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Impact of Rainfall on Per Hector Yield of Tur in Solapur District: A Geographical Analysis

Dr. Krishna Bapu Patre

Abstract

Agriculture is an important economic activity in Solapur district, and the production of rain-fed crops is largely influenced by climatic conditions. Tur (pigeon pea) is one of the important pulse crops cultivated in the district and is particularly suitable for dry and semi-arid conditions. Since Solapur district lies in the rain-shadow region and receives uncertain and scanty rainfall, variations in rainfall can influence the productivity of Tur. The present study attempts to examine the impact of rainfall on the per hectare yield of Tur in Solapur district during 2024–25. The study is based on secondary data relating to rainfall and per hectare yield of Tur collected from the Agriculture Department, Socio-Economic Review, and District Statistical Abstract of Solapur district. Pearson's coefficient of correlation was used to examine the relationship between rainfall and per hectare yield of Tur. The study reveals a positive correlation of ***+0.3123*** *between rainfall and per hectare yield of Tur. The coefficient of determination (*$R^2 = 0.0975$*) indicates that rainfall explains* ***9.75 per cent*** *of the variation in Tur yield, while the remaining* ***90.25 per cent*** *is influenced by other factors. The highest yield is recorded in Akkalkot, followed by Pandharpur and Barshi, whereas Mangalwedha records the lowest yield. The study indicates that rainfall is an important factor affecting Tur productivity, but other physical, technological, and agricultural factors also play a major role.*

Keywords: *Agriculture, Correlation, Rainfall and Tur*

Introduction:

Agriculture occupies an important position in Indian economy. Its contribution to the national income in1950-51 was up to 54 per cent which decline to only 18.50 per cent at present. Agriculture provides food, fodder, pulses and row material and thus contributes to overall economic growth. Agriculture forms the back bone of Indian economy and pulses crops form the back bone of agriculture allied industries in India. The importance of pulses crops was Pulses are a source of supplementary protein to daily diets based on cereals and starchy food for a predominantly vegetarian population and for those who cannot afford expensive animal protein. Pulses are therefore often regarded as poor man's meat. They also provide energy, essential minerals, vitamins and several compounds considered beneficial for good health. Their cultivation enriches soil by adding nitrogen, and improves the physical, chemical and biological soil properties. The Tur is a major pulse crop in India. Basically it is the tropical crop. It drought tolerant crop and recommended for dry region. Tur is the major pulse crop in Solapur district. It can be grown in both Rabi and Kharif season. Rainfall is the only source of water for Tur cultivation in many tahsil of study region. Through the farmers use other source of irrigation for Tur crop like canal water, tank water, well and bore well water. These are all again depending on rainfall for recharging. There is wide temporal variation in per hector yield of Tur in Solapur district. Therefore attempt is made here to study the impact of rainfall on per hector yield of Tur in Solapur district in 2024-25.

Study Region:

For the present investigation Solapur district is selected as a study region. Geographically Solapur district is located between $17^0 10'$ North to $18^0 32'$ North latitude and $74^0 42'$ East to $76^0 15'$ East longitude. It covers an area of 14,895 sq. km. The district is situated on the south eastern fringes of the state of Maharashtra and the district is bounded on the north by the Ahmednagar district and Osmanabad district, on the east by Osmanabad and Gulbarga district of the state of Karnataka, on the south by Sangli and Bijapur district and on the west by Pune and Satara district. The shape of district resembles flying eagle. The proportion of area of Solapur district as compare to Maharashtra is about five (5%) per cent. It is administratively sub-divided into 11 tahsils. The soils of the district can be classified into three main types. These are black soil, coarse grey soil and reddish soil. Agro-climatically, the entire district comes under the rain shadow area. Rainfall is uncertain and scanty. The average rainfall for the district is 545.4 mm.

