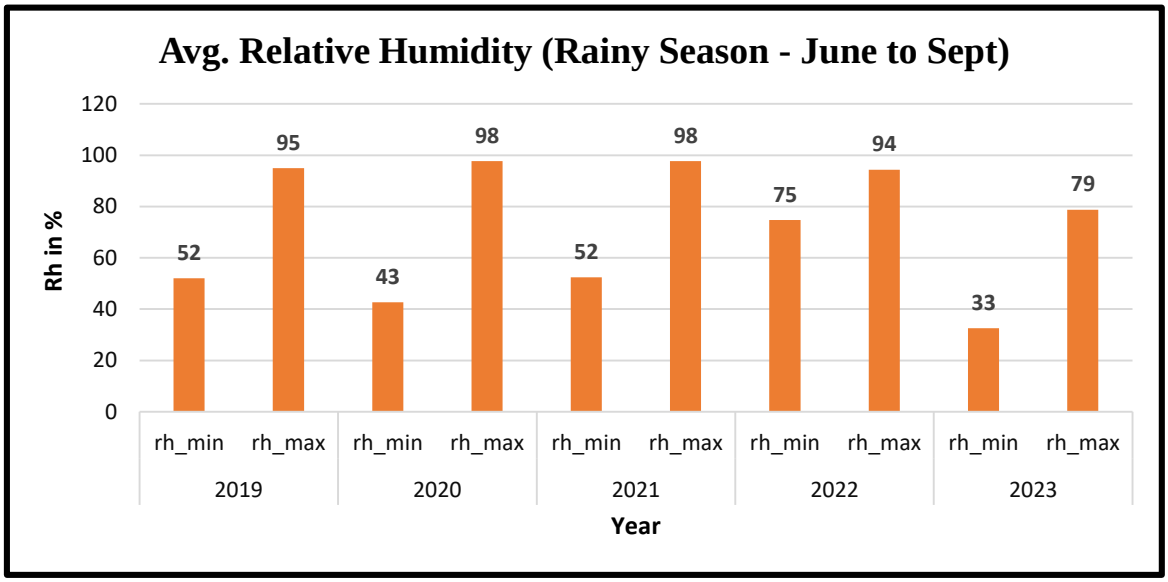


The graph 3.6.2 presents the temperature in the Amravati district during the summer season from 2019 to 2023 exhibited a consistent range, with minimum temperatures fluctuating between 20-22°C and maximum temperatures ranging from 38-41°C.

3.7 Relative Humidity

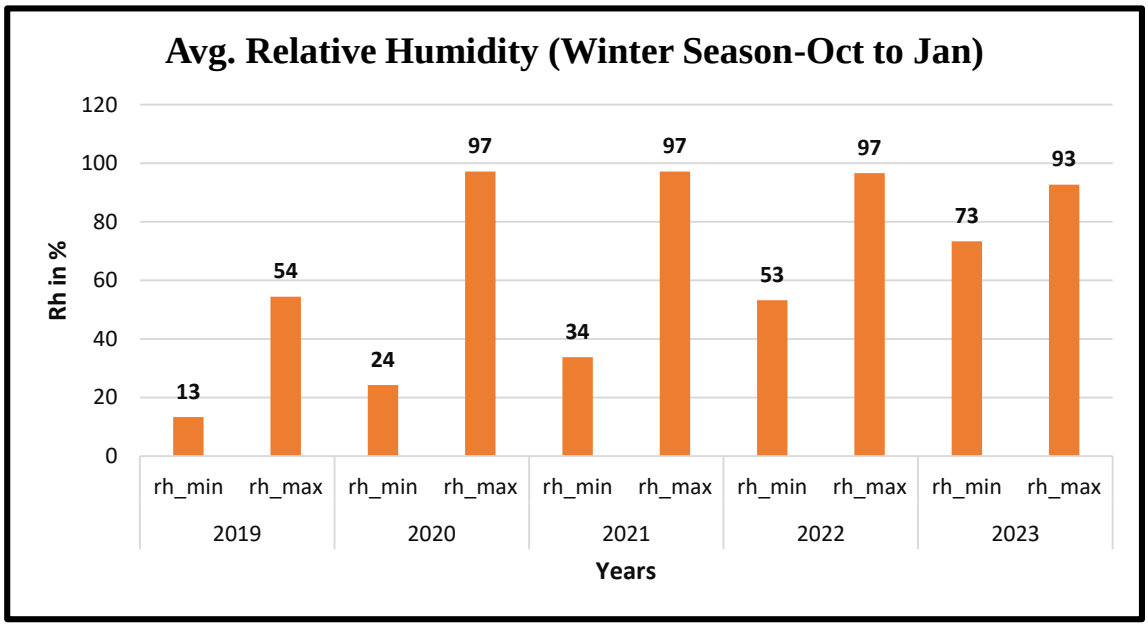
Relative Humidity is the ratio of the actual quantity of moisture at a certain temperature and pressure to the maximum it can hold at the same temperature and pressure. It is usually multiplied by 100 and expressed in percent.

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



The graph 3.7.1 illustrates humidity levels during the rainy season in the Amravati district, revealing a variation in minimum humidity from 33% to 75% and maximum humidity ranging between 79% and 98%.

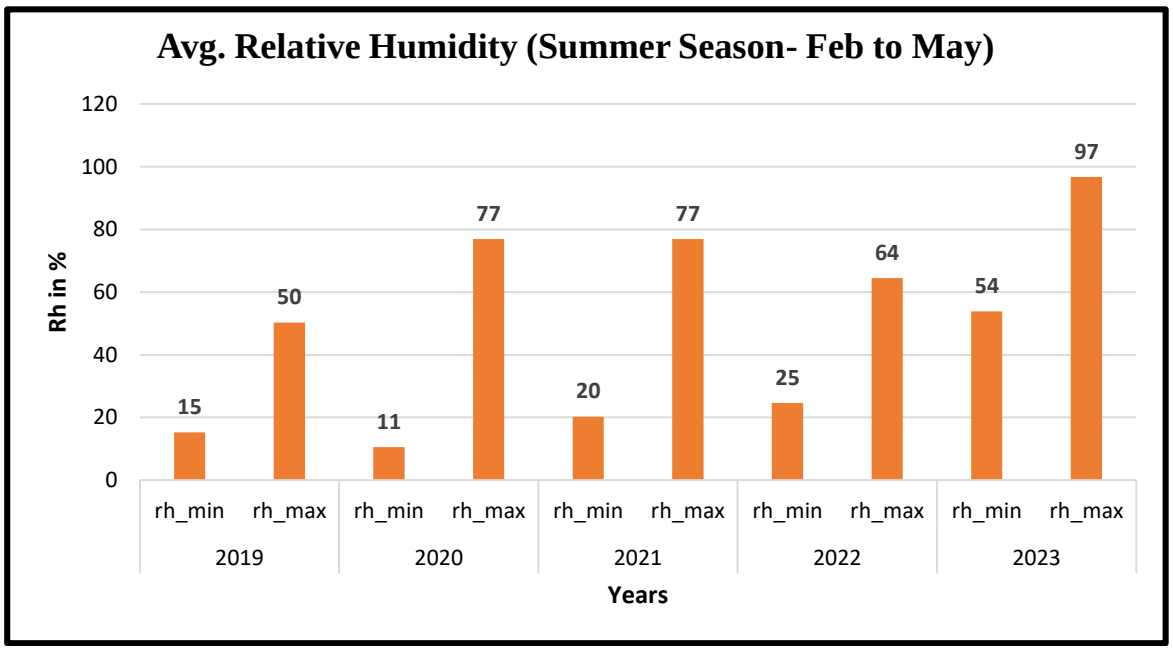
3.3.1 Avg. Relative Humidity (Winter Season-Oct to Jan



The graph 3.7.2 illustrates humidity levels during the winter season in the Amravati district, revealing a variation in minimum humidity from 13% to 73% and maximum humidity ranging between 54% and 97%.

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

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



The graph 3.7.3 illustrates humidity levels during the summer season in the Amravati district, revealing a variation in minimum humidity from 11% to 54% and maximum humidity ranging between 50% and 97%.

Sr. No.	Climate Variability	Kharif			Rabbi	
4.1	Impact of Temperature	Cotton	Soybean	Tur	Gram	Wheat
	Crop Growth and Yield`	● Stunted Growth Normal temp. for cotton crop is 27-32 c. minimum temp. required for germination is 16 C if temp <16c it affects germination of seed, 21-27c is good for vegetative growth and fibre development affect if the temp<15c and also affect the crop production temp>43c it causes flower and bud dropping ● shedding of square ● Decrease in soil moisture so uptake of nutrients is reduced. ● yield losses	●average temperature-26-30C ●Lower temp.-delay the flowering ●higher temp-dropping of flowering Stunted Growth ●dropping of flower ●Decrease in soil moisture affect uptake of nutrients is reduced ●Yield Losses up to 20% ●In 2022 rabbi soybean crop In Tiosa Tehsil affected due to high Temperature (42-45c)	● Normal temp. 20-30c due to high temperature dropping of flower ● Decrease in soil moisture so uptake of nutrients is reduced ● Yield Losses up to 20%	● normal temp- 15-25)OC ● low temp and cold-causes disfavour to germination and flowering Germination Problem ● Vegetative Growth Disturb ● Decrease in soil moisture so uptake of nutrients is reduced ● Yield Losses up to 10%	● Normal temp- 16-22C, wheat required cool temp. for growth and tillering ● If temp high- affect the growth ● >25 c it reduces grain weight ● Optimum temp. for germination is 20-22c ● if the temp high it affect the germination Problem ● various stages affected(e.g. crown root initiation stage) ● Decrease in soil moisture so uptake of nutrients is reduced ● Yield Losses up to 10%

	Water Availability	● Soil Moisture Decrease it causes soil Cracking Wilting of Crop ● Stress of water on Crop dropping of flower. ● Decrease in soil moisture so uptake of nutrients is reduced ● Water Stress affect boll formation shading of flower and boll	●Soil Moisture Decrease it causes soil Cracking Wilting of Crop ●Stress of water on Crop dropping of flower. ●Decrease in soil moisture so uptake of nutrients is reduced	● Soil Moisture Decrease it causes soil Cracking Wilting of Crop ● Stress of water on Crop dropping of flower. ● Decrease in soil moisture so uptake of nutrients is reduced	● Soil Moisture Decrease it causes soil Cracking Wilting of Crop ● Stress of water on Crop dropping of flower. ● Decrease in soil moisture so uptake of nutrients is reduced	● Soil Moisture Decrease it causes soil Cracking Wilting of Crop ● Stress of water on Crop dropping of flower. ● Decrease in soil moisture so uptake of nutrients is reduced
	Pest and Diseases Infestation	● Due to Diseases And past decreases the quality of crop e.g. *kawadi kapas* effect of pink bollworm ● Sucking Pest Increase	●Whitefly Attack Curling of leaves ●Due to Diseases And past decreases the yield e.g. Yellow vein mosaic	● Flower shedding ● pod bollworm affect the quality and yield	● Flower shedding ● pod bollworm affect the quality and yield	● *Tambera* Diseases leaf rust affect the yield.
4.2	**Impact of Rainfall on**					
	Crop Growth and Yield	● wilting of crop ● yield losses ● shedding of square ● Increase in pest and disease attack. ● In Amravati district July 2023 crop affected area is16512 Ha. and in 2022 95443Ha.	●Vegetative Growth Stunted ●Wilting of plants. ● Yield Losses up to 20% ●Increase in pest and disease attack. e.g. In Amravati dist. In the month of July and August 2022 soybean 108003 ha, in July 2023 crop affected area is 33524 Ha.	● wilting of crop ● Yield Losses up to 20% ● Increase in pest and disease attack. ● In Amravati district July 2023 crop affected area is 12492 Ha. and Tur 38735ha in 2022	● Germination Problem Vegetative Growth Disturb ● Yield Losses up to 10%	● Germination Problem ● Vegetative Growth Disturb ● Yield Losses up to 10%

	Irrigation Supply	● Soil Moisture level decrease, it causes soil Cracking Wilting of Crop ● Stress on Crop Affect flowering and losses yield	●Soil Moisture level Decrease it causes soil Cracking Wilting of Crop ●Stress on Crop Affect flowering and losses yield	● Soil Moisture level Decrease it causes soil Cracking Wilting of Crop ● Stress on Crop Affect flowering and losses yield	● Soil Moisture level Decrease it causes soil Cracking Wilting of Crop ● Stress on Crop Affect flowering and losses yield	● Soil Moisture level Decrease it causes soil Cracking Wilting of Crop ● Stress on Crop Affect flowering and losses yield
	a) Drought	● soil moisture level decrease it causes soil cracking wilting of crop ● stress on crop affect flowering and losses yield	●soil moisture level decrease it causes soil cracking wilting of crop ●stress on crop affect flowering and losses yield	● soil moisture level decrease it causes soil cracking wilting of crop ● Stress on Crop Affect flowering and losses yield	● soil moisture level decrease it causes soil cracking wilting of crop ● Stress on Crop Affect flowering and losses yield	● soil moisture level decrease it causes soil cracking wilting of crop ● stress on crop affect flowering and losses yield
	b) Flood	● Decrease the soil air so damage the roots of plants and increased the fungal infection ● removing & flowing of plants ● Yield Losses up to 50% ● In July 2023, IN 10 Villages affected 422 farmers 52 Ha.	●Decrease the soil air so damage the roots of plants and increased the fungal infection ●removing & flowing of plants ●Yield Losses up to 40% in a district Amravati taluka, Devra Devri and Antora are the villages severely affected due to flood.	● Decrease the soil air so damage the roots of plants and increased the fungal infection ● removing & flowing of plants ● Yield Losses up to 30% ● Removal of the top layer of fertile soil.	● Decrease the soil air so damage the roots of plants and increased the fungal infection ● removing & flowing of plants ● Yield Losses up to 40%	● Decrease the soil air so damage the roots of plants and increased the fungal infection ● removing & flowing of plants ● Yield Losses up to 50%
	Pest and Disease infestation and its management	Fungal pathogens of insects are favoured by high humidity and their incidence would	Fungal pathogens of insects are favoured by high humidity and their incidence would	_	Fungal pathogens of insects are favoured by high humidity and their incidence would be	_

		be increased by climate changes that lengthen periods of high humidity and reduced by those that result in drier conditions.	be increased by climate changes that lengthen periods of high humidity and reduced by those that result in drier conditions.		increased by climate changes that lengthen periods of high humidity and reduced by those that result in drier conditions.	
	Soil erosion and nutrient loss	● The nutrient loss is closely related to erosion. ● due to high rainfall remove the upper layer of fertile soil ● The rate of soil loss is 16.4tonnes/hectare every year, (CSWCTRI), Dehradun. ● Nutrient loss due to erosion is very harmful effect for crop production reducing regularly or arable land convert in barren land.	●The nutrient loss is closely related to erosion. ●due to high rainfall remove the upper layer of fertile soil ●The rate of soil loss is 16.4tonnes/hectare every year, (CSWCTRI), Dehradun. ●Nutrient loss due to erosion is very harmful effect for crop production reducing regularly or arable land convert in barren land.	● The nutrient loss is closely related to erosion. ● due to high rainfall remove the upper layer of fertile soil ● The rate of soil loss is 16.4tonnes/hectare every year, (CSWCTRI), Dehradun. ● Nutrient loss due to erosion is very harmful effect for crop production reducing regularly or arable land convert in barren land. ● In 2022 due to heavy rainfall 4707 Ha. soil degraded in the district.	● The nutrient loss is closely related to erosion. ● due to high rainfall remove the upper layer of fertile soil ● The rate of soil loss is 16.4tonnes/hectare every year, (CSWCTRI), Dehradun. ● Nutrient loss due to erosion is very harmful effect for crop production reducing regularly or arable land convert in barren land.	● The nutrient loss is closely related to erosion. ● due to high rainfall remove the upper layer of fertile soil ● The rate of soil loss is 16.4tonnes/hectare every year, (CSWCTRI), Dehradun. ● Nutrient loss due to erosion is very harmful effect for crop production reducing regularly or arable land convert in barren land.

