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Climate Variability and Agriculture Growth and It's Trends (A Case Study Of Jaipur Dist. Rajasthan)

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Abstract: Planning of agriculture development requires in the first instance collection of available information on agricultural area, crop production and trends of its temperature variation with climate. Cropping pattern of an area affects vegetation, land quality, land capability and sustainable development. Paper deals with rain fall, total cropping area, netirrigated area and total crop production changing in Jaipur District in 1999-2000 to 2019-2020 in respect of assessment of agriculture development The object is to find out the changes in agricultural area of Jaipur district and discuss about the trends of growth and agriculture in Jaipur district. Hypothesis of the research is Jaipur district experiences aberrant agricultural production during last two decades. Sustainable utilization of available land resources determines the socio-economic and cultural progress of a region.The term land is assigned different economic activities based on suitability in respect of activity. It is a dynamic phenomena that keeps changing with time and from place to place. After green revolution, the agriculturalproduction was increased tremendously, but due to redundant application of high yielding variety (HYV) seeds, chemical fertilizers, pesticides and excessive use of water resulting indegradation of land, soil quality and environment. Therefore, agricultural sustainability is a big challenge before the region. In this region, there are limitations on productivity, some show higher and other give low levels of productivity. Productivity and capability of land leads to the sustainability of agriculture in region.

Keywords Productivity, capability, cropping pattern, sustainability, HYV, PMFBY, Netarea sown, cropping intensity.

Introduction

Agriculture plays a vital role in India's economy. 54.6% of the total workforce is engaged inagricultural and allied sector activities (Census 2011) Government of India hastaken severalsteps for its development in a sustainable manner. Steps have been taken toimprove the income of farmers. Further, to mitigate risk in the agriculture sector, a scheme "Pradhan Mantri Fasal Bima Yojana" (PMFBY) was also launched in 2016.
Schemes such as Formation& promotion of 10,000 FPOs (Farmer Producer Organization)& the Agriculture Infrastructure Fund have also been launched recently to benefit the sector.As per the Land UseStatistics 2016-17, the total geographical area of the country is 328.7 million hectares, of which 139.4 million hectares is the reported net sown area and 189.3million hectares is thegross cropped area with a cropping intensity of 143.6%. The net area sown works out to 42.4%of the total geographical area. The net irrigated area is 68.6 millionhectares. Agriculture plays a crucial role in human development. However, it faces various challenges in the way to achieve major goals such as adequate food production, better health, economic prosperity, environmental sustainability and livelihood sustainability. The major proportion of the population of our country lives in rural areas, hence, the strategy of sustainable agriculturaldevelopment will help in upliftment of the rural livelihood, poverty eradication, employmentand income generation for the farmers.

Review of literature

(FCCC/TP/2008/3 2008) studied "Physical and socio-economic trends in climate-related risks and extreme events, and their implications for sustainable development" Global average temperatures are on the rise, ice and snow are melting at an unprecedented rate, and sea levels are rising due to climate change, according to the Intergovernmental Panel on Climate Change's Fourth Assessment Report. Future projections indicate that these climatic physical tendencies will only get worse. Drawing on data supplied by the IPCC, this paper outlines the physical and socio-economic trends in climate-related hazards and extreme events for developing nations, with

a focus on LDCs and SIDS, as well as the consequences for sustainable development. It was prepared as part of the Nairobi work programme on impacts, vulnerability, and adaptation to climate change. In the world's poorest places, physical and socioeconomic trends are worsening the situation, making it harder to achieve sustainable development and the Millennium Development Goals. This is causing more poverty, fewer livelihoods, and worse health and education.

(Zhai and Zhuang 2012) **st**udied "Agricultural Impact of Climate Change: A General Equilibrium Analysis with Special Reference to Southeast Asia" This research analyses the economic repercussions of climate change for Southeast Asian nations through 2080, drawing on the most recent global projections of these impacts on agricultural productivity. The findings point to modest overall effects of climate change on the world economy as a result of agricultural losses. The developing world would end up losing out in the end due to the substantial structural changes in global agricultural output and commerce brought about by the uneven distribution of productivity losses across global regions. Reducing agricultural production would have moderate but non-negligible negative consequences on Southeast Asia's economic output, given the predicted diminishing agricultural component of the economy. Most Southeast Asian nations stand to lose more ground in terms of welfare as a result of worsening terms of trade due to the predicted rise in reliance on crop imports in the next decades. The anticipated negative impacts are lower in Singapore and Malaysia, and higher in the Philippines, Indonesia, Thailand, and Vietnam, depending on the country's economic structure. Reversing the current trend of diminishing agricultural output should be Southeast Asia's top priority if the area is to mitigate the possible agricultural losses caused by the predicted climate change.

(Ninan and Bedamatta 2012) studied "Climate Change, Agriculture, Poverty and Livelihoods: A Status Report" Drawing on previous research, this article analyses how climate change is affecting various crops, seasons, and areas within India's agricultural sector. The study acknowledges that different crops, geographies, and climate change scenarios would experience different impacts of climate change. There is evidence that when temperatures rise in many regions of India, agricultural productivity falls. Several studies have shown that by 2080–2100, rising temperatures in India are likely to cause a 10% to 40% drop in agricultural output. The response of irrigated and rainfed wheat yields to climate change is anticipated to be an increase in regions above 27° N latitude, and a decrease of -2.3% to -23.9 % in all other regions. A projected loss of 3-26 percent in net agricultural revenues is associated with temperature rises ranging from 2° C to 3.5 ° C. The food production volatility in India, which affects poverty and livelihoods, is a direct result of the growing climate sensitivity of the country's agricultural sector. Attention should be given to the speed with which Indian farmers can modify their agricultural methods to accommodate climate change, as well as to the policies and technology that will facilitate this adaptation.