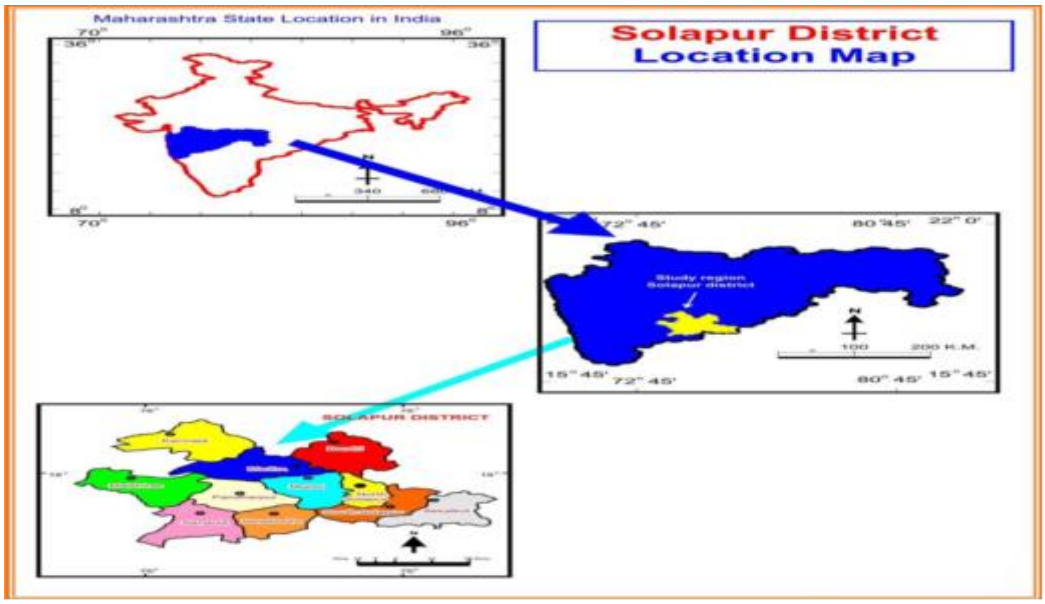

Fig. No. 01

Objective:

The main objectives of this paper are as following,

1) To study the per hector yield of Tur in the study region
2) To examine the impact of rainfall on per hector yield of Tur in Solapur District.

Database and Methodology:

The study was conducted in the Solapur district in Maharashtra state. For the purpose of the study, only secondary information was collected from different sources. The secondary data like rainfall, per hector yield of Tur and geographical information collected through Agriculture Department and Socio-Economic review and district Statistical abstract of Solapur District for the year 2024-25 used. To examine the impact of rainfall on the per hector yield of Tur, Pearson's Coefficient of Correlation technique has been utilized. The degree of relationship by considering rainfall as an independent variable 'X' and per hector yield of Tur as dependent variable 'Y' is measured.

Result and Discussion:

Tur (pigeon pea) is an important pulse crop cultivated in Solapur district. It plays a significant role in the food and nutritional security of the rural population and also contributes to farmers' income. Tur is generally grown under rain-fed conditions and therefore its growth, development, and yield are considerably influenced by the availability and distribution of rainfall during different stages of the crop. Adequate and timely rainfall supports germination, vegetative growth, flowering, and grain formation, whereas insufficient or excessive rainfall may adversely affect crop productivity. Fallowing table no. 01 shows that year wise average annual rainfall and Jawar production in Solapur District.

The table no. 01 indicate that, the average per hector yield of Tur in Solapur district was 696 Kg/Ha in 2024-25, but spatial distribution varies from tahsil to tahsil ranging from 208 to 1051Kg/ hector. The **highest per hectare yield of Tur is recorded in Akkalkot, Pandharpur and Barshi tahsil.** The higher productivity can be attributed mainly to favourable rainfall conditions, particularly the adequate and timely distribution of rainfall during the important growth stages of the crop. Suitable soil conditions, effective moisture availability, and favourable agricultural practices may also have contributed to the higher yield.