	Harvest & Storage	● Boll Rot ● quality of produce is damage	●Pod size Decrease In 2022 as per PMFBY 8691 farmers lost their crops at post-harvest time in the district.	● Pod size Decrease ● quality of produce is damage	● Pod size Decrease ● quality of produce is damage	● Yield Losses up to 20% ● quality of produce is damage
4.3	**Impact of Other Calamities (Cyclones and hail storms etc.)**	Shading of boll and leaves	●dropping of pod	Hail Storms at the ripening stage cause heavy loss to the crop. causes flower drop.	Hail Storms at ripening cause heavy loss to the crop. Causes flower drop.	affect the tiller and flower
	Crop Damage and Loss	● Yield losses up to 40%	●Yield losses up to 40% ●crop damage due to cold waves	● Yield losses up to 40%	● Yield losses up to 40% In 2022 due to uncertain Rainfall and hailstorm for wheat crop-1431ha, onion-840ha, gram100ha, maize 126ha, oranges-5390 ha affected	● Yield losses up to 40% ● Yield loss crop is 313 Ha. Santra 896 Ha.

LOSSES DUE TO HIGH RAINFAL AND HAILSTORMS

देशोन्नती

तिवसा तालुक्यात तिसऱ्यांदा पावसाचे थैमान

देशोन्नती वृत्तसंकलन...

शेतात पाण्याचे तलाव ○ शाळेत पाणी शिरले

Amravati Edition
Aug 9, 2022 Page No. 8
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Saline Soils and their impact on cropping in the district

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

Land Use/Land Cover, Palaeochannels and Lineaments:

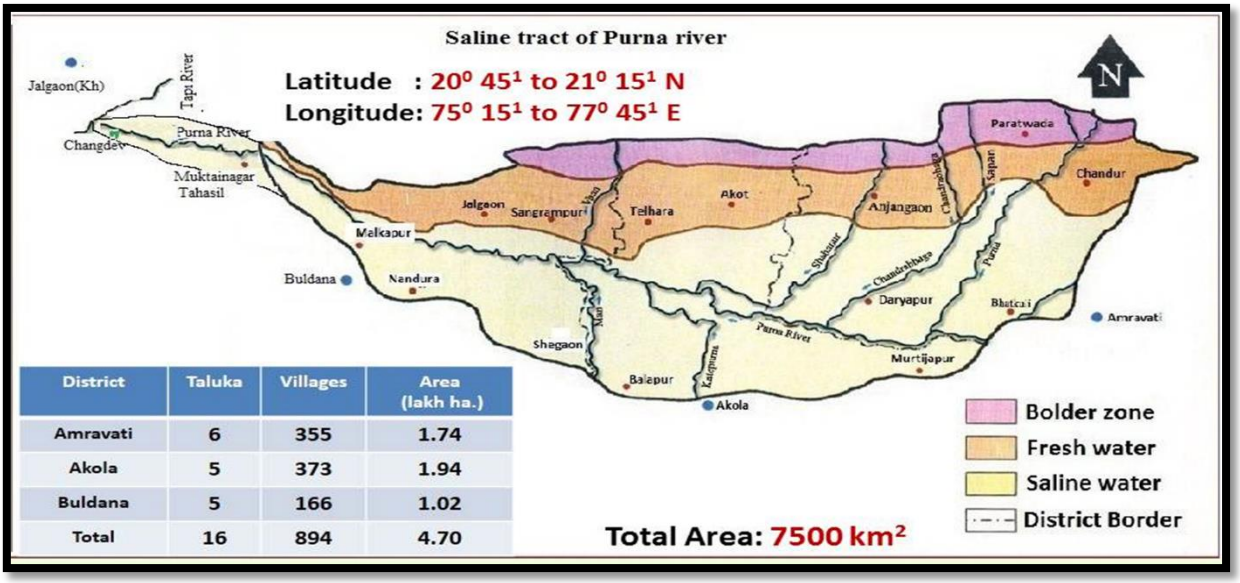
Land use/land cover map, prepared by using the satellite data of three seasons, viz. Kharif, rabbi and Zaid, and following the standard land use classification as pro-posed by NRSA (1995) denotes five major units: (i) built-up land (282.47 km2),(ii) agricultural land (12,438.35 km2), (iii) forest land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

The salinity is recorded in both shallow and deep aquifers as revealed by the dug well and borewell data. It has also been experienced that there is an irregular trend in the magnitude of salinity both in lateral and vertical profiles of the basin. Because of it, the groundwater of the area is unsuitable for both drinking and agricultural purposes. **More than 400 villages falling in saline area are continuously facing severe problem of drinking water, which becomes more acute in summer months. The magnitude of the**

problem is so high that in some of the area it is directly affecting the socio-economic set-up, i.e. desertification of villages, reduction of crop yield, and infertility of soil. The area is also deprived of well irrigation; hence, only rainfed crops are cultivated.

Socio-economic Status:

Agriculture is the main land use in the basin area. Maximum agriculture is unirrigated followed by the non-cultivable area and grazing land. Cotton (Gossypium) is major crop in



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

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

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

Chapter 5: Measures to cope with climatic variability

Sr. No	Climate Variability	Recommendation of Universities
1	**Rainfall condition**	
	Heavy Rainfall	• Ridges & Furrow sowing 7793 • Increase Spacing Distance • A District adopted BBF in 1088 Ha. Yield has increased by 10-15 %. • Fungicide Spraying • Trichoderma Drenching • Short Duration Variety • In Amravati District 50329 ha Dead furrow drawned.
	Low Rainfall	• In District In the year 2023 soybean crop yield decreased by 51 to 55% due to dry spell as per mid advisory report. • Across sowing on a slope • Sowing on Ridges & Furrow. • Selection of Short Duration Variety • Nipping of apical bud spray liquid nutrient • Give irrigation by sprinkler /drip
	Dry Spells / water stress	• Foliar application of liquid nutrient. • Don't Cultivation of Soil /adopt zero tillage method. • Irrigation by sprinkler /drip • Dug Farm pond.
	Terminal Drought	• Application of foliar micronutrients.
	Late onset of monsoon	• Selection of late duration Variety • Selection of short duration variety
2	**Temperature Condition**	
	High Temperature	• Selection of Climatic Crop ex. Pearl Millet • Spraying Potassium Phosphate & Drenching • Application of Micro Nutrient
	Cold waves/low temperature	• During night smoking in field • irrigate the crop
3	**Hailstorms**	• Sowing of busy, dwarf crop Variety
4	**Soil degradation**	• Conservation tillage can reduce soil erosion and runoff, resulting in less surface loss of nitrogen. • Horizontal sowing on a slope • remove the excess water through • Dead Farrow • Sowing of busy, dwarf crop Variety • Take soil conservation measure like graded bunding, loose boulder, Nala Bunding

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

6.1 CRTs Interventions

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

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

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

FFS (Farmers' Field School) sessions have been implemented in the project village since 2018, focusing on soybean, cotton, pigeon pea and gram crops in the Amravati 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	-	-	540	480	500	400	1722	1566
2020	1061	896	1519	1299	1109	976	1583	1401
2021	1314	1182	1600	1365	1132	1003	1791	1616
Average	**1187.50**	**1039.00**	**1219.67**	**1048.00**	**913.67**	**793.00**	**1698.67**	**1527.67**

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 14.29% 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 16.38% 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 15.22% compared to the control plot.

The FFS plot for Gram crops benefited from various CRT interventions, including as Seed treatment with fungicide and biofertilizer, sowing by BBF method, protective irrigation, NSKE, and use of pheromone traps. As a result, the yield of the FFS plot increased by 11.19% compared to the control plot.

नानाजी देशमुख कृषि संजीवनी, प्रकल्प २०२०-२१, उपविभाग :- मोर्शी, जिल्हा :- अमरावती शेतीशाळा क्षेत्रातील पीक कापणी प्रयोगानुसार उत्पादन अहवाल
पीक :- कपाशी

अ.क्र.	गाव	शेतकऱ्याचे नाव (होस्टफार्मर)	पिकाचेनाव		प्रात्यक्षिक प्लॉटमधील एकूण खर्च	पारंपारिक पध्दतीचे प्लॉटमधील एकूण खर्च	प्रात्यक्षिकप्लॉटमधील उत्पादन (कि./हे)		पारंपारिकपध्दतीचे प्लॉटमधील उत्पादन (कि./हे)		विकतेवेळीबाजारभाव		बाजारभावानुसारमिळालेले उत्पन्न (रु/हे)		प्रात्यक्षिक प्लॉटमधीलमिळालेले निव्वळ वाढीव उत्पन्न (रु/हे)
			मुख्य पिक	आंतरपिक			कपाशी	उडीद/मुंग/तूर	कपाशी	उडीद/मुंग/तूर	कपाशी	उडीद/मुंग/तूर	प्रात्यक्षिक (शेतीशाळा) प्लॉटमधील	पारंपारिक प्लॉटमधील	
1	सार्सी	गंगाधर गौरखेडे	कपाशी	मुंग	35525.0	36600.0	1042.5	0.0	872.5	0.0	56.0	62.0	22855.0	12260.0	10595.0
2	वरखेड	प्रकाश कडू	कपाशी	मुंग	34550.0	36300.0	1195.0	0.0	1057.5	0.0	56.0	60.0	32370.0	22920.0	9450.0
3	ठानाठुनी	केशोर काकडे	कपाशी	मुंग	33525.0	35350.0	995.0	0.0	917.5	0.0	55.0	60.0	21200.0	15112.5	6087.5
4	सुरवाडीबु.	अंकुश देशमुख	कपाशी	मुंग	29600.0	31275.0	1105.0	0.0	975.0	0.0	57.0	60.0	33385.0	24300.0	9085.0
5	तळेगाव ठाकूर	विशाल गायधने	कपाशी	मुंग	31250.0	34025.0	1090.0	0.0	920.0	0.0	55.0	60.0	28700.0	16575.0	12125.0
6	सावंगा	राजेंद्रजी आंडे	कपाशी	मुंग	60875.0	55875.0	1900.0	0.0	1375.0	0.0	56.0	50.0	45525.0	21125.0	24400.0
7	करजगाव	मुरलीधर शेळके	कपाशी	मुंग	62750.0	61375.0	2425.0	0.0	1650.0	0.0	58.0	50.0	77900.0	34325.0	43575.0
8	पिंपळखुटा	गजानन पडोळे	कपाशी	मुंग	66260.0	53375.0	2337.5	0.0	1362.5	0.0	58.0	50.0	69315.0	25650.0	43665.0
9	गोरेगाव	मारोतराव नागले	कपाशी	उडीद	54387.5	46125.0	1600.0	0.0	1225.0	0.0	58.0	50.0	38412.5	24925.0	13487.5
10	नागझिरी	विनायक पडोळे	कपाशी		62750.0	70000.0	1140.0	0.0	1030.0	0.0	58.0	0.0	3370.0	10260.0	13630.0
11	बेनोडा	कांताबाई जिचकार	कपाशी	मुंग	59750.0	51000.0	1500.0	0.0	1175.0	0.0	56.0	50.0	24250.0	14800.0	9450.0
12	पळसोना	श्रीराम युवनाते	कपाशी		55750.0	61500.0	1170.0	0.0	1070.0	0.0	58.0	0.0	12110.0	560.0	11550.0
13	धामणधस	श्रावण कोडापे	कपाशी	उडीद	61625.0	67900.0	1060.0	0.0	920.0	0.0	58.0	56.0	-145.0	14540.0	14395.0
14	मणकापूर	उकंडराव कुडसिंगे	कपाशी	उडीद	65250.0	70500.0	1225.0	0.0	1040.0	0.0	58.0	60.0	5800.0	10180.0	15980.0
15	मागोना	महादेव मानकर	कपाशी		65000.0	72000.0	1250.0	0.0	1180.0	0.0	58.0	0.0	7500.0	-3560.0	11060.0
16	कोळविहीर	सचिन चपे	कपाशी	मुंग	31975.0	34425.0	1275.0	0.0	1175.0	0.0	58.0	48.0	41975.0	33725.0	8250.0
17	आष्टोली	अतुल इंगोले	कपाशी	तूर	31725.0	33025.0	1312.5	812.5	1250.0	762.5	59.0	70.0	102587.5	94100.0	8487.5

शेतीशाळा होस्ट फार्मर यांनी सलग तीन वर्षे हवामान अनुकूल तंत्रज्ञानाचा वापर केलेल्या उपविभागातील १५ होस्ट फार्मर च्या शेतीमधील माती नमुने काढून रँडम पध्दतीने माती परीक्षण करण्यात आले ,त्यामध्ये सन २०१८ व २०२०-२१च्या अहवालात जमिनीतील सेंद्रिय कर्बाचे प्रमाण चे विश्लेषण अहवाल मध्ये १०शेतकऱ्यांच्या शेतीमधील सेंद्रिय कर्बाचे प्रमाण वाढल्याचे दिसून आले आहे.