(Soares 2013) studied "Climate change and its Impact on Agriculture" One of humanity's main worries is the ever-changing and unpredictable climate. Recurring floods and droughts pose a huge danger to the way of life for billions of people who rely on land for the majority of their necessities. Frequently, natural disasters like droughts, floods, heat waves, forest fires, landslides, etc., have a negative impact on the world economy. Earthquakes, tsunamis, and volcanic eruptions are not weather-related, yet they can alter the atmospheric chemical makeup nonetheless. Consequently, weather-related catastrophes will occur. An increase in aerosols, which are atmospheric pollutants, is a result of greenhouse gas emissions such as carbon dioxide from fossil fuel combustion, chlorofluorocarbons, perfluorocarbons, and many more. Other causes of extreme weather include the destruction of the ozone layer and the release of radiation with a UV-B filter, volcanic eruptions, forest fires, and the "human hand" in deforestation.

(Zhu and Troy 2018) studied "Agriculturally Relevant Climate Extremes and Their Trends in the World's Major Growing Regions" Climatic change is anticipated to influence the frequency and intensity of climate extremes, which in turn can have a detrimental impact on agricultural productivity. The major growing regions for maize, wheat, soybean, and rice were studied from 1951 to 2006. A derived 1° data set of growing season climate indices and extremes was created using a combination of in situ station measurements (the Global Historical Climatology Network's Daily data set) and various other gridded data products. The quantity of hot days, length of dry spells, and intensity of rainfall are some of the agriculturally significant climatic variables included in this dataset. While temperature-related indicators showed little trending prior to 1980, most growing locations have seen statistically significant warming trends for all crops since then. Particularly, there has been a

noticeable uptick in the frequency and severity of extremely hot weather, which is known to reduce crop production. When compared to temperature patterns, rainfall is less stable; some areas get more rain than others. It has been shown that extreme weather events, such as dry growing seasons, are generally associated with higher temperatures, higher drought indices, and bigger vapour pressure deficits. Consequently, a number of weather factors that have a negative effect on harvest yields come together. These findings demonstrate that the worldwide agriculture sector has been increasingly vulnerable to adverse weather events since 1980.

(Rao, Prasad, and Mohapatra 2019) studied "Climate Change and Indian Agriculture: Impacts, Coping Strategies, Programmes and Policy" Global processes have a profound impact on both agriculture and climate. Reduced agricultural output is a direct result of even a little climatic shift. The average temperature of the atmosphere is rising due to the climate change phenomenon, which has emerged as a major trend that will have far-reaching consequences for the world's future. World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP) both identified carbon dioxide (CO2) as the primary cause of climate change due to its highest contribution to global warming, and the 1972 Club of Rome Report formally acknowledged global warming as an international issue. The only way to modify farming practises and increase agricultural output is to conduct thorough assessments of the impacts of climate change on the agricultural sector (Fraser et al., 2008).

(Datta, Behera, and Rahut 2022) studied "Climate change and Indian agriculture: A systematic review of farmers' perception, adaptation, and transformation" In India, the agricultural sector is feeling the pinch of climate change. Important governmental actions to address these challenges include understanding how farmers perceive and adjust to the changing climate. Within this framework, this research uses Scopus and the Web of Science to conduct a comprehensive literature assessment on the topic of perception and adaptation among Indian farmers. The majority of Indian farmers have reported higher temperatures, more unpredictable rainfall, and less rainfall overall, which is in line with the weather records. It appears that Indian farmers have used a broad variety of adaptation strategies, the majority of which are systematic and progressive in nature. It is also becoming more common for farmers to implement transformational adjustments, which include significant changes in how they use land, allocate resources and labour, modify their occupational pattern, and implement new farming systems. The research does not, however, provide strong evidence that farmers' adaptation strategies are a direct outcome of their views on climate change. A number of factors, including household income, farm size, gender, and resource endowment, as well as a lack of timely and appropriate access to relevant information and credit, impact the adoption of adaptation methods. The report recommends massive investments in farmer capacity building and the Indian agricultural system as a whole to prevent maladaptive effects and attain sustainability in the long run. Furthermore, for successful policies towards food security and farmers' wellbeing, it is vital to employ an integrated strategy to examine how farmers perceive and adjust to changing climate conditions and their results.

(Gomathy and Kalaiselvi 2023) studied "Climate Change and its Impact on Agriculture" Alterations to the worldwide patterns of precipitation over the long term are known as global climate change. Brief (daily) shifts in a region's temperature, wind speed and direction, and/or precipitation totals are what the word "weather" describes (Merritts et al. 1998). Climate change has the potential to impact agriculture in the long term through a variety of pathways, including changes to crop yields and quality, growth rates, photosynthesis and transpiration rates, moisture availability, and more. Worldwide, food production is going to be hit hard by climate change. A decrease in agricultural productivity is possible if several crops are unable to withstand increases in the mean seasonal temperature. The effects of climate change on agricultural production will be felt more acutely in regions where temperatures are already near the physiological maximum for crops (IPCC, 2007). Factors that contribute to global warming by changing the make-up of the atmosphere can have an effect on crop yields via changes in plant physiology. As a result of both the positive and negative effects of climate change on agriculture, the latter is expected to have far-reaching ramifications for food supply and security, necessitating specific agricultural responses.

