

A STUDY OF AVAILABILITY AND USE OF IRRIGATION FACILITIES FOR COTTON CROP CULTIVATION

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ABSTRACT:

The agriculture forms the backbone of development by providing employment to the 52 % of India's work force. It is a source of livelihood and food security for a vast majority of low income, poor and vulnerable sections of the society. The Agricultural sector plays a significant role in the Maharashtra's economy. It is the main occupation of the state. The agriculture & allied activities contributes good amount to the State's income. Cotton is an important fiber yielding crop of global importance. Cotton is cultivated on about 10.31 million hectares of land in the country which account 30% of the global cotton area and contributes to 22% of global cotton production. India is the second largest producer of cotton after China.

In India about one-third of the total area under cotton cultivation is irrigated. Maharashtra has about 34% of the area under cotton cultivation with only 4% Irrigated cotton percentage. The 96% of the cotton cultivation Maharashtra is rain fed. The Irrigation for cotton crop is mainly dependent on the availability of Irrigation source to the cotton growing farmers of Maharashtra. The main irrigation sources available to cotton growing farmers are well, canal, Tube well and lift irrigation.

In the present research is based on irrigation sources available to cotton growing farmers and their use for the cotton crop cultivation. The cotton crop cultivation types such as Irrigated and Rain fed are dependent on availability of irrigation facility. This research is based on primary data collection from Khandesh Region of Maharashtra. The statistical test Chi square and Correlation is used to test the hypotheses.

Key Words: Cotton crop, Khandesh Region, Irrigation facilities, Irrigated Cotton Cultivation, Rain fed Cotton Cultivation.

INTRODUCTION:

Agriculture is the important sector of Indian economy. As per the Central Statistics Office (CSO), the share of Agriculture and Allied sectors