मृद विश्लेषण अहवाल						
अ.क्र.	होस्ट फार्मर चे नाव	गावाचे नाव	२०१८-१९ मध्ये करण्यात आलेल्या माती परीक्षण मध्ये आढळलेले कर्बाचे प्रमाण (%)	२०२०-२१ मध्ये करण्यात आलेल्या माती परीक्षण मध्ये आढळलेले कर्बाचे प्रमाण (%)	कार्बाच्या प्रमाणात दिसून आलेली वाढ / घट	२०१८-१९ च्या तुलनेत २०२०-२१ मध्ये कार्बाच्या प्रमाणात दिसून आलेली वाढ किंवा घट टक्केवारी मध्ये (%)
1	मेघा बबन दळवी	रायपुर	0.11	0.38	0.27	245.45
2	अमोल कृष्णराव घोम	तरोडा	0.31	0.30	-0.01	-3.23
3	अर्जुन एकनाथ कोंडे	डोमक	0.33	0.28	-0.05	-15.15
4	प्रकाश किसन गावंडे	ब्राम्हणवाडा पाठक	0.20	0.23	0.03	15.00
5	आशिष पी. वैद्य	दहीगाव	0.45	0.33	-0.12	-26.67
6	वासुदेव सुभाषराव देशमुख	काजळी	0.13	0.31	0.18	138.46
7	उकंडराव डी. कुडसिंगे	माणिकपूर	0.08	0.22	0.14	175.00
8	श्रावण सोनाजी कोहाले	धामणगाव	0.13	0.29	0.16	123.08
9	गजानन भास्कररास पडोळे	पिपळखुटा	0.06	0.20	0.14	233.33
10	राजेंद्र शिवहरी आंडे	सावंगा	0.03	0.34	0.31	1033.33
11	मुरलीधर डेबुजी शेळके	करजगाव	0.01	0.42	0.41	4100.00
12	राजेंद्र गणेशराव खुळे	कोदोरी	0.25	0.35	0.10	40.00
13	योगेश शिवराव बर्वे	कोटगावंडी	0.44	0.36	-0.08	-18.18
14	मंदा राजकुमार पावडे	मादान	0.45	0.36	-0.09	-20.00
15	सविता अरविंद राउत	रसुलापूर	0.20	0.31	0.11	55.00

6.3 Impact of CRT on Crop Yield Based on Broad Bed Furrow (BBF)

Objectives:

1. Yield Improvement: The primary objective of BBF is to assess the impact of implementing Broad Bed Furrow (BBF) technology as a Climate Resilient Technology (CRT) on crop yield. It quantifies the increase in crop yield, such as soybean, tur, Chana or other crops, resulting from the adoption of BBF technology.
2. Water Management: Evaluate how BBF technology affects water management in agriculture. This includes the efficient utilization of water resources, reduced water wastage, and improved soil moisture retention.
3. Impact of BBF: The impact of BBF technology on soil health and fertility and productivity. BBF enhances nutrient retention, reduces soil erosion, and promotes overall soil health. Due to BBF pattern soil moisture and aeration is maintained so uptake of nutrients is easy as result yield is increased by 10 to 15 %. The adoption of BBF technology contributes to climate resilience, especially in regions prone to droughts or excess rainfall In Amravati District Area under BBF in the last three years. In year 2020, area is 22.98 ha, year 2021, area is 151.93 ha, year 2022, area is 134.06 ha and year 2023, area is 129.07 Ha.

In Surali Village Tehsil Chandur Bz. in 2020 Mr. Sham Eknath Deshmukh sown gram on BBF technology in 2 acre field. In harvest he obtained 32 quintal grams; this is the impact of BBF technology. In the same village Mr. Anil Deshmukh In 2021-22 yr. sown soybean and turned on BBF technology. While having high rainfall in harvest he got 5 quintals/ acre whereas other farmers in villages without BBF tech got 2-3 quintals/ acre. consequently sowing on BBF it helps farmer

6.4 Impact of Zero Tillage on Yield Crops (District Data):

Zero tillage, also known as no-till farming, is an agricultural practice in which crops are planted into the soil without prior ploughing or tilling of the field. This method has several potential impacts on crop yields, In Amravati district as shown in table there are hundred farmers who are practicing SRT on area one 108 hectares. The following are the impacts of SRT.

In Jasapur Village of Chandur bz.Tehsilmr. Manik Parasram Bhele adopted SRT for cotton crop in 2 acre. He implemented SRT after harvesting banana crop, In kharif he sown cotton on the same bed due to SRT in the healthy aerated soil crop grown well. The second year this cultivation cost was reduced. It helps to protect the topsoil from erosion, it can improve soil structure and enhance microbial activity. Reduced soil disturbance promotes the development of beneficial soil organisms, leading to healthier, more fertile soil. Soil disturbance in zero tillage conserves soil moisture, which can be particularly beneficial in regions with limited rainfall or during drought conditions. This can result in more consistent crop yields in the district. Farmers practicing zero tillage save on fuel and labour costs associated with traditional ploughing and tilling, which can contribute to overall profitability. Reduces cost of cultivation.

6.5 Impact of Neem-Based Extracts on yield of Crops (District Data):

The neem-based extracts, derived from the neem tree *(Azadiracta Indica)*, the products are neem oil and neem-based pesticides are widely used in agriculture for their various benefits used on crops. Neem-based extracts can positively affect crop yield in several ways:

Neem extracts, particularly neem oil and neem-based pesticides, have natural insecticidal and fungicidal properties. They can help control a wide range of agricultural pests and diseases. By reducing pest and disease pressure, crops can grow more vigorously and produce higher yields.

The preparation and use of Neem oil is promoted in Villages through FFS. Neem-based products are often used as part of integrated pest management (IPM) strategies. They can protect beneficial insects and microbes, which can help maintain a balanced ecosystem in the field. This can indirectly contribute to improved crop yields.

Sr. No.	Crop Name	Total Plot	Average yield of control plot(qtl)	Average yield of FFS plot(qtl)	% increase in yield due Technology Adaptation
1	Soybean	164	471	524	11.25
2	Gram	227	644	714	10.87

The table shows no of farmers and area in 2023-24, sown by using Broad Bed Furrow (BBF) and Zero Tillage technology (SRT) is following

Tehsil	BBF		SRT	
	No of farmers	Area (Ha.)	No. of farmers	Area (Ha.)
Amravati	24	44.79	14	17.66
Bhatkuli	27	36.73	3	3.2
Chandur Railway	0	0	8	9.06
Dhamangaon	0	0	2	1.4
Daryapur	10	18.67	9	11.32
Anjangaon-Surji	1	2	8	8
Chikhaldara	2	5	1	0.4
Chandur bazar	3	11.2	12	12
Morshi	0	0	32	31.52
Warud	0	0	2	1.4
Teosa	0	0	9	12.46
Total	**67**	**118.39**	**100**	**108.42**

Neem-Based Extracts

Photo 1 Nimboli collection, Shivsagar Wamanrao Wadhe, Wandhali tal: Bhatkuli,

Photo 2 Nimboli drying, Wamanrao Vimakar Daryabad, Tal- Bhatkuli

Photo 3 Nimboli grinding, krushitai karuna Vimaker, Daryabad, Tal- Bhatkuli

Photo 4, 5 Neemoil Prepration Shitaltai Mangesh Varhekar, Shingnapur, ta- Daryapur

Broad Bed Furrow (BBF)

Photo 1 Masod tal: Chandur bz, BBF

Photo 2 Masod tal: Chandur bz Masod, BBF

Photo 3 Masod tal: Chandur bz. farmer field school

Photo 4 Palsona, Tal: Warud, neem & organic fertilizers

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

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

7.1 Drought

7.1.1 Rainfed situation

7.1.1.1. Early season drought (delayed onset)

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks 4th week of June	Deep and medium deepblack soils	Cotton	No change	**Normal recommended package of practices of Dr. PDKV, Akola**	
		Cotton + Pigeon pea	No change	**Normal recommended package of practices of Dr.PDKV, Akola** • Cotton + pigeon pea (6:2) • Cotton + Green gram/ Black gram (1:1)	Linkage with Dr. PDKV, MSSC, NSC
		Soybean	No change	**Normal recommended package of practices of Dr. PDKV, Akola** • Test seed for higher germination percentage • Adopt seed rate of 75-80 kg/ha • Seed treatment with Thiram 3 g +Carbendazim 1g/kg seed, dried and then treated with bio-inoculants such as *Rhizobium* 200g + PSB 200g and *Trichoderma* 40 g for every 10 kg seed • Prefer intercropping with one row of pigeon pea after every 4 or 6 rows of	

				soybean • Open the furrow after every 3 or 6 rows of soybean	
		Pigeon pea	No change	**Normal recommended package of practices ofDr. PDKV, Akola** • Prefer intercropping: pigeon pea + soybean (4:2 or6:2 ratio or pigeon pea + cotton (8:1 or 6:2 ratio)	
		Sorghum (*kharif*)	No Change	**Normal recommended package of practices of Dr. PDKV, Akola** • Seed treatment with Imidacloprid 70 WS @ 7g/ kg seed and Thiram @ 3g/kg seed	
	Shallow blacksoils*	Soybean	No change	• Normal recommended package of practices ofDr. PDKV, Akola • Test seed for higher germination • Adopt a seed rate of 75-80 kg/Ha. • Seed treatment as above	
		Green gram	No Change	Normal recommended package of practices of Dr. PDKV, Akola	
		Black gram			

*Farmers do cultivate cotton in shallow black soils also; however, the productivity is low

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks (2nd week of July)	Deep and medium deep black soils	Cotton	Soybean (varietiesJS-335, JS-93 -05) Pigeon pea (varieties AKT-8811,Vipula , PKV-Tara, BSMR-736)	• Normal recommended package of practices of Dr. PDKV, Akola • Test seed for higher germination percentage • Adopt seed rate of 75-80 kg/ha • Seed treatment with Thiram 3 g + Carbendazim 1g /kg seed, dried and then treated with bio-inoculants such as *Rhizobium* 200g + PSB 200g and *Trichoderma* 40 g for every 10 kg seed • Prefer intercropping with one row of pigeon pea after every 4 or 6 rows of soybean • Open the furrow after every 3 or 6 rows of soybean • Weed free condition at critical stages of crop growth • Sowing at wider spacing (90x90 cm)	Linkage with Dr. PDKV / MSSC. NSC for seed for seed
		Cotton + Pigeon pea	Prefer early varieties/hybrids of American cotton / desi cotton No change in varieties for Pigeon pea	• In cotton adopt 20-25% more seed rate than recommended and reduce fertilizer dose by 25% • Replace hybrids with improved varieties in cotton (American Cotton: AKH-8828, PKV Raj, AKH-081, Desi Cotton:- AKA-5, AKA-7, AKA-8) • Avoid intercropping of Green gram and black gram in cotton • Adopt intercropping system of cotton + sorghum + Pigeon pea + sorghum (6:1:2:1) to reduce the risk due to delayed sowing • Maintain weed free condition at critical stages of crop growth	Linkage with PDKV / MSSC NSC for seed
		Soybean	No Change	• Maintain weed free condition at critical stages of crop growth • Normal recommended package of practices	
		Pigeon pea	Prefer varieties: AKT8811,Vipula, PKV- Tara, BSMR-736	• Adopt weed free condition at critical stages of crop growth • Adopt a spacing of 90 x 20 cm instead of 90 x 30 cm	

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
Early season drought (delayed onset)			**Change in crop / cropping system including variety**	**Early season drought (delayed onset)**	**Major Farming situation**
Delay by 4 weeks (2nd week of July	Deep and medium deep blacksoils	Sorghum (Kh. Jowar)	Replace sorghum with soybean (varieties JS-335, JS-93 -05) or with pigeon pea (varieties AKT 8811, Vipula, PKV-Tara,BSMR-736)	• Follow normal recommended package of practices • Maintain seed free condition at critical stages of crop growth	
	Shallow black soils	Soybean	No change in varieties	• Normal recommended package of practices of Dr. PDKV, Akola • Test seed for higher germination percentage • Adopt seed rate of 75-80 kg/ha • Seed treatment with Thiram 3 g + Carbendazim 1g /kg seed, dried and then treated with bio-inoculants such as *Rhizobium* 200g + PSB 200g and *Trichoderma* 40 g for every 10 kg seed • Soil test based application of fertilizers is recommended	
		Green gram	Replace Green gram with Black gram andsoybean	Seed treatment as above	Linkage with PDKV / MSSC NSC for seed
		Black gram	No change	As above	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks	Deep and medium deep	Cotton	• Sole pigeon pea (varieties AKT-8811, Vipula, PKV Tara, BSMR- 736)	• Adopt closer spacing (60 x 30 cm) in Pigeon pea • Frequent interculture for i*n situ* moisture conservation and for weed free conditions	Linkage with MSSC and NSCfor seed and
(4th week ofJuly)	blac k soils		• Sunflower (hybrids) / Sesame (variety AKT64) • Castor (varieties / hybrids: AKC-1,GCH-4, 5, 6 and DCH-117, DCH 32) • Pearl millet (varieties PKV Raj, Shradha, Saburi) • Pearl millet + Pigeon pea inter-cropping(2:1 or 4:2 row ratio)		Dr. PDKV , KVK for agro-technique s
		Cotton + Pigeon pea	Sole pigeon pea / sunflower / sesame /castor / pearl millet, pearl millet + pigeon pea as above	As above	
		Soybean	Sole pigeon pea / sunflower / sesame / castor / pearl millet, pearl millet + pigeon pea as above	As above	
		Pigeon pea	No change. Prefer varieties AKT-8811, Vipula, PKV Tara, BSMR-736.	• Seed hardening • Soil test based fertilizer application isrecommended • Frequent interculture for i*n situ* moisture conservation and for weed free conditions	