Table No.1

Rainfall and Per Hector Yield of Tur in Solapur District-2024-25

Sr. No.	Tahsil	Rainfall (mm)	PHY of Tur (Kg.)
1	Akkalkot	613	1051
2	Karmala	649	692
3	Barshi	808	821
4	Madha	721	675
5	Malshiras	403	534
6	Mangalwedha	533	208
7	Mohol	721	675
8	North Solapur	649	635
9	Pandharpur	567	1024
10	Sangola	579	643
11	South Solapur	589	696
District		621.09	696

Source: *Compiled by Researcher on the basis of Agriculture Department and Socio-Economic review and district statically abstract of Solapur District 2024-25*

Table no. 01 also shows that, **the lowest per hectare yield of Tur is recorded in Mangalwedha (208 kg/Ha), Malshiras (534 kg/Ha) and North Solapur (635 kg/Ha), tahsil.** The comparatively low productivity associated with inadequate, irregular, or poorly distributed rainfall during the important growth stages of the crop. Since Tur is largely dependent on rainfall, prolonged dry periods or insufficient moisture can adversely affect germination, vegetative growth, flowering, and grain formation.

Table No.2

Impact of rainfall on Per Hector Yield of Tur in Solapur District

Sr. No.	Tahsil	X (Rainfall)	Y(PHY of Tur)
1	Akkalkot	613	1051
2	Karmala	649	692
3	Barshi	808	821
4	Madha	721	675
5	Malshiras	403	534
6	Mangalwedha	533	208
7	Mohol	721	675
8	North Solapur	649	635
9	Pandharpur	567	1024
10	Sangola	579	643
11	South Solapur	589	696
Coefficient of correlation			0.3123
Coefficient of determination			0.0975

The high positive correlation is observed in between rainfall and per hector yield of Tur in Solapur district. The coefficient of correlation in this regard is +0.3123. The degree of linear association between these two variable obtained by using the coefficient of determination (r2) is found to be at 0.0975, which reveals that the independent variable (X) i.e. rainfall are explaining 09.75 per cent of the total variations in dependent variable (Y) i.e. per hector yield of tur in Solapur district. The remaining 90.25 per cent of the variation in per hectare yield is influenced by other factors apart from rainfall. These factors may include soil characteristics, availability of irrigation, temperature, distribution of rainfall, quality of seeds, fertilizer use, agricultural technology, pest and disease conditions, and farming practices. Therefore, rainfall is an important climatic factor affecting Tur productivity, but it alone cannot fully explain the spatial variation in per hectare yield of Tur in Solapur district.

Conclusion and suggestion:

From the above observation we can concluded that, there is considerable spatial variation in Tur productivity among the tahsils of Solapur district. **Akkalkot records the highest per hectare yield of 1,051 kg/ha,** followed by Pandharpur with **1,024 kg/ha** and Barshi with **821 kg/ha.** In contrast, **Mangalwedha records the lowest yield of 208 kg/ha**, followed by Malshiras and North Solapur. The variation suggests that rainfall alone does not determine Tur productivity and that the interaction of climatic, soil, irrigation, and agricultural management factors plays an important role in determining yield.

It is also concludes that rainfall has a **positive relationship with the per hectare yield of Tur** in Solapur district. The coefficient of correlation is **+0.3123**, indicating a positive but relatively weak relationship between rainfall and Tur productivity. The coefficient of determination is **0.0975**, which shows that rainfall explains only **9.75 per cent** of the total variation in per hectare yield of Tur. The remaining **90.25 per cent** of the variation is influenced by other factors such as soil characteristics, irrigation availability, temperature, and rainfall distribution, quality of seeds, fertilizer application, agricultural technology, pest and disease conditions, and farming practices.

The empirical results suggest that, there is an urgent need to improvement in Tur productivity in Solapur district requires an integrated approach involving better rainfall management, efficient water use, suitable varieties, improved farming practices, and appropriate agricultural technology.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

References:

1. M. Husain (2002), Systematic Agricultural Geography, Rawat Publication, Jaipur.
2. Noor Mohammad & A. Majid (1995): Determinants of Agricultural Productivity In Arid Region, New Dimensions In Agricultural Geography Vol.-8, Pp103.
3. Pawar C.T. (1989) Impact of Irrigation: A regional perspective. Pp 108
4. Singh Jasbir and Dhillon S.S. (2004) Agriculture Geography. 110,126,134, 155,158,160.
5. Socio-Economic review and district Statistical abstract of Solapur District 2024-25