(S. C. Swami, 2014) "Impact of Climate Change on Agriculture in Rajasthan" In this study, the historical climate trends in Rajasthan, including the Jaipur District, are investigated, and the implications of climate change on agriculture are discussed. The difficulties that farmers are confronted with are brought to light, and adaptation strategies are proposed.

(D. S. Rathore and S. P. Das, 2018)"Agricultural Drought Assessment in Jaipur District of Rajasthan

Using Remote Sensing and GIS" Agricultural droughts in the Jaipur District are the primary focus of this research, which employs remote sensing and geographic information system (GIS) techniques. A better understanding of the spatial and temporal patterns of droughts, as well as the effects that droughts have on crops, is provided by this study.

(R. K. Sharma and M. K. Jat,2015) "Impact of Climate Change on Agriculture and Its Mitigation in Western Rajasthan, India" Agriculture in Western Rajasthan, which includes Jaipur District, is the focus of this study, which investigates the effects of climate change on agriculture. It discusses various strategies for mitigating the effects of climate change, including the utilisation of drought-resistant crop varieties and water management tactics.

(L. S. Rathore and B. R. Sahu,2020) "Adaptive Strategies of Farmers to Climate Variability: A Case Study from Jaipur District, Rajasthan" The purpose of this study is to investigate the adaptive methods that farmers in the Jaipur District utilise in order to deal with the varying weather conditions. It investigates the ways in which farming patterns and traditional knowledge are being utilised to reduce the hazards associated with climate change.

(A. Sharma and V. Kumar, 2019) "Assessment of Climate Variability and Its Impact on Crop Yield: A Case Study of Jaipur District, Rajasthan" The fluctuation of the climate and its direct influence on agricultural yields in the Jaipur District are both investigated in this study. In order to find patterns and relationships between climatic variables and agricultural productivity, it employs statistical analysis.

(H. S. Meena and V. P. Singh, 2017) "Assessment of Climate Change Impact on Wheat and Mustard Crop in Semi-Arid Region of Jaipur District, Rajasthan" The semi-arid region of Jaipur District is the centre of this research, which was conducted to investigate the effects of climate change on wheat and mustard crops. In order to forecast future climate scenarios and the consequences those scenarios will have on crop yields, it use modelling tools.

(M. K. Pareek and R. K. Sogani, 2016) "Analysis of Spatial and Temporal Variability of Rainfall in Jaipur District of Rajasthan" For the purpose of this study, the geographical and temporal variability of rainfall patterns in the Jaipur District is investigated. This study investigates the patterns and variations in rainfall, which is critically important for comprehending the availability of water for agricultural purposes.

(R. K. Poonia and M. M. Soni, 2019) "Assessment of Climate Change Vulnerability and Adaptation Strategies in Jaipur District, Rajasthan" This study determines the degree to which the Jaipur District is susceptible to the effects of climate change and identifies adaptation measures that might be implemented at the local level. This includes a thorough study of the potential dangers and the procedures that can be taken to adapt to them.

(A. K. Singh and P. R. Shukla, 2014) "Impact of Climate Change on Agriculture: Evidence from Jaipur District of Rajasthan" According to the findings of this study, the effects of climate change on agriculture in the Jaipur District are supported by empirical evidence. The study of data and observations made in the field are included in order to gain an understanding of the shifting dynamics of agriculture..

(S. K. Sharma and R. K. Kaushal, 2018) "Assessment of Climate Variability and Its Impact on Maize Production in Jaipur District, Rajasthan" The influence that climate variability has on maize output in the Jaipur District is the specific topic of investigation in this study. This study investigates the connection between the various climate factors and the yields of maize crops.

(A. Verma and S. C. Sharma, 2021) "Assessment of Climate Change Impact on Horticultural Crops in Jaipur District, Rajasthan" The purpose of this study is to investigate the effects that climate change has had on horticultural crops in the Jaipur District, including fruits and vegetables. It investigates the ways in which alterations in temperature and patterns of rainfall have an impact on the production of horticultural goods.

(R. S. Choudhary and P. C. Moharana, 2015) "Farmers' Perception and Adaptation to Climate Change in Jaipur District, Rajasthan" The purpose of this study is to evaluate the ways in which farmers in the Jaipur District perceive climate change and the techniques they employ to adapt to it. Insights into the local knowledge and methods that farmers have embraced are provided, which are particularly valuable.

(S. Gupta and R. K. Rana, 2020) "Analysis of Monsoon Variability and Its Impact on Kharif Crops in Jaipur District" The variability of the monsoon and its impact on Kharif crops, like as rice and cotton, in the Jaipur District are the primary topics of investigation in this study. It analyses the effects that delayed or unpredictable monsoons have on crop productivity and provides a conclusion.

(M. L. Sharma and S. K. Meena, 2017) "Sustainable Agricultural Practices for Climate Change

Mitigation in Jaipur District, Rajasthan" The Jaipur District is the focus of this research project, which investigates sustainable farming practises that have the potential to help reduce the consequences of climate change. It places an emphasis on the significance of responsible soil management and conservation agriculture.

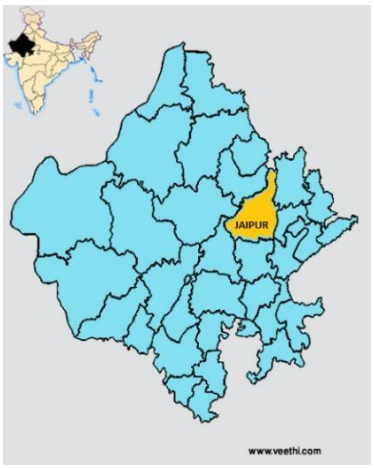
(R. P. Singh and A. K. Goyal, 2019) "Assessment of Water Availability and Its Impact on Agriculture in Jaipur District" In this study, the availability of water for agricultural purposes in the Jaipur District is evaluated, taking into account a variety of parameters including groundwater levels and surface water sources. The issues and potential solutions that are associated with water management are discussed.