		Sorghum	• Sole pigeon pea (varieties AKT-8811, Vipula, PKV Tara, BSMR- 736) • Sunflower (hybrids) / Sesame (variety AKT64) • Castor (varieties / hybrids: AKC-1,GCH-4, 5, 6 and DCH-117, DCH 32) • Pearl millet (varieties PKV Raj, Shradha, Saburi) • Pearl millet + pigeon pea inter-cropping(2:1 or 4:2 row ratio)	• Adopt closer spacing(60x30 cm)for Pigeon pea • Follow *insitu* moisture conservation measures. • Apply 2% urea as foliar spray for millets	
	Shallo wblack soils	Soybean	• Sole pigeon pea (varieties AKT-8811, Vipula, PKV Tara, BSMR- 736) • Sunflower (hybrids) / Sesame (variety AKT64) • Castor (varieties / hybrids: AKC-1,GCH-4, 5, 6 and DCH-117, DCH 32) • Pearl millet (varieties PKV Raj, Shradha, Saburi) • Pearl millet + pigeon pea inter-cropping (2:1 or 4:2 row ratio)	• Seed hardening • Follow *in situ* moisture conservation measures • Soil test based fertilizer application • Weed free condition at critical stages of crop growth	
		Green gram	Same as above	Same as above	
		Black gram	Same as above	Same as above	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks (2^{nd} week of August)	Deep and medium deep black soils	Cotton	• Sole pigeon pea (varieties AKT-8811, Vipula, PKV Tara, BSMR-736) • Sunflower (hybrids) / Sesame (variety AKT64) • Castor (varieties / hybrids: AKC-1, GCH-4, 5, 6 and DCH-117, DCH 32) • Pearl millet (varieties PKV Raj, Shradha, Saburi) • Pearl millet + pigeon pea inter-cropping(2:1 or 4:2 rowratio)	• Adopt closer spacing (60x30cm)for Pigeon pea • Follow *in situ* moisture conservation measures	Linkage with MSSC and NSC for seed and Dr. PDKV , KVK for agro-techniques
		Cotton + Pigeon pea			
		Soybean	• Sole pigeon pea (varieties AKT-8811, Vipula, PKV Tara, BSMR-736) • Sunflower (hybrids) / Sesame (variety AKT64) • Castor (varieties / hybrids: AKC-1, GCH-4, 5, 6 and DCH-117, DCH 32) • Pearl millet (varieties PKV Raj, Shradha, Saburi)		
		Pigeon pea	Prefer varieties: PKV Tara and BSMR-736		
		Sorghum (*kh.*)	• Sole pigeon pea (varieties AKT-8811, Vipula, PKV Tara, BSMR-736) • Sunflower (hybrids) / Sesame (variety AKT64) • Castor (varieties / hybrids: AKC-1, GCH-4, 5, 6 and DCH-117, DCH 32) • Pearl millet (varieties PKV Raj, Shradha, Saburi)	-do-	
	Shallow black soils	Soybean	• Sunflower (hybrids) • Sesame (AKT64) • Pearl millet (PKV Raj Shradha, Saburi)	-do-	
		Green gram		-do-	
		Black gram		-do-	

7.1.1.2. Early season drought (Normal onset)

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moistureconservation measures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Deep and medium deep black soils	Cotton / Cotton + Pigeon pea	• Give protective irrigation wherever possible • Raise cotton seedlings in nursery & transplant when sufficient soil moisture is available • Gap filling aided with pot watering 7-10 days after sowing when crop stand is less than80% • In case of less than 30% germination, take up re-sowing with a wider spacing of 45 cm when sufficient soil moisture is available	• Avoid applying fertilizer till sufficient soil moisture is available • Mulching with cropresidue • Apply organic matter / FYM / Compost for better moisture retention • Making of conservation furrows for moisture conservation. • Sowing on broad bedfurrow (BBF)	
		Soybean	• Give protective irrigation wherever possible • Gap filling with maize and sesame • If germination is less than 50% re-sowing immediately after receipt of rains • Take up one hoeing for weed management		
		Pigeon pea	• Gap filling either with sesame or maize • Provide protective irrigation, wherever possible. • Take up one hoeing	-do-	
		Sorghum(*kh*)	Take up to maintain optimum plantpopulation	-do-	
	Shallow black soils	Green gram	• Protective irrigation wherever possible • Take up thinning to maintain optimum plant population and one hoeing	-do-	
		Black gram	-do-	-do-	
		Soybean	• Give protective irrigation wherever possible • Gap filling with maize and sesame • If germination is less than 50% re-sowing immediately after receipt of rains • Take up one hoeing for weed management	-do-	

7.1.1.3. Mid-season drought(long dry spell)

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Deep and medium deep blacksoils	Cotton / cotton + Pigeon pea	Avoid applying fertilizer till sufficientsoil moisture is available. Interculture for weeding	• Opening of alternate furrows • Mulching with crop residue • Take up intercultivation to create soil mulch to conserve soil moisture • Give protective irrigation, if possible	Linkage with on-going government schemes to encourage adoption of micro-irrigation for better use efficiency of scare water
		Soybean	-do-	-do-	Linkage with on-going farm ponds programme and IWMP for rainwater harvesting and efficient use of water with micro-irrigation techniques like sprinklers.
		Pigeon pea	-do-	-do-	
		Sorghum (*kh*)	-do-	-do-	
	Shallow black soils	Soybean	-do-	• Foliar spray of 2 % urea orDAP • Other measures as above	
		Green gram	Intercultivation	• Spraying of 2 % urea orDAP. • Protective irrigation ifpossible.	
		Black gram			

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	Deep and medium deep black soils	Cotton / Cotton + pigeon pea intercropping	Protective irrigation if possible	• Apply foliar spray of 2 % urea or DAP • Adopt soil moisture conservation measures like ridges and furrows • Supplemental irrigation(10 mm	
		Soybean			
		Pigeon pea			

				depth) with harvested rain water in ponds by adopting micro-irrigation (sprinklers)	
		Sorghum(*kh)*	-do-	• Protective irrigation, if possible • In case of poor grain filling harvest for fodder. • Adopt soil moisture conservation measures like ridges and furrows	
	Shallow black soils	Soybean	Protective irrigation		
		Green gram			
		Black gram			

Condition	Major Farming situation	Normal Crop/croppingsystem	Suggested Contingency measures		
			Crop management	**Rabi Crop planning**	**Remarks on Implementation**
Terminal drought (Early withdrawal ofmonsoon)	Deep and medium deep black soils	Cotton / Cotton + pigeon pea Intercropping	• Giving life saving supplemental irrigation, if available • Picking / harvesting at physiological maturity -do-		Linkage with NFSM or ISOPOM for seed supply and other inputs
		Soybean		Plan for *rabbi* crops Chickpea/Safflower	
		Pigeon pea			
		Sorghum (*kh*)			
	Shallow black soils	Soybean			
		Green gram		Prepare for *rabbi* sowing provided irrigation is available	
		Black gram			

7.1.2. Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/croppingsystem	Agronomic measures	Remarks on Implementation
Delayed release of water in canalsdue to low rainfall	Deep and medium deep black soils	Wheat and Chickpea	Wheat to be replaced by Chickpea/Safflower/Mustard	Follow alternate row /micro-irrigation Irrigate at critical cropgrowth stages	Linkage with on-going government schemes to encourage adoption of micro-irrigation for better use efficiency of scare water
	Shallow blacksoils	Chickpea	Safflower / Mustard		
Limited release of water in canals due to low rainfall	Deep and medium deep black soils	Wheat and Chickpea	Wheat to be replaced by Chickpea/Safflower/Mustard /Linseed/Sesamum	Follow alternate row or micro-irrigation Irrigate at critical crop growth stages	As in previous condition
	Shallow black soils	Chickpea	Safflower / Mustard		Shallow black soils
Insufficient groundwater recharge due to low rainfall	Open well irrigated rabbi cropping situation	Wheat, Chickpea, Safflower	Chickpea / Safflower	Adopt micro-irrigation (sprinkler)	Linkage with on-going IWMP Encourage percolation tanks for groundwater recharge

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 waterlogging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post- harvest**
cotton	• Open field channels to drain excess water and avoiding surface ponding • Apply 2% urea foliar spray after cessation of rains • Interculture at optimum soil moisture to improve soil aeration	• Open field channels to drain excess water and avoiding surfaceponding • Apply multi-nutrient or hormonal spray to promote flowering	• Open fieldchannels to drain excess water and avoiding surface ponding • Timely picking of cotton	• Protect pickedcotton in storage from drenching andsoiling • Drying of wetcotton andmarketing

Soybean	Provide drainage	Provide drainage	Timely harvesting of produce	Shifting to safer place and drying of produce
Green gram	As above	-do-	-do-	-do-
Black gram	As above	-do-	-do-	-do-
Pigeon pea	• Open field channels to drain excesswater and avoiding surface ponding • Interculture at optimum soil moisture toimprove soil aeration	Open field channels to drain excess water and avoiding surface ponding	-do-	Stacking and drying of producefollowed by threshing
Horticulture				
Acid Lime and orange	Opening of field channels to drain out excess water and avoid surface ponding in the orchard Interculture at optimum soil moisture to improve soil aeration	• Mrig bahar crop is unaffected • For Ambe bahar crop, open field channels to drain out excess water and avoid surface ponding, • Nutrient spray of NAA 10 ppm + 1% urea to prevent flower drop	Timely harvest to avoid losses	Grading of fruits, cleaning of mold affected ones followed by washing and waxing
Heavy rainfall with high speed winds in a short span				
Cotton	• Open field channels to drain excesswater and avoiding surface ponding	Opening of field channels to remove surface ponding	Timely picking in caseof early forewarning of rains	Shifting to safer place for drying
Soybean	Opening of field channels to removesurface ponding		Timely harvesting incase of early forewarning of rains	
Green gram				
Black gram				
Pigeon pea				
Horticulture				
Nagpur Mandarin	Provide bamboo staking to less than 3 year aged plants to avoid lodging	• Provide bamboo staking to less than 3 year aged plants to avoid lodging • Opening of field channels to drain out excess water and avoid remove surface ponding	Opening of field channels to remove surface ponding	Collection and grading of fallen fruits followed by washing, waxing and marketing
Acid lime and sweet orange				

Outbreak of pests and diseases due to unseasonalrains	Vegetative stage	Flowering stage	Crop maturity stage	Post- harvest
Cotton	Provide drainage for removing stagnant water and drench plant base with copper oxy chloride 0.3% or carbendazim 0.1% particularly in low lying patches in the fields to prevent *Fusarium* wilt incidence	• Incessant rains trigger grey mildew incidence – apply foliar spray of sulphur @ 25 g/10 l water • Wet spells aggravate bacterial leaf blight incidence, protect with streptocycline sulphate 6 g / 10 l + copper oxychloride 30 g/ l0 l • Drench plant base with carbendazim 0.1% or COC 0.3% after rains toprevent wilt incidence in low lying patches in field • Remove water logging as excess soil moisture leads to leaf reddening. Go for soil application of$MgSO_4$ @ 20-25 kg/ha or foliar spray of 0.5-1.0% $MgSO_4$ and 1% urea as soon as the reddening symptoms appear • Timely correction of N status either by optimum supply in the soil orthrough foliar application of 2% urea or DAP at boll development stage reduces leaf reddening	• Incessant rains trigger grey mildew incidence – prevent with foliar spray with sulphur @25 g/10 l water • Protect boll rot with carbendazim 0.1% spray immediately after cessation of rains	Drying of wet cotton to prevent molds
Soybean	Early planted soybean is likely to be attacked by girdle beetle and green semilooper due to copious rains. Watch for drooping and drying of leaves. Manually remove the infested plants or plant parts from below the girdles. Protect against semilooper when density reaches 2-4 larvae per m	Monitor adult moth activity of *Spodoptera* through pheromone traps (10 traps /ha) and observe egg masses and gregarious larvae. Wet spell followed by a dry spell of 7-10 days during flowering or up to two weeks after flowering severe pest incidence is likely. When density crosses ETL of 1-2 larvae /m row length, apply quinalphos 25 EC 20 ml/10 l or Emamectin benzoate 5 SG @ 4 g/10 l or Profenofos 50 EC @ 25 ml/10 lit orLambda cyhalothrin 5 EC @ 6	-	-

	row length then go for with foliar spray of NSKE 5% or dimethoate 30 EC 1 ml/l	ml/10 lit or Indoxacarb		
Green gram	Protect against powdery mildew with foliarapplication of penconazole 5 ml or dinocap 10 ml or tridemorph 5 ml or sulphur spray @ 30 g/10 litre of water.	To control Powdery mildew penconazole 5 ml or dinocap 10 ml ortriadomorph 5 ml or sulphur spray @30 g/10 litre of water.	-	-
Black gram	-do-	-do-	-	-
Pigeon pea	Improved field drainage of excess water anddrenching with copper oxy chloride @ 25g/10 lit of water to avoid incidence of wilt and root rot	Improved drainage and drenching with copper oxy chloride @25g/10 litof water to avoid incidence of wilt and root rot	-	-
Horticulture				
Mandarin Sweet Orange	Protect against Citrus *psylla* with foliarspray of malathion 50 EC 10 ml Orquinalphos 25EC 10ml Or cypermethrin 25EC 4 ml/10 litre.	Protect against Citrus *psylla* with foliar spray of malathion 50 EC 10 mlOr quinalphos 25EC 10ml Or cypermethrin 25 EC 4 ml/10 litre	- -	- -

7.3. Extreme events: Heat wave / Cold wave/ Hailstorm

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat wave				
Oranges (Mandarinand Sweet orange)	• Increase the frequency of irrigation, • Use of temporary shade net • Mulching	• Increase the frequency of irrigation • Pruning of damaged branches / twigs	• Increase the frequency of irrigation • Mulching to reduce soil temperature • Pruning of damaged parts and apply Bordeaux paste 1% to cut ends	Immediate harvesting of fruits,grading and marketing

Cold wave				
Oranges (Mandarin and Sweet orange)	Protect with polythene sheet	Smoking, flood irrigation during evening hours, Basin mulching, Apply supplementary dose of fertilizer	Smogging, frequent light irrigation during evening hours, basin mulching, apply supplementary dose of fertilizer	Not applicable
Hailstorm				
Wheat, chickpea, safflower	Re-sowing in case of severedamage	Light and frequent irrigation.	• Apply 10% additional nitrogen • Light and frequent irrigation	Timely harvesting and shifting of produce to safer place in caseof early forewarning
Oranges (Mandarinand Sweet Orange)	Not applicable	Prune damaged branches and twigsand apply Bordeaux paste 1% to avoid fungal infections	Prune damaged branches and twigs and apply Bordeaux paste 1% to avoid fungal infections Apply hormonal spray NAA 20 ppm + 1 % urea to prevent flower drop.	Immediate harvesting, gradingand marketing of produce

Chapter 8: Agro meteorological Advisory

8.1 Agro-meteorogical advisory

8.1.1 Importance/ Need of Agromet advisory

Indian agriculture has been dependent on weather from the last century, but since the last few years the uncertainty of weather is becoming dangerous for agriculture business in the country. Due to climate change, farmers have to face many calamities such as heavy rainfall, cyclonic storms, extreme cold, extreme temperatures, hail and drought. All these factors are having an adverse effect on crop production. Our farmers eagerly await the southwest monsoon before the Kharif season. The use of weather forecasting is not limited to sowing but it is useful in every operation from harvesting to storage of the crop. In short, right from plowing the field to the time the produce/commodity reaches the market. The Meteorological Department under the Ministry of Earth Science (MoES), is doing its best under the Gramin Krishi Mausam Seva Scheme to reduce the losses of the farmers by collecting and organizing climate/weather, soil and crop information and to amalgamate them with weather forecast to assist farmer

8.1.2 Forecasts or advisories generated at district level

Skymet Pvt. Ltd setup 90 AMU throughout the district in the Mahaved project. They collect data from the units and provide generated data to the district. Also forecasts or advisories generated from Dr. Panjabrao Deshmukh Krushi Vidyapith Akola, and district follows that.

8.1.3 DAMU information

Due to the ongoing climate change, agricultural production is reduced due to large scale loss of crops, and the main reason is that the information about the changing climate does not reach the farmers in time. District Agricultural Meteorological Centre at Durgapur (Badnera) Amravati, District Agricultural Meteorological Centre under Rural Agriculture Meteorological Service Scheme in association with India Meteorological Department, New Delhi and Indian Council of Agricultural Research, New Delhi to provide timely weather based guidance on daily weather and crop production has been started. Daily information on meteorological factors is collected at this centre and based on the weather forecast provided by India Meteorological Department, Regional Meteorological Centre, Nagpur, every Tuesday and Friday, Agricultural Science Centre, Durgapur (Badnera) Amravati, all agricultural subject specialists, Agriculture and Animal Husbandry of the district Under the guidance of officers in the department, agricultural advice is doing important work to reach the farmers.

8.1.4 Other sources of Agro-met advisory

Forcasts or Advisories generated at district level and other sources

District and Block Wise process of Agromet Advisory Generation

Every Tuesday and Friday weather forecast Received from India Meteorological Department, Regional Meteorological Centre, Nagpur

⇓

Meeting of agro metrological specialist from DAMU

⇓

Climate Based Crop Wise Agromet Advisory Prepared

⇓

Dissemination / Broadcasting of Agriculture Advisory Bulletins

⇓

Broadcasting Information to District and Taluka agriculture offices through mail

⇓

Dissemination of information using newspaper, radio and what sap group

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

There are two apps for forecasting which are Meghdoot and Damini. This is the sample advisory provided

ग्रामीण कृषी मौसम सेवा
भारत मौसम विभाग
कृषी विज्ञान केंद्र, दुर्गापूर
बडनेरा, अमरावती-444701

हवामानावर आधारीत कृषि सल्ला

दिनांक : 24-05-2022

अमरावती(महाराष्ट्र) साठी हवामान पूर्वानुमान - वर जारी :2022-05-24 (पुढील पाच दिवसांसाठी सकाळी ८:३० वाजेपर्यंत वैध)

हवामान घटक	2022-05-25	2022-05-26	2022-05-27	2022-05-28	2022-05-29
पर्जन्यमान (मिमी)	0.0	2.6	2.8	2.4	0.0
कमाल तापमान (अं.से)	39.0	39.0	40.0	40.0	39.0
किमान तापमान (अं.से)	26.0	25.0	25.0	24.0	24.0
सकाळची सापेक्ष आर्द्रता (टक्के)	43	48	45	44	49
दुपारची सापेक्ष आर्द्रता (टक्के)	29	31	30	32	33
वाऱ्याचा वेग(किमी/तास)	5.0	5.0	5.0	5.0	5.0
वाऱ्याची दिशा(अंश)	293	304	300	293	293
मेघाच्छादन (ऑक्टा)	2	4	4	3	2

हवामान सारांश / चेतावणी:

अमरावती जिल्ह्यामध्ये, भारतीय हवामान विभाग, प्रादेशिक हवामान केंद्र, नागपूर च्या जिल्हास्तरीय मूल्यवर्धित अंदाजानुसार, पुढील पाच दिवस कमाल तापमान ३९ ते ४० अंश सेल्सिअस, तर किमान तापमान २४ ते २६ अंश सेल्सिअसच्या दरम्यान राहील. सकाळची सापेक्ष आद्रता ४३ ते ४९ टक्के तर दुपारची सापेक्ष आद्रता २९ ते ३३ टक्के दरम्यान राहील. वाऱ्याचा वेग सरासरी ताशी ५.० कि.मी तास राहील. दिनाक २५ मे २०२२ ते २९ मे २०२२, दरम्यान आकाश निरभ्र ते आंशिक ढगाळ तसेच हवामान कोरडे राहण्याची शक्यता वर्तविण्यात आली आहे. दिनांक २५ आणि २६ मे २०२२, ला एक ते दोन ठिकाणी (तुरळक ठिकाणी) विजांच्या कडकडाट आणि मेघगर्जनासह हलका ते मध्यम पाऊस पडण्याची शक्यता आहे आणि आकाश ढगाळ राहील. विस्तारित अंदाजानुसार (ई.आर.एफ.एस) अमरावती जिल्ह्यात दिनाक २९ मे , २०२२ ते ४ जून , २०२२ या दरम्यान कमाल तापमान सरासरी पेक्षा कमी राहण्याची तसेच किमान तापमान सरासरी पेक्षा कमी राहण्याची शक्यता आहे.

कृषि सल्ला:

• पुढील तीन दिवसाच्या कोरड्या हवामान अंदाजानुसार शेतीतील कामे चालू ठेवावीत. हंगामी पिके, फळबागा,

भाजीपाला पिकामध्ये अंतरमशागतीची कामे डवरणी, निंदनी(खुरपणी) इत्यादी, तसेच कीड व रोग व्यवस्थापनासाठी कृषी रसायनाची फवारणी व उभ्या पिकात खते देण्याची कामे सुरु ठेवावीत. • शेतकरी बांधवांनी येणाऱ्या खरीप हंगामासाठी सोयाबीन बियाण्याची टंचाई बघता आपल्याजवळील बियाण्याची बाजारात विक्री न करता ते बियाणे जपून वापरावे घरची सोयाबीन बियाणे म्हणून वापरावयाचे असल्यास बियाण्याची उगवण क्षमता तपासून घ्यावी. • जमिनीची मशागत (नांगरणी, वखरणी) समतल किंवा मुख्य उताराला आडवी करावी. त्यामुळे पावसाचे पाणी जिमनीत मुरून जिमनीची धूप कमी होण्यास मदत होते. • शेतकरी बंधूनी हवामान अंदाजावर आधारित कृषी सल्ला व हवामानचा पूर्वानुमाना करीता मेघदुत मोबाईल अॅपचा वापर करावा. तसेच शेतकरी बंधूंनी मेघगर्जना व विजेचा पूर्वानुमानाकरिता दामिनी अॅपचा वापर करावा.

संक्षिप्त संदेश सल्ला:

• मेघगर्जनेसह विजांचा कडकडाट होण्याची अधिक शक्यता असल्याने शेतात काम करत असताना मेघगर्जनेचा आवाज आल्यास तात्काळ सुरक्षित ठिकाणी आसरा घ्यावा.

पिक निहाय सल्ला:

पिक	पिक निहाय सल्ला
कपाशी	• कोरडवाहू कपाशी करिता तीन वर्षातून एक वेळा आणि बागायती पिकासाठी दरवर्षी नागरणी आवश्यक आहे. पेरणी पूर्वी एक वखरपाळी दिली असता जमिनीतील ओलावा तीव्रता २० टक्के पर्यंत कमी होते. कोरडवाहू कपाशीला हेक्टरी १२ ते १५ गाडी आणि बागायती कपाशीला हेक्टरी २० ते २५ गाडी चांगले मुरलेले शेणखत किंवा कंपोस्ट खत पेरणीपूर्वी शेतात एकसारखे मिसळून द्यावे. दरवषी खत दिल्यास रासयनिक खत मात्रा ५० टक्क्यांनी कमी करता येते.
	• सोयाबीन लावावयीकरिता मध्यम भारी पतीची उत्तम पाण्याचा निचरा होणारी, तसेच साम ६.५ ते ७.५

प्रशिक्षण व भेट योजना, (डॉ. पंदेकृवि), अमरावती
जिल्हा मासिक चर्चासत्र
संदेश कालावधी– १ ते ३१ डिसेंबर, २०२३

कृषि विद्याविषयक संदेश :

सर्वसाधारण सूचना

- संकरित ज्वारीचे अथवा लवकर येणाऱ्या कपाशीचे (क्षेत्र) शेत मोकळे होताच जमिनीतील अल्प ओलाव्याचा फायदा घेऊन शेताच्या मशागतीस सुरुवात करावी.
- मृद संधारणाची कामे करुन घ्यावे.
- पिके निघालेल्या शेतातील मातीचे नमूने घेऊन निर्धारित कार्यक्रमानुसार तपासणीकरिता प्रयोगशाळेकडे पाठवावे.
- उपलब्ध ओलिताचा रबी पिकांसाठी पूर्णपणे फायदा होण्यासाठी नियोजनबध्द पाण्याचा वापर करावा.
- शेतातील काडीकचरा न जाळता त्यापासून कंपोस्ट खत तयार करावे. साठवणुकीचे धान्य उन्हात चांगले वाळवून नंतर साठवणूक करावी.
- रबी गव्हाची पेरणी वेळेवर करावी.
- दरवर्षी उन्हाळयात जनावरांच्या चाऱ्याची टंचाई दूर करण्यासाठी शिवाय दुधाळ जनावरांना भरपूर हिरवा चारा मिळावा म्हणून हिरव्या चाऱ्याच्या पिकांची लागवड करावी.
- ओलिताची सोय असलेल्या ठिकाणी उन्हाळी भुईमुगासाठी तसेच सुर्यफुलाकरिता शेतीची मशागत करुन शेत तयार करावे. बियाणे, खते इ. निविष्ठेची जुळवा–जुळव करुन ठेवावी.
- लागवड केलेल्या नवीन फळझाडांची जोपासना करावी.

कापूस : उशीरा येणाऱ्या किडींचे नियंत्रण करावे. कापूस स्वच्छ राहील अशा रीतीने वेचणी करावी व स्वच्छ जागी ठेवावे. ओलिताची सोय असल्यास गरजेप्रमाणे ओलित करावे. लवकर येणाऱ्या वाणांची शेवटची वेचणी होताच पऱ्हाटया उपटून ओलिताची सोय असल्यास उन्हाळी भुईमूग पिकासाठी जमीन तयार करावी.

संकरित ज्वारी : पीक काढून होताच जमीन तयार करावी व ओलिताची सोय असल्यास उन्हाळी पिकांचे नियोजन करावे. ज्वारीचे फनकटे जाळून नष्ट न करता, त्यापासून कंपोस्ट खत तयार करण्याची योजना आखावी.

खरीप तूर : तुरीचे पीक या कालावधीत फुलावर व शेंगामध्ये दाने भरण्याच्या अवस्थेत आहे. सदर बहाराचे कडींपासून संरक्षणासाठी वेळीच दखल घ्यावी. संरक्षित ओलिताची सोय करावी.

सुधारित ज्वारी : वेगवेगळी वाण परिपक्व होताच कणसे काढून व वाळवून मळणी करावी. ज्वारीची सोंगणी करुन धांडे वाळल्यावर पेंडया बांधून त्याची आवश्यकतेप्रमाणे साठवणूक करावी.

अर्धरबी पिके : तूर, सुर्यफुल, तीळ या सारख्या पिकांना पिकांच्या नाजूक अवस्थेत ओलिताची सोय करावी. रोग व किडींचे नियंत्रण करावे.

रबी पिके : कोरडवाहू पिकात शक्य तेथे आंतरमशागत करुन जमिनीतील ओल राखून ठेवावी.

हरभरा : घाटेअळीचा प्रादुर्भाव दिसून येताच त्याचे नियंत्रण करावे. ओलित व्यवस्था असल्यास एक हलके ओलित पीक फुलोऱ्यावर असताना करावे. दुसरे ओलित, घाटे भरण्याच्या अवस्थेत करावे.

करडई : मावा किडींचा प्रादुर्भाव असल्यास त्याचे नियंत्रण करावे. ओलिताची सोय असल्यास या पिकास ३०, ५० आणि ६५ दिवसांनी ओलिताच्या तीन पाळया दिल्यास अधिक उत्पन्न मिळते. जेथे एकच ओलिताची सोय असल्यास ५० दिवसांनी, दोन ओलिताची सोय असल्यास ३० व ५० दिवसांनी ओलित द्यावे. ओलित हलक्या स्वरुपाचे करावे.

गहू : ओलित अवस्थेत देखील १५ डिसेंबर नंतर उशीरा गहू पेरु नये. वेळेवर पेरणी झालेल्या गव्हाला २१ दिवस होताच नत्राचा दुसरा हप्ता देऊन नंतर ओलित करावे. उशीरा पेरणी करावयाचा गहू १५ डिसेंबरपर्यन्त पेरणी पूर्ण करावी, त्यासाठी विद्यापीठाने शिफारस केलेले वाण एकेडब्ल्यु–३८१, एचआय–९७७, एचडी–२५०१ पूर्णा, एनआयडब्ल्यु–३४ वापरावे. पेरणी करतेवेळी दोन ओळीतील अंतर कमी म्हणजे १५ ते १८ से.मी. ठेऊन बियाणे प्रति हेक्टरी १५० किलो वापरावे.