Study Area

India is situated north of the equator between 8°4' north to 37°6' north latitude and 68°7' eastto 97°25' east longitude. It is the seventh-largest country in the world, with a total area of 3,287,263 square kilometres (1,269,219 sq mi).

Rajasthan is located in northwestern India, bounded on the west and northwest by Pakistan and shares domestic borders with the states of Punjab, Haryana, Uttar Pradesh, Madhya Pradesh and Gujarat. With a land area of 342,239 sq km, Rajasthan is the largeststate in India geographically.

Jaipur district is located in the eastern part of Rajasthan State between $26^0$23’ to $27^0$51’ North Latitudes and $74^0$55’ to $76^0$50’ East Longitudes. Total area of the district is 11143 Km^2 and population is 6626178 (Census 2011). The district is located at an average height of 1417 feet above sea level. In the North, Jaipur district shares its borders with Sikar and Mahendragarh districts (Haryana). In the south, it is surrounded by Tonk district, in the east by Alwar, Dausa and Sawai Madhopur districts and in the west by Nagaur and Ajmer districts. From east to west, Jaipur district is spread over 180 km while the length from northto south is about 110 km. Banganga and Sabi Rivers are the main sources of water for the district. Jaipur district has a semi-arid climate.



Objectives

1. To find out the changes in agricultural trends and growth of Jaipur district.
2. To discuss the climatic variability in Jaipur district.

Hypothesis

Geo-environmental factors are responsible for agriculture growth and its trends.

Methodology

Methodology in this paper is expounded as the systematic method to sort out the research problem. Secondary data have been collected from Economics and Statistics Department of Rajasthan, Agriculture Department of Rajasthan, Meteorological Centre Jaipur, other reports, books Directorate of Economics and Statistics, Rajasthan and researchworks.

1. Climate

The district experience different climatic parameter which are responsible agriculture.

2. Rainfall

Rainfall is a major indicator of the climate in any region. It directly affects the cropping area as well as intensity and production of all crops in Jaipur District. The irrigationsources also depend on rainfall in the study area.

Table 2: Rainfall in Jaipur District 2001-2020 (In Centimeter)

Years	Normal Rainfall	Actual Rainfall	Variation (+/-)
2001	54.82	56.94	(+) 2.12
2002	54.82	62.65	(+) 7.83
2003	54.82	68.06	(+) 13.24
2004	54.82	59.93	(+) 5.11
2005	54.82	38.30	(-) 16.52
2006	54.82	59.93	(+) 5.11
2007	54.82	48.52	(-) 6.30
2008	54.82	42.97	(-) 11.85
2009	54.82	51.00	(-) 3.82
2010	54.82	68.67	(+) 13.85
2011	54.82	59.00	(+) 4.18
2012	54.82	64.12	(+) 9.30
2013	54.82	65.12	(+) 10.30
2014	54.82	58.03	(+) 3.21
2015	54.82	58.03	(+) 3.21
2016	54.82	38.60	(-) 16.22

2017	54.82	59.30	(+) 4.48
2018	54.82	36.62	(-) 18.20
2019	54.82	53.70	(-) 1.12
2020	54.82	58.70	(+) 3.88

Source: District Statistical Outline Jaipur (2001-2021)

Above given table demonstrates amount of rainfall during year 2001 to 2020 in Jaipurdistrict which communicate variation in rainfall data. Normal rainfall in Jaipur district is 54.82 cm. The study area received more than normal rainfall 68.06 cm in the year 2003, 68.67 cm in 2010, 65.12 cm in 2013 and 64.12 cm in 2012. The region experienced less than normal rainfall 38.30 cm in 2005, 42.97 cm in 2008, 38.60 cm in 2016 and 36.62 cm in 2018.Rainfall directly affects cropping area, production and productivity.

3. Cropping Area

Agriculture trends and development are directly related with the cropping area in Jaipur District. This table shows the total cropping area of cereals, pulse, oilseed and other crops. Data of total cropping area of various crops have been analyzed from the year 2001 to2020, which is uncertain, year by year during this time period due to the variability of climatic parameter and its effects there on.

Table 3: Total Cropping Area Under Various Crops- 2001-2020 (In Hectare)

Years	Cereal Crops	Pulse Crops	Oilseed Crops	Other Crops	Total Crops
2000-2001	489297	65128	108658	3546	666629
2001-2002	517770	93797	124847	3211	739625
2002-2003	468650	101310	89942	4980	664882
2003-2004	580450	136552	123848	4601	845451
2004-2005	503177	150145	256901	4447	914670
2005-2006	504018	111473	264482	4189	884162
2006-2007	507960	86162	168710	4350	767182
2007-2008	519579	101816	244558	4265	870218
2008-2009	528840	143737	263692	3603	939872
2009-2010	548908	92347	173774	1910	816939
2010-2011	595910	199013	195570	1799	992292
2011-2012	555559	236276	194873	1556	988264
2012-2013	545128	174336	175599	1788	896851
2013-2014	551852	245590	173041	1765	972248
2014-2015	557535	205138	167626	2426	989951
2015-2016	601682	75953	134342	3017	933316
2016-2017	556358	216886	147297	6310	922754
2017-2018	558164	220261	110228	1883	890536
2018-2019	524014	213750	136759	2342	876885
2019-2020	564708	43001	79538	632	687879