ऊस: सुरु हंगामात म्हणजे जानेवारी महिन्यात ऊस लावण्याकरिता जमिनीची खोल मशागत करावी. ढेकळे फोडून सपाट करावी, रिजरच्या सहायाने ९० से.मी.अंतरावर सऱ्या पाडाव्यात. जोडओळ पध्दतीत ७५:१५०:७५ किंवा ९०:१८०:९० से.मी. अंतरावर सऱ्या पाडाव्यात. ठिबक सिंचन पध्दतीने लागवड करण्यासाठी जोडओळ पध्दतीचा अवलंब करावा. आडव्या नांगरणीपूर्वी २५ टन उत्तम कुजलेले शेणखत/कंपोस्ट खत वापरावे. रासायनिक खते, बेणे, बेणेप्रक्रियेसाठी औषधे इत्यादी निविष्ठांची जुळवाजुळव करुन ठेवावी.

(डॉ. हेमंत ह. डिके)
विस्तार कृषिविद्यावेत्ता,
प्रशिक्षण व भेट योजना,
अमरावती–४४४ ६०३

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

Mode of Dissemination: In a district KVK prepared an Agromet advisory. Weather forecasting in agribusiness is conveyed to the farmers by organizing farmer public awareness programs at village level through the leading agro meteorological specialists and other agricultural specialists at the Agricultural Science Centre, Durgapur (Badnera), Amravati, Crop problems are directly communicated. Under the Farmer Awareness Program, farmers are registered with their mobile numbers and added to what's App groups of their respective Tehsils, so that they can get weather information at home. So far, more than 320 agricultural weather advisory leaflets have been sent to the farmers of Amravati district through What's App groups to villages in all 14 Tehsils of the district. Also, more than 55000 farmers benefited from the agricultural climate advisory leaflet. Every week feedback is taken from the farmers regarding the agricultural advisory leaflets on climate.

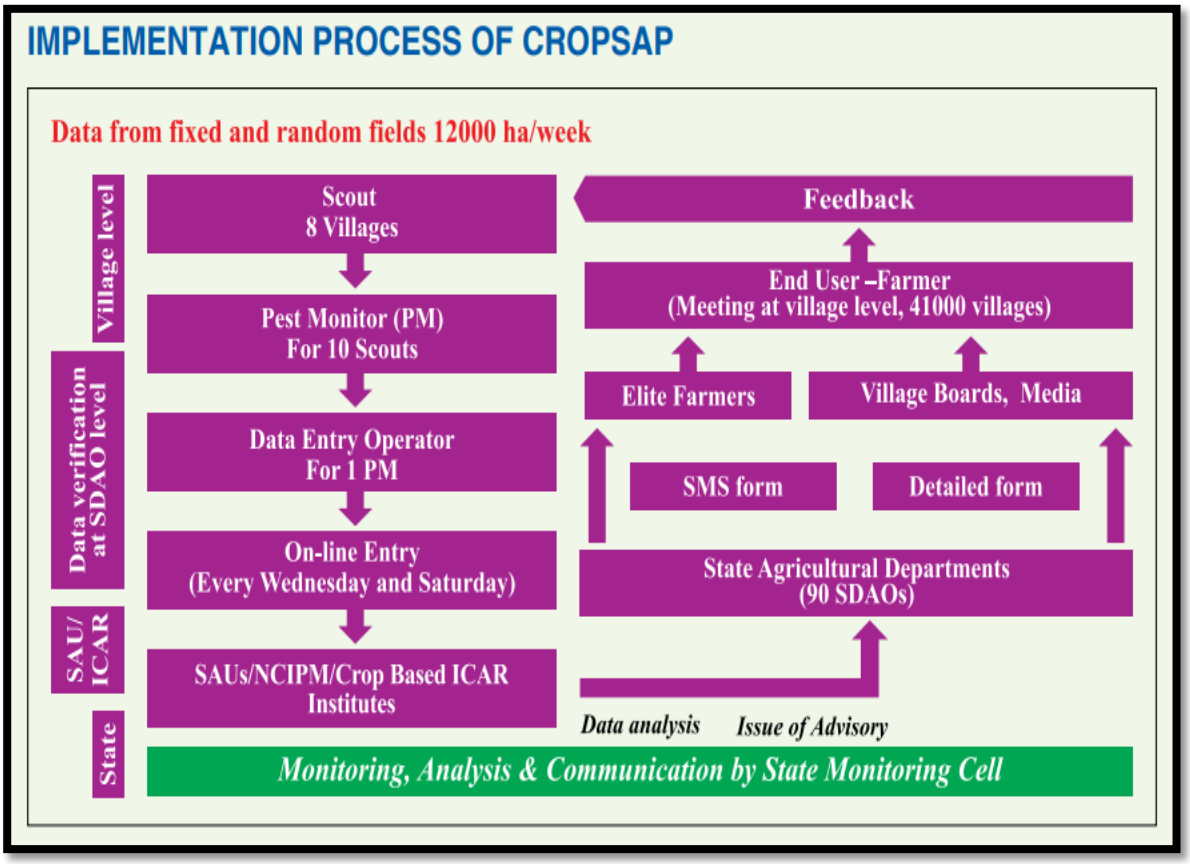
Also to the Agriculture Department, District Officer's Office, Animal Husbandry Department, Akashvani Kendra News Paper and various agriculture related social organizations working for the farmers in the district, weather based agricultural advisory pamphlets are disseminated.

Farmers get weekly advisories through Agriculture assistants and messages. Farmers getting aware about the diseases, pest attack and weather. The millennial generation of farmers mainly follow the advisory. In a district, due to advisories farmers are getting alert and spraying at the proper time. i.e. doing proper practices in time. It results in an increase in yield.

8.2 Advisory Base on Pest Surveillances Agriculture activity

8.2.1 Implementation Status of CROPSAP:

CROPSAP in district level general Pest disease management is also recommended on a regular basis. All adversaries circulate at time of crop management for each and every crop.



CROPSAP provided a larger canvas for pest management. The Crop sap data is collected by Agri Assistant weekly. Each Agriculture assistant takes a fixed plot reading of 2 Crops in 4 plots in 2 villages. Agriculture supervisor and circle officer randomly takes 4 Readings from the field. Further TAO, SDAO, DSAO takes 2 reading each of crop randomly as per online data PDKV, Akola generate advisories and Agri. Asst guide farmers according to advisories. For e.g. in a district from 04/12/2023 10/12/2023, 83.8% agriculture assistants uploaded Crop sap reading in a week.

The pest affected areas across soybean, cotton, Tur, Grams are implemented with scientifically based pest management practices across Maharashtra.

8.2.2 Impact on Crop pests and diseases management

Crop sap data is a source for crop advisories. It helps farmers by providing information on various stages of crops. Farmers get awareness about the crop related pest. Pest and disease management consists of a range of activities that support each other. Most management practices are long-term activities that aim at preventing pests and diseases from affecting a crop. Management focuses on keeping existing pest populations and diseases low.

It increases crop fertility and productivity. Also increases crop production and to prevent post-harvest losses and distressed sales. By improving the crop variety through cross-breeding and hybridization, the crop yield can be increased. Pest management is involved with the safety of our health, our foods and the protection of our property. It is vital to have a system of control for pests for the safety of the overall public. In District due to crop sap in Amravati district pink bollworm Attack reduced.

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

9.1 Existing marketing scenario in the district

9.1.1 Year wise marketable surplus of major crops. (All values in quintal)

Year/Crop	Cotton	Soybean	Tur	Wheat	gram
2019	407983	2298077	1131248	283838	1164101
2020	1153659	762861	1091862	346560	979878
2021	257384	1681279	1408647	399365	912196
2022	126021	2131411	1348539	353201	1139479

9.1.2 Year wise price variation of major crops. (All values in Rupees)

Year/Crop	Cotton	Soybean	Tur	Wheat	gram
2018	5300	3200	4200	1800	3550
2019	5400	3550	5400	2150	4000
2020	5500	3800	5900	1800	4000
2021	7800	5000	6200	1900	4600
2022	8800	5300	6800	2200	4300

(Source: APMC, Amravati Dist.)

9.2 Constraints in existing value chain

1. At the time of sowing, the seeds are not available on time and are sold by the Krishi Seva Kendra at a higher price
2. Due to lack of automated farming implementation and lack of skilled labour, Sowing is not done on time.
3. While farmer selling their agriculture produce, farmer bear transporting cost, agent commission in APMC and also village level agent purchase at low cost
4. Due to lack of infrastructure i.e. warehouses at village level farmers have to sell their produce because of insufficient storage capacity.
5. Low economic condition of farmer, losses occurring due to processing mills not available nearby places.

An analysis of the strengths, weaknesses, opportunities and threats for all the 12 APMCs in the district has been done. It helped realize the essential factors that APMCs can leverage on and those which it can improve on. Every APMC has a different need based on the requirements of the farmers, the arrivals, the sale, its connectivity by rail and road and the proximity of processing factories.

SWOT ANALYSIS OF APMC WISE VALLUE CHAIN

APMC	Strength	Weakness	Opportunities	Threats
Amravati	● Storage facility is good, ● Open auction & competitions, ● High No. of traders, ● Farmers Rest house & all basic infrastructure, ● Railway Connectivity	● Bad Road conditions, ● No Auction Halls , Compound & Electricity, ● Lack of Resources, ● Low efficiency of Staff , ● No F & V marketing , ● No Pack house & Shade ● No cold storage	● Development of Infrastructure, ● Formation of groups, ● Grading & packing facility, ● Providing range & graders ● More pro producer activities ● Establishment of cold storage units ● SMS services for farmers for disseminating price, arrivals ● Variety wise price declaration ● More Processing plants	● Evolution of Private market
Achalpur	● Electronic weighbridge ● Auction Hall, Godown (Storage Room / Hall) available ● Water Facility available ● Electricity, Farmer Rest House available ● Traders Shop , ● Canteen Facility , ● Animal Dispensary , ● Availability of pledge loan facility	● No Cold Storage , ● No F & V Pack house, ● No Grading & Packing Unit, ● No Transport Facility	● F & V Pack house ● Basic Infrastructure availability , ● More pro producer activities ● Establishment of cold storage units ● SMS services for farmers for disseminating price, arrivals ● Variety wise price declaration ● More Processing plants	● Private Market, ● Changes in Farmers Habit to sell directly to traders ● Lack of competency

Morshi	• Open auction System , • Open auction Hall, • Electronic Weigh instrument available , • Water Cooler available, • Overhead Water Tank, • Rate Board present, • Shop For Traders & Atayas , Canteen , • Pledge Loan Facilities available, • Farmers guest house available	• Bad Road conditions & Lighting , • Electronic Weigh bridge not available • No Storage Facilities • No E. Trading , • No Projection TV, • No Digital Board, • No Hamal Bhavan, • No Advance Grading equipment , • No Toilet Block, • Orange Market not developed • Existing warehouses (APMC & MSWC) are in poor condition. • No cold storages & pack house for fruits	• Development of Road & Lighting facilities • Electronic Weigh bridge, • Storage Facilities are not available, • More pro producer activities • Establishment of cold storage units • SMS services for farmers for disseminating price, arrivals • Variety wise price declaration • More Processing plants	• Private Market, • Changes in Farmers Habit to sell directly to traders
Warud	• Auction Hall, Godown (Storage Room / Hall) are available • Water Facility, electricity available, • Farmer Rest House available • Availability of pledge loan facility, • Compound Wall	• Bad Road conditions & Lighting , • Existing warehouses (APMC & MSWC) are in poor condition. • No cold storages & pack house for fruits • No Grading & Packing Unit • No Transport Facility • Low Office Staff,	• Development of Road & Lighting facilities • Establishment of F & V Pack house, Grading & packing Unit • Transport Facility, • More pro producer activities • Establishment of cold storage units • SMS services for farmers for disseminating price, arrivals	• Private Market • divert purchasing fruits

			• Variety wise price declaration • More Processing plants	
Dhamangaon Railway	• Open auction System and auction hall , • Electronic Weigh instrument available, • Electronic Weigh bridge available • Water Cooler , Overhead Water Tank available, • Rate Board , Shop for Traders & Adtayas, • Canteen present • E. Trading, Digital Board available • Well-Constructed Internal Roads, • Shetkari Nivas, Toilet Block	• No Storage facilities, • No Projection TV, • No Hamal Bhavan, • No Advance Grading equipment.	• Development of Roads and Storage Facilities	• Private Marketing , • Lack of Advance Technology & • Lack of research & Competitiveness
Chandur Railway	• Electronic weighing bridge available • Auction Hall , shaded Platform available • Availability of Farmers Rest House , Marketing Cell, Electronic Display Board, Street light , Drinking Water Facility, Parking Facility, Train Connection	• Lack of Labour rest house , Electronic weighing Machine, Banking Services, Traders, Pack house for F & V	• Farmers Groups can produce bulk production with quality, • Infrastructure Development will help to invite farmer in APMC, • Diversification of Farmer to Fruits & Vegetable Crops	• Private Marketing , • Lack of Advance Technology & • Lack of research & Competitiveness