Source: District Statistical Outline Jaipur (2001-2021

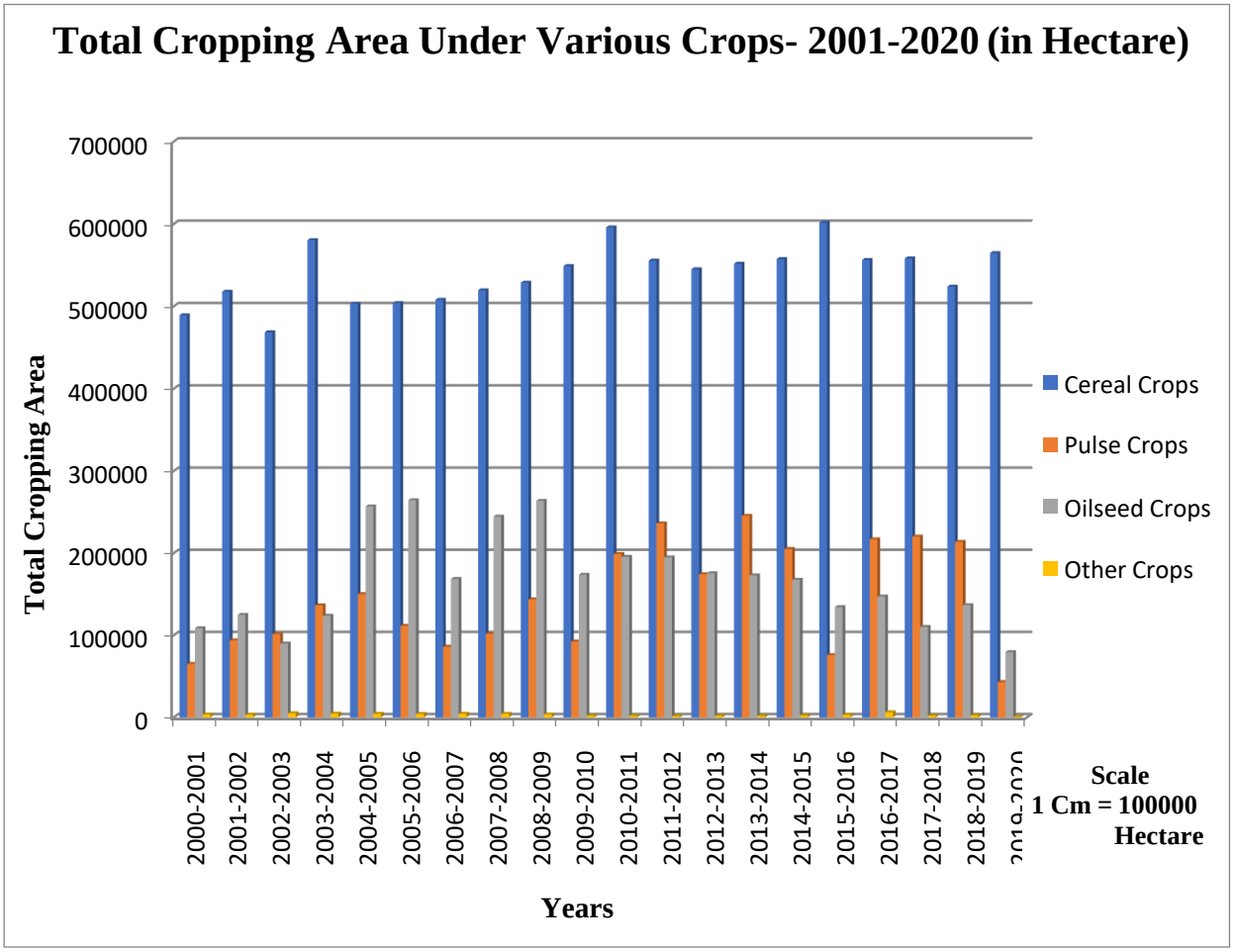


Diagram 1: Total Cropping Area of Various Crops- 2001-2020

Table and diagram shows total cropping area under various Crops during agriculturalyear 2000-01 to 2019-20 which convey uneven cropping area. During the cropping year 2000-2001 total area under various crops was 666629 hectare, which was minimum 664882 hectare in the season 2002-03 and maximum 992292 hectare in the cropping year 2010-2011and agriculture area is comparatively less 687879 hectare in the agricultural year 2019-20.

Total cropping area depends on variability in rainfall and other climatic phenomenon. The irrigation, crop rotation cropping pattern, leaving fallow land, availability of fertilizers andinsecticides, farmer and consumer demand etc, are also determinant factors for variation inland productivity and land capability in the region.

4. Net Irrigated Area

Due to uncertain and irregular rainfall, the study area has extreme need of irrigation for crop production. Wells, tube wells, ponds, canals are major irrigation sources. The irrigation sources and their availability also in inevitable for agriculturesustainability. This table displayed this in respect on agriculture production.

Table 4: Net Irrigated Area of Jaipur District - 2001-2020 (In Hectare)

Years	Wells and Tube wells	Ponds	Canals	Other Sources	Net Irrigated
2000-2001	337471	1	1280	00	338752
2001-2002	329230	179	1160	00	330569
2002-2003	270763	00	179	00	270942
2003-2004	310233	146	110	00	310489
2004-2005	327426	156	1870	00	329452
2005-2006	327020	00	2649	38	329707
2006-2007	298397	00	801	00	299198
2007-2008	310644	00	160	00	310804
2008-2009	327624	00	940	00	328564
2009-2010	288466	00	941	00	289407
2010-2011	384104	289	4446	272	389111
2011-2012	377976	581	8410	14	386981
2012-2013	383146	00	7507	334	390987
2013-2014	385329	410	1008	2811	389558
2014-2015	383242	00	2543	1748	387533
2015-2016	383242	287	1221	00	384750
2016-2017	371071	00	1524	4043	376638
2017-2018	281448	302	00	00	281750
2018-2019	279044	1286	00	00	280330
2019-2020	262618	159	4895	3971	281657

Source: District Statistical Outline Jaipur (2001-2021)

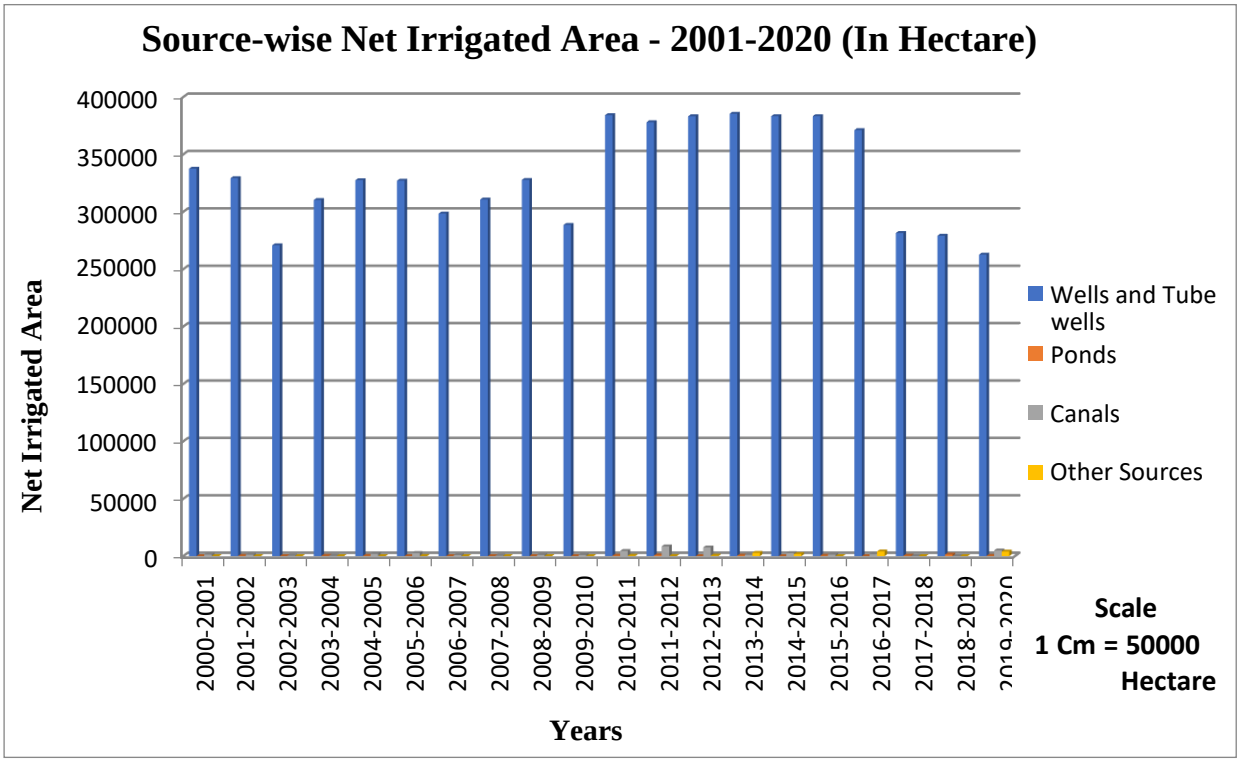


Diagram 2: Source-wise Net Irrigated Area- 2001-2020

Above given table and diagram display net irrigated area during agricultural year 2000-01 to 2019-20 in Jaipur district that shows inconsistent in net irrigated area. During the cropping year 2000-2001 net irrigated area was 338752 hectare, which was minimum 270942hectare in the year 2002-03 and maximum 390987 hectare in the cropping year 2012-2013 and net irrigated area is comparatively less 281657 hectare in the agricultural year 2019-20. Net irrigated area depends on monsoon duration, amount of rainfall, water resources, type of crops etc.

5. Crop Production

Jaipur district experiences aberrant agricultural production during last two decades.

Data of total production of various crops as cereal, pulse, oilseed and other crops during year2001 to 2020 have been given below, that shows inconsistent of production due to the diversified factors of climatic variation.

Table 5: Total Production Under Various Crops- 2001-2021 (In Tonne)

Years	Cereal Crops	Pulse Crops	Oilseed Crops	Other Crops	Total Crops
2000-2001	430703	46317	62943	21449	561412
2001-2002	631375	74641	144211	56385	906613
2002-2003	385992	33349	51792	13008	484141
2003-2004	719421	74030	126211	56932	976594
2004-2005	654714	55026	220467	50015	980222
2005-2006	567384	39038	224229	22568	853219
2006-2007	605230	40974	174415	59975	880594
2007-2008	843163	36156	248020	55324	1182663
2008-2009	1125634	82864	268889	58520	1535907

2009-2010	423029	25534	118187	15086	581836
2010-2011	423029	205317	248616	38461	915423
2011-2012	804386	304832	427513	27315	1564046
2012-2013	1242696	351519	490560	38084	2122859
2013-2014	1050484	385264	508234	50595	1994577
2014-2015	656619	253308	195734	46882	1152543
2015-2016	718113	50901	164332	54540	987886
2016-2017	809192	204745	202494	12146	1228577
2017-2018	823107	77639	132862	48517	1082125
2018-2019	859774	225240	162419	42365	1289798
2019-2020	708721	142862	91235	35018	977836