Anjangaon Surji	• Adequate certified electronic weighing, • Auction Hall ,shaded platform available • Good Road condition, • Availability of Open Auction system, Middle Man Shops , Godown - 2, Supervisor Room, Farmers House	• No Cold Storage, TV, Digital Board, Pack House.	• Soybean Grading packing unit setup, • F& V market development , • Banana Market Development	• Private Market, • Increase in Direct Selling • Lack of competency by the management
Daryapur	• Good Storage Facility • Auction Hall available, • Good Farmers Network , Good Infrastructure and Well Trained Staff	• Lack of banking facility, • No Grading & packing • Few traders come to Daryapur APMC	• Development of banking facilities • Grading and packing units	• Private Market, • Increase in Direct Selling
Chandur Bazar	• Open Auction Hall present, • Electronic Weigh instrument and bridge available , • Overhead Water Tank, Rate Board , Shop For Traders & Adtayas, Canting are available	• Lack of banking facility, Storage Facilities • No E. Trading , Projection TV , Digital Board, • No Shetkari Nivas, Hamal Bhavan , • Advance Grading equipment not present, • No Toilet Block , CCTV Camera	• More pro producer activities • Establishment of cold storage units • SMS services for farmers for disseminating price, arrivals • Variety wise price declaration • More Processing plants	• Private Market, • Increase in Direct Selling
Nandgaon Khandeshwar	• Open auction System, Open auction Hall, • Overhead Water Tank, Rate Board, Toilet Block available	• No Storage to farmers Produce, • No Drinking water cooler, Compound wall, cement concrete road, • No Electrification, Grain & pulses cleaning unit,	• Development of all basic & productive infrastructure	• Private Market, • Increase in Direct Selling

		● No Godown, Weighbridge, solid waste management, ● No Shop for Traders & adtayas, Canteen , ● No Electronic Weight instrument		
Dharani	● Open Auction System , Auction hall available, ● Godown, water Facilities available ● Shetkari Nivas , Cotton Yard, Weighbridge available	● No compound wall ● Some basic Infrastructure missing,	● To develop the all basic and productive infrastructure	● Private Market, ● Increase in Direct Selling
Tiwasa	● Open auction System, Open auction Hall.	● No Storage to farmers Produce, ● No Drinking water cooler, Compound wall, cement concrete road, ● No Electrification, Grain & pulses cleaning unit, Godown, Weighbridge, ● No solid waste management, Shop for Traders & *adtayas*, Canting, ● No Electronic Weighing instrument	● To develop the all basic and productive infrastructure	● Private Market, ● Increase in Direct Selling

(Source – Market Strategy Supplement of MACP, Amravati)

SWOT ANALYSIS OF COMMODITY WISE VALLUE CHAIN

COMMODITY	STRENGTH	WEAKNESS	OPPORTUNITY	THREATS
Soybean	Largest consumer in form of oil and oilcake for animal feed, short duration crop	productivity is very low less susceptible to heavy rain and diseases, high working capital required for production	Growing demand for ready to eat and value-added product like soya-paneer, soya-milk	fluctuation in market rate unavailable of storage facility i.e. warehouse transport facility for small land holder Imports from Brazil
Cotton	Largest consumer in form of oil, cloths	long duration crop, for more crop irrigation facility is required, lack of technology for individual farmer to separate cotton seed & cotton lint from cotton, labour scarcity in cotton picking	--	not safe to storage cotton, required space unavailability of storage for cotton bale required more transport imports from America
Tur(Pigeon Pea)	Largest consumer in form of tur dal	long duration crop, for more crop irrigation facility is required	--	--
Gram	Largest consumer in form of chana dal and floor (besan)	cant store for long period in house	Growing demand for ready to eat and value-added product like *chiwada, shev* in packing item	need more cold storage transport facility for small land holder

9.3 Potential for strengthening of commodity wise value chains

Strengthening is going on using SMART NDKSP AND MAGNET. These projects will focus on strengthening the traditional agricultural system to make it more market-oriented and broadening the participation of the private sector in the value chain. The project has the following three major components.

1. Strengthening of institutional arrangements for agribusiness reforms

Under this component, strengthening of agriculture and marketing department, capacity building (training) of employees/officers in this department, establishment of crop value chain development interest promotion councils, establishment of technical room for policy changes etc. Items included.

2. Setting up a risk mitigation system

Warehouse based Sub Projects are risk mitigation. These sub-projects will provide godown and grain storage facilities for farmers at village level in a decentralized manner. These projects were mainly implemented through various executive Primary Agriculture Cooperative Society PACS.

3. Cotton Value Chain:

Under this component clean and homogenous cotton is produced and cotton bales (*Gathan*) are sold under the brand name Smart Cotton through electronics platform and also developing the cotton value chain. It will be implemented through the Department and Maharashtra State Co-op. and Cotton Growers Marketing Federation Ltd

9.4 FPCs' contribution in value chain development

9.4.1 Status of FPCs in the district

Beneficiary FPC/SHGs under NDKSP

Sr. No.	Taluka	Village	Name of Farmer Group	Registered as	Activity name	Commodity wise value chain
1	Amravati	Malegaon	Bhaiyasaheb Thakur Farmer Producer Company Ltd	FPC	Construction of Godown/ Small Warehouse.	soybean, cotton bales, gram pigeon pea
2	Anjangaon	Chincholi Bk.	Ekveera Farmer Producer Company Limited	FPC	Dryer Unit	Soybean, tur, gram,
3	Anjangaon	Kumbhargaon Bk.	Sevhen Wheel Sendiriy Shetkari Bachat Gat, Kumbhargaon	SHG	Sorting Grading Unit	wheat, tur, gram,

4	Chandur Bazar	Asegaon	Krishi Sahyog Farmers Producer Company Ltd	FPC	Dall Mill (Cleaning/Sorting/Grading Unit).	Gram, tur
5	Chandur Bazar	Belora	Belora Farmer Producer Company	FPC	Seed Storage/ Godown.	Soybean, gram, tur
6	Chandur Railway	Malkhed	Bhumi Shetkari Gat, Chandur Railway	Farmers group	Establishment of Custom Hiring Centers	cotton, soybean, gram, pigean pea
7	Dhamangaon	Mangrul Dustgir	Paisawishv Farmer Producer Co Ltd	FPC	Goat Breeding Center.	goat breeding
8	Dhamangaon	Dhamangaon	Aai Agriculture Farmers Producer Company Limited	FPC	Food Processing Unit. (Poha Making Machine)	Rice
9	Nandgaon	Dhaba	Kumkum Swayam Sahyata Samuha	SHG	Vegetable/ Fruits Processing Unit.	Mung, Udid, wheat and Vegetable
10	Nandgaon	Pimpri gavanda	Rauba Agro Farmer Producer Company Limited	FPC	Establishment of Custom Hiring Centers	cotton, soybean, gram, pigeon pea
11	Warud	Sheghat	Ganorkar Aroma Farm Producer Company	FPC	Medicinal/Aromatic Plants Processing Unit.	Geranium plant
12	Warud	Rajura Bazar	Cottonbee Agro Producer Company Limited, Warud	FPC	Construction of Godown/ Small Warehouse.	cotton, soybean, gram, pigeon pea

9.4.2 Assessment of FPCs in the district

9.4.2.1. Objectives of Evaluation

- The study is an attempt to assess the Farmer Producer Companies of project area and find whether these companies are performing and earning sufficient returns to sustain

business. The report has also proposed a rating method to measure the performance of FPCs considering different 8 parameters. The reports analysed 99 Farmer Producer Companies with the help of parameters. The parameters were further assigned performance scores on the basis of efficiency and effectiveness with the help of Automatic Rating Meter.

- On the basis of assessment report, suggesting the measures for strengthening of FPCs e.g. capacity building, climate resilience adaptation.

Table No. 9.4.2.1.a. Criteria for Evaluation of FPCs

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

Scoring Method of Evaluation

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

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

9.4.2.2 Output of evaluation.

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

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

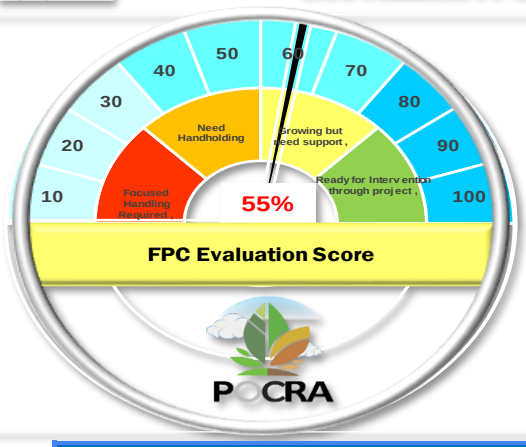
Customized FPC Evaluation Report

Nanaji Deshmukh Krush Sanjivani Praklap

Maharashtra Project on Climate Resilient Agriculture

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

CUSTOMIZED FPC EVALUATION REPORT



Name of FPC

Riyaz Farmers Producer Company

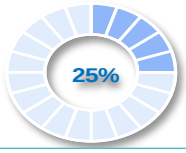
Address

Plt No 237 Tiwsaghat,Ta.Warud , Dist-Amravati, Pincode- 444906

Score Report

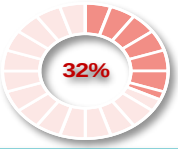
Criteria	Max. Score	Score Obtained
Organization & Adminstration (Core Foundation Strength)	21	16
Governance (Control Systems in Place)	11	8
Management (Decision making processes)	8	6
Infrastructure (Assets and resources)	5	3
Finance (Financial base and health)	25	8
Business & Market Linkages (Resource quality)	21	11
Capacity Building (Resource quality)	5	2
Climate Resilience (Adaptability to climate risk)	4	1
Final Score	100	55

What could improve your FPC?



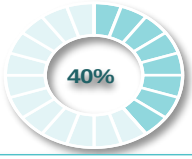
Climate Resilience

The FPC should promote various climate resilient agricultural technologies.



Finance

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



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

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

Chapter 10: Extension strategies for adaptation to climate change

I) Preparation of Village Adaptation Plan

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

❖ **Planning for water security**

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

❖ **Planning for soil health**

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

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

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

❖ **Planning for Carbon sequestration**

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

❖ **Planning for reduction of production cost**

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

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

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

d. Reducing tillage operations (by conservation agriculture)

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

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

a. Identification of CRV.

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

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

❖ **Adoption of climate resilient technologies**

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

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

c. Most prominently adopted technologies and their impact

d. Innovative technologies adopted

e. Validation of technologies developed by Progressive farmers

❖ **Integrated Pest Management Plan**

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

b. Plan of IPM technologies to be adopted

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

d. Skill training to reduce pesticide hazard

❖ **Integrated farming systems**

a. Potential for crop based and other livelihood activities

b. Households to be engaged in IFS

c. Plan for market linkage for IFS produce

❖ **Preparation of contingency plan**

a. Village level weather forecast mechanism

b. Preparedness for contingencies

c. Crop insurance promotion and status

d. Monitoring of contingencies

e. Assessment of losses due to natural calamities if any

❖ **Strengthening of commodity value chains**

a. Assessing existing commodity value chains

b. Identification of gaps in existing value chains

c. Assessing volume of commodity to be marketed

d. Assessing warehouse availability and available capacity

e. Assessing transportation facilities

f. Plan for infrastructure

g. Plan for market linkage of major commodities

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

II. Convergence of Govt. Programs with Extension Plan

On Covid-19 -background, from 01/04/2021 to 17/04/202, through 217 groups at 122 Location, a total of 4441.35 quintals of vegetables were sold.

Ranbhaji Mahotsav - District Level Ranbhaji Mahotsav on behalf of Maharashtra State, Department of Agriculture on 14/08/2021 *Premkishore Sikchi Charitable Trust, Valgaon, Tt. At Amravati* was organised. Which was inaugurated by *Hon. Guardian Minister Hon. Smt. Yashomatitai Thakur*. According to the suggestion of the Commissioner of Agriculture, according to the natural availability of wild vegetables at district level and Tehsil level. Ranbhaji Mahotsav was organized from 09 to 15 August 2021. In 1985 farmers participated in the vegetable festival organized at district and Tehsil level. At this time 74 wild vegetables were available for sale. And there was a turnover of Rs.2.45 lakhs.

Agriculture Sanjivani week- from 21st June to 1st July 2021, meetings were organized in 1443 villages with the participation of 29862 farmers and guidance was given regarding preparation of Kharif season, importance of seed germination, seed treatment, soil testing, various schemes of agriculture department, precautions to be taken while handling/spraying chemical pesticides.

District Level Women Farmers Day - 240 women farmers participated successfully in District Level Women Farmers Day organised at Premchand Sikchi Resort, Walgaon on 22nd October 2021 through the Agriculture Department.

Pradhan Mantri Pik Bima Yojana- Under this scheme 52,528 farmers will be covered for kharif season 2021 by Rs.3089.0 lakh, under weather based fruit crop insurance scheme, Rs.653.0 lakh has been sanctioned for 1770 farmers

Dr. Panjabrao Deshmukh Organic Farming Mission- In the premises of the office of the Joint Director of Agriculture. On 26 / 01 / 2022 By the hands of the Hon. Guardian minister, a farm produce sales center was established with brand name '**Mom'** Through this a total turnover of Rs.62,338 was recorded in Between January 26 and March 10, 2022, Mom purchased agricultural produce from a farmer producer company and sold the produce directly at the stall. The market has been closed due to the deterioration of goods due to increasing heat.

Pradhan Mantri Sukshma khadya Unnayan Yojana – In 2021-22, in this scheme, 35 percent subsidy is available for individual and group projects with an upper limit of Rs. 10 lakhs. Accordingly, 88 projects have been submitted to the bank out of which 13 proposals have been approved and 18 proposals have been rejected. 57 proposals are pending with the Bank level.

Orange Farming School - Orange Farming School is organized on the first Friday of every month from February 2022. Various topics are discussed in the Agricultural School related to Ambia Bahar. Dr. Panjabrao Deshmukh Agricultural University's professor and the officers of

Agriculture Department are guiding in these orange farming schools. Agriculture School is being implemented in //50 villages of 10 Tehsils of the district.

Distribution of fertilizer, seeds on the farm bund - In the year 2021-22, a total of 31361 quintals of chemical fertilizers and 5099 quintals of seeds were delivered to the farmers' bunds through farmers' groups, agricultural centers and chemical fertilizer manufacturing companies in Amravati district.

Vikel Te Pickel -
In the year 2021-22, a total of 81 farmer groups / farmer producer companies are selling agricultural produce to bulk buyers / sellers / processors. In this, 61 farmer groups 282 M.Tons of their produce have been sold, 20 farmers producing companies, 29400 M.Tons of agricultural produce has been sold.