Source: District Statistical Outline Jaipur (2001-2021)

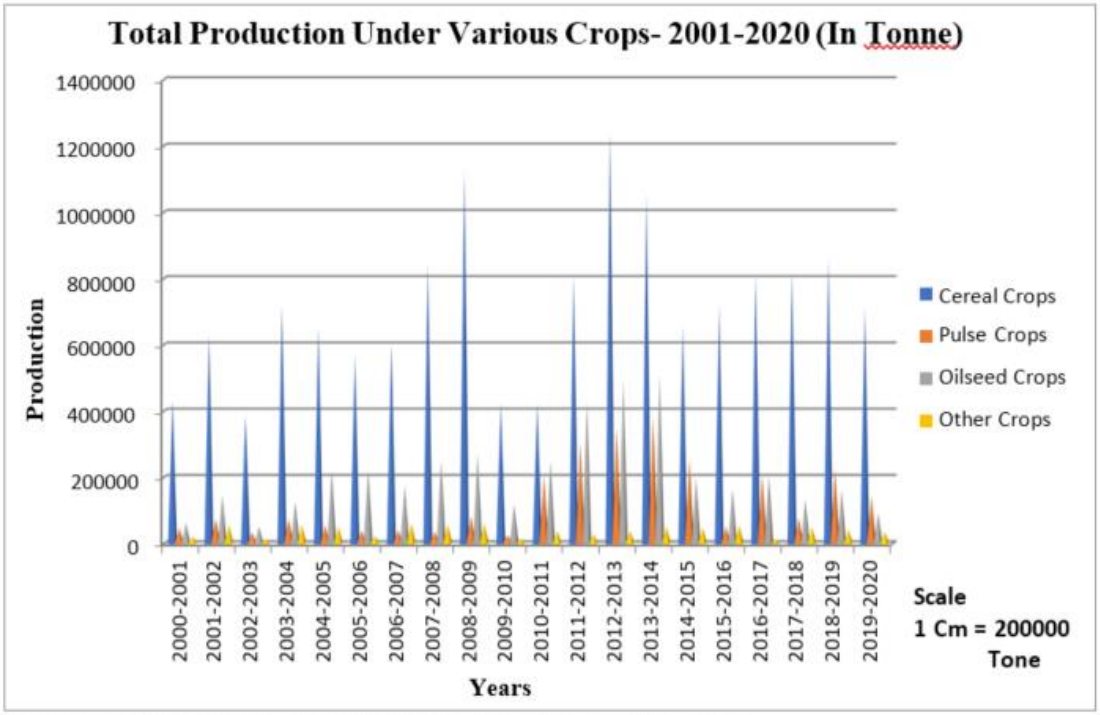
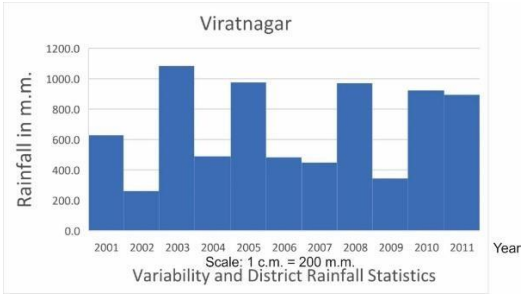
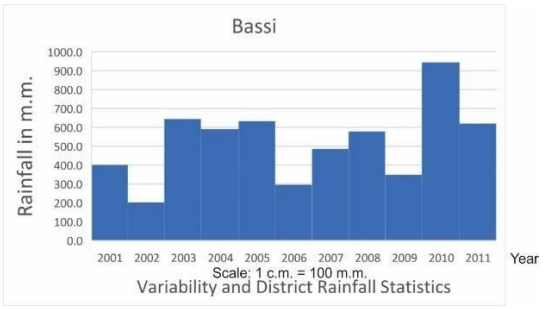
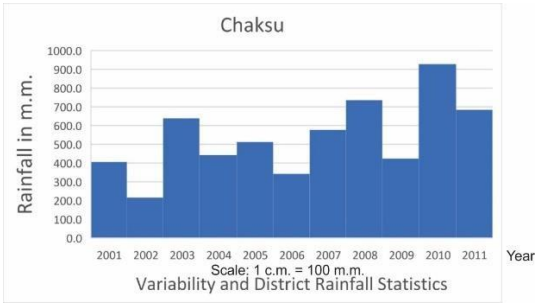


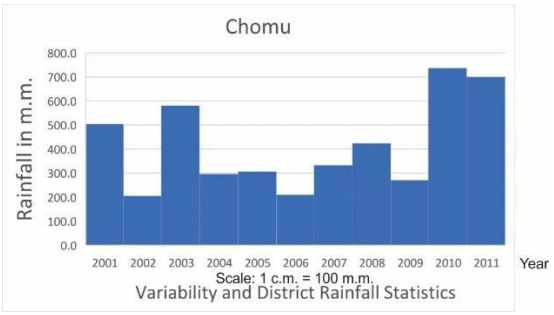
Diagram 3: Total Production Under Various Crops- 2001-2020

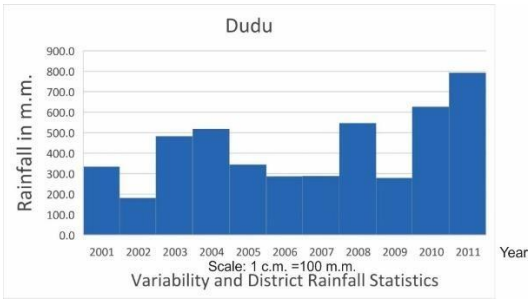
Above given table and diagram exposes total production under various Crops during agricultural year 2000-01 to 2019-20 in Jaipur district which convey dissimilar production. During the cropping year 2000-2001 total production under various crops was 561412 ton, which was minimum 484141 ton in the season 2002-03 and maximum 2122859 ton in the cropping year 2012-2013 and crop production is comparatively less 977836 ton in the agricultural year 2019-20. Total crop production depends on climatic conditions, amount of precipitation, amount of irrigation, crop rotation, utilization of fertilizers and insecticides, demand of farmers, government, industries and appropriators as well as users.