Balasaheb Thackeray Agricultural Business and Rural Transformation Project (SMART) -
In 2021-22, 50 proposals have been received in the district under these and submitted to the Commissionerate for preliminary approval and out of 18 proposals have received preliminary approval. 7 detailed project reports of the proposal have been submitted. 32 proposal is Processed at Commissionerate level for approval

III. Monitoring mechanism for village adaptation progress

1) Weekly review of Tehsils Agriculture Officers and Circle Agriculture Officers.
2) Weekly meetings with field functionaries of all agriculture schemes.
3) Through the field farm school to give the proper guidance for farmers regarding climate resilient technologies to create sustainable livelihood opportunities.
4) To inspire the farmer by effective communication through various training and agri. exhibitions to plan adaptation of new technology and schemes and to focus on adaptive climate resilient agriculture technologies for sustain.
5) To identify the needs and problems of farmers for effective implementation of various agriculture schemes.
6) To train extension workers, government officials, and agricultural experts to provide guidance and support to farmers in adopting mechanization.
7) Provide easy access to information about the latest trends in mechanization and government support programs through online platforms and local agricultural extension offices.
8) Encourage the formation of farmer cooperatives to jointly invest in and share machinery. This can help small farmer’s access modern equipment.
9) Promote the use of mechanization methods that are environmentally sustainable, such as precision agriculture and reduced chemical usage.
10) Monitor the adoption of modern agricultural technologies and machinery, such as tractors, harvesters, irrigation systems, and precision agriculture tools.

11) To Communicate Importance and implementation of new demonstration, conduct the farmer training.
12) Select the innovators & focus adaptation technology.
13) Creation of sustainable livelihood opportunities
14) To Study natural resources.

15) Most important indicator which needs special attention of farmers

IV. Strategy for revisiting the village adaptation plan

1) Strategy for revisiting of village adaptation plan:-
2) Revisiting a village adaptation plan is essential to ensure that it remains effective and relevant to the changing needs and circumstances of the communities it serves. Here's a strategy for revisiting and updating a village adaptation plan:
3) Stakeholder Engagement: Identify and engage with key stakeholders, including local government officials, community leaders, farmers, NGOs, and agricultural experts. Conduct meetings and workshops to gather input and feedback on the existing plan and to understand the evolving needs and challenges of the villages.
4) Assessment of Changing Climate Patterns: Consider the impact of changing climate patterns on agriculture and rural communities. Assess the need for climate-resilient strategies and adaptations.
5) Technology and Mechanization: Review the adoption of modern agricultural technologies and machinery in the villages. Evaluate the effectiveness of any support or subsidies provided for technology adoption.
6) Market and Value Chain Analysis: Analyse the local and regional markets for agricultural produce. Identify opportunities to strengthen value chains, improve market access, and increase farmers' income.
7) Resource Management: Evaluate the sustainable management of natural resources, including water, soil, and forests. Consider strategies for resource conservation and sustainable practices.
8) Climate-Smart Agriculture: Incorporate climate-smart agricultural practices and technologies to help farmers adapt to changing weather patterns. Promote techniques such as crop diversification and water management.
9) Capacity Building and Training: Review the effectiveness of training and capacity-building programs for farmers. Ensure that farmers have access to knowledge and skills needed for modern and sustainable farming practices.
10) Community Participation: Involve local communities in the planning and decision-making process. Encourage community-led initiatives and self-help groups.
11) To establish convergence models of resources, manpower to improve the economic condition of farmers.
12) To build partnerships and networking/tie ups with various agencies (Krushi Vidyapeeth/ KVK/Research Institute /FPO/FPC).
13) Availability and accessibility of basic amenities and services and achieving Sustainable Development Goals.
14) We prepared Plan according to their needs & problems and revisit the respective village.

Annexure I Sample Village Level Micro-Plan

http://mlpv2.mahapocra.gov.in/vdp.php?census_code=532132

गाव विकास आराखडा प्रपत्र

महाराष्ट्र शासन - कृषि विभाग
नानाजी देशमुख कृषि संजीवनी प्रकल्प

POCRA

गाव विकास आराखडा

गाव समुहाचा क्रमांक- 503_ptcs-2_02

गावाचे नाव-	राजना	सेन्सस कोड-	532132
महसुल मंडळ-	Asegaon	तालुका-	चांदुर बाजार
उपविभाग-	मोर्शी	जिल्हा-	अमरावती

गावसमुहातील इतर समाविष्ठ गावे

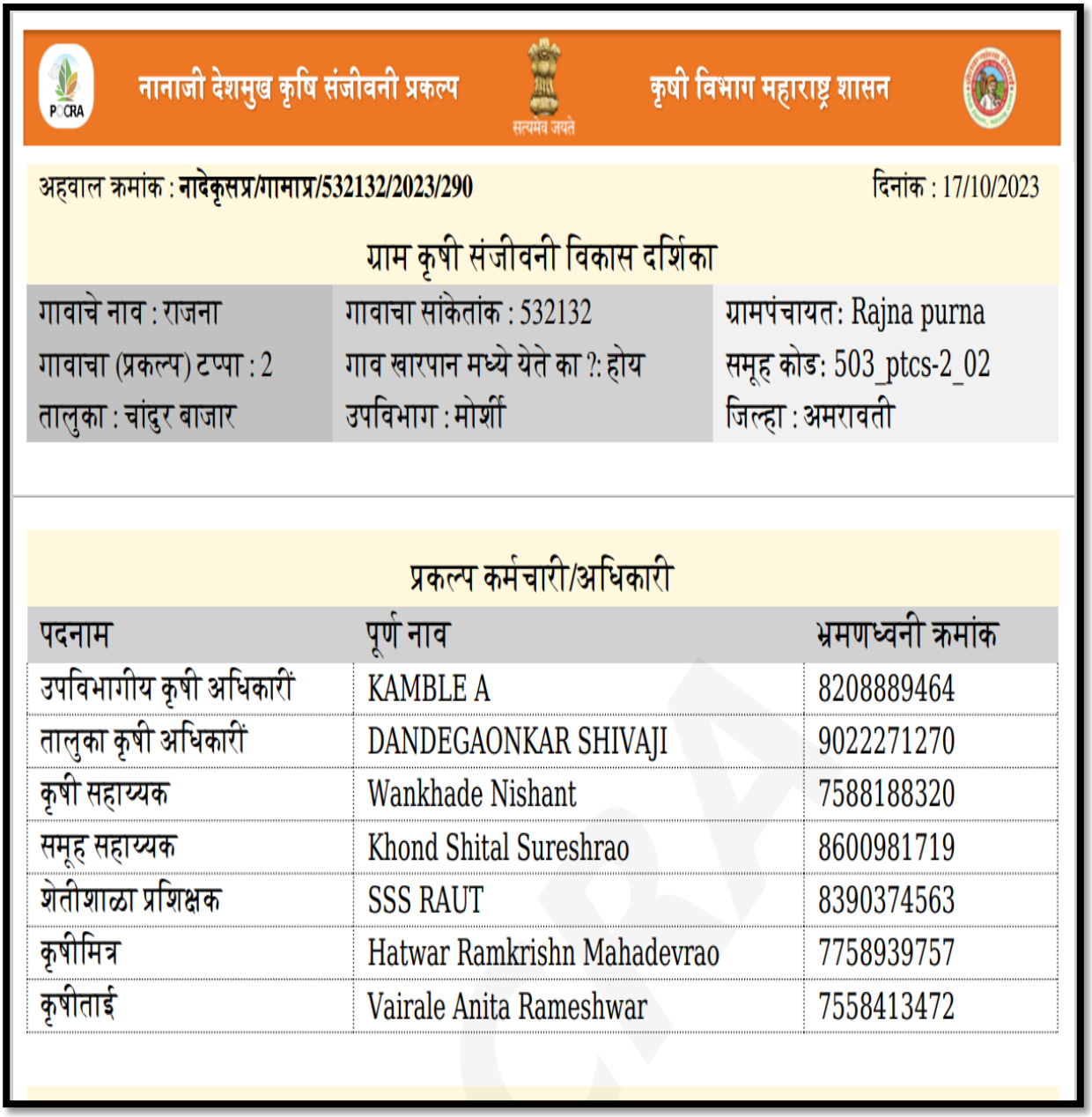
अ. क्र	गावाचे नाव	सेन्सस कोड	अ. क्र	गावाचे नाव	सेन्सस कोड
1	मेंगनाथपूर	531942			

सुक्ष्मनियोजन प्रक्रिया कालावधी	- 28-07-2021 ते 04-08-2021
गाव विकास आराखडा तयार करणा-या कृषि सहाय्यकाचे नाव	- Nishant Wankhade
गाव विकास आराखडयाची तांत्रिक तपासणी करणारे कार्यालय	- उपविभागीयकृषिअधिकारी,मोर्शी
ग्राम कृषि संजीवनी समिती मंजूरी ठराव क्रमांक व दिनांक	- ठराव क्रमांक 3 दि. 21-04-2008
ग्रामसभा मंजूरी ठराव क्र व दिनांक	- ठराव क्रमांक 3 दि. 17-12-2021
जिल्हास्तरीय समन्वय समितीकडील मंजूरीचा दिनांक	- _____

जिल्हा अधिक्षक कृषि अधिकारी,अमरावती कार्यालय

Annexure II Sample Village Profile

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



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

अहवाल क्रमांक : **नादेकृसप्र/गामाप्र/532132/2023/290** दिनांक : 17/10/2023

ग्राम कृषी संजीवनी विकास दर्शिका

गावाचे नाव : राजना	गावाचा सांकेतांक : 532132	ग्रामपंचायत: Rajna purna
गावाचा (प्रकल्प) टप्पा : 2	गाव खारपान मध्ये येते का ?: होय	समूह कोड: 503_ptcs-2_02
तालुका : चांदुर बाजार	उपविभाग : मोर्शी	जिल्हा : अमरावती

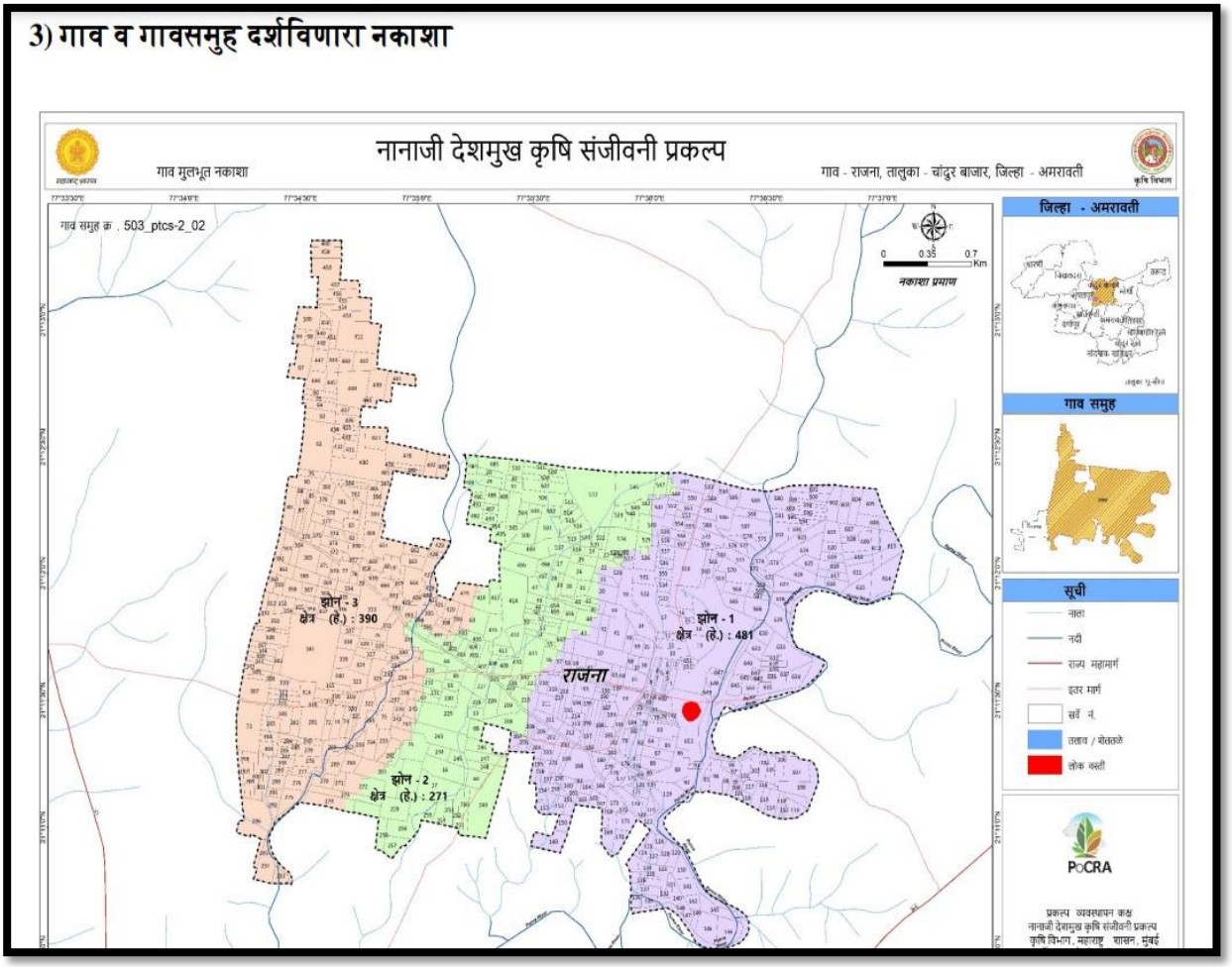
प्रकल्प कर्मचारी/अधिकारी

पदनाम	पूर्ण नाव	भ्रमणध्वनी क्रमांक
उपविभागीय कृषी अधिकारीं	KAMBLE A	8208889464
तालुका कृषी अधिकारीं	DANDEGAONKAR SHIVAJI	9022271270
कृषी सहाय्यक	Wankhade Nishant	7588188320
समूह सहाय्यक	Khond Shital Sureshrao	8600981719
शेतीशाळा प्रशिक्षक	SSS RAUT	8390374563
कृषीमित्र	Hatwar Ramkrishn Mahadevrao	7758939757
कृषीताई	Vairale Anita Rameshwar	7558413472

अनुक्रमणिका

Annexure III Sample Village Map (गावाचा मुलभूत नकाशा)

https://mahapocra.gov.in/maps/BaseMap/532132.pdf



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

https://mahapocra.gov.in/home/taluka_advisory/78