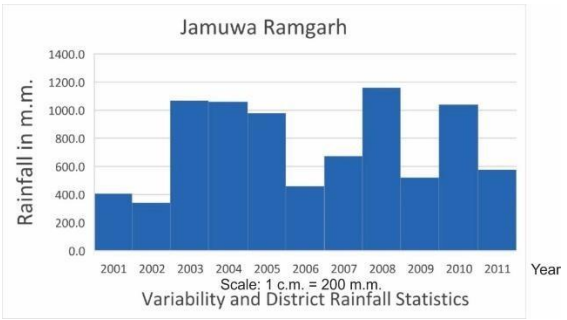

Viratnagar
Rainfall in m.m.
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Year
Scale: 1 c.m. = 200 m.m.
Variability and District Rainfall Statistics

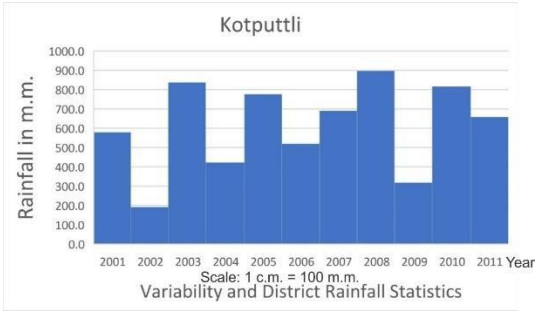

Bassi
Rainfall in m.m.
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Year
Scale: 1 c.m. = 100 m.m.
Variability and District Rainfall Statistics

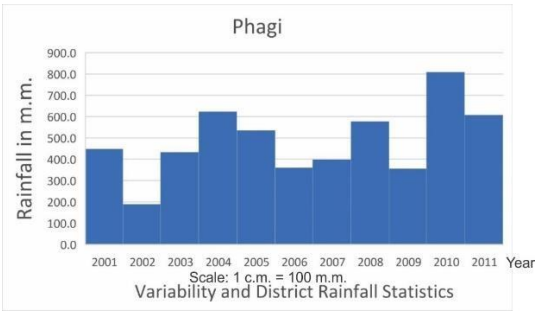

Chaksu
Rainfall in m.m.
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Year
Scale: 1 c.m. = 100 m.m.
Variability and District Rainfall Statistics

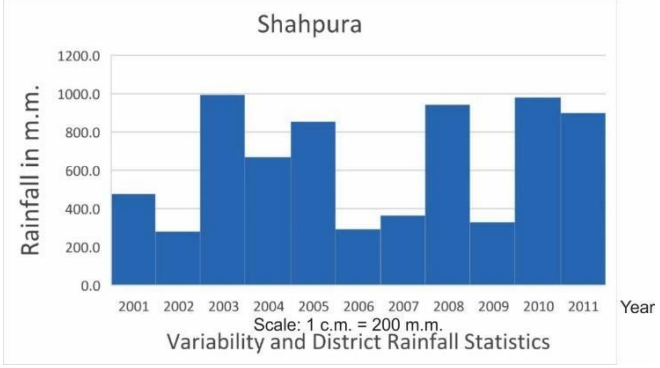

Chomu
Rainfall in m.m.
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Year
Scale: 1 c.m. = 100 m.m.
Variability and District Rainfall Statistics


Dudu
Rainfall in m.m.
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Year
Scale: 1 c.m. =100 m.m.
Variability and District Rainfall Statistics


Jamuwa Ramgarh
Rainfall in m.m.
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Year
Scale: 1 c.m. = 200 m.m.
Variability and District Rainfall Statistics


Kotputtli
Rainfall in m.m.
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Year
Scale: 1 c.m. = 100 m.m.
Variability and District Rainfall Statistics


Phagi
Rainfall in m.m.
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Year
Scale: 1 c.m. = 100 m.m.
Variability and District Rainfall Statistics


Shahpura
Rainfall in m.m.
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Year
Scale: 1 c.m. = 200 m.m.
Variability and District Rainfall Statistics

Conclusion

During the cropping year 2000-2001 total area under various crops was 666629 hectare, which was minimum 664882 hectare in the season 2002-03 and maximum 992292 hectare in the cropping year 2010-2011 and agriculture area is comparatively less 687879 hectare in the agricultural year 2019-20. During the cropping year 2000-2001 total production under variouscrops was 561412 ton, which was minimum 484141 ton in the season 2002-03 and maximum2122859 ton in the cropping year 2012-2013 and crop production is comparatively less 977836ton in the agricultural year 2019-20. Due to the diversified factors of climatic variation of the region experiences the co-relation in between the crop area and production.

The variation in climatic factors reflects in the land area, land capability and productivity and growth in agriculture which leads in the sustainability of agriculture. Sustainability and development in agriculture is needed for sustainable development.

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- https://icar.org.in/
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- https://statistics.rajasthan.gov.in/
- https://plan.rajasthan.gov.in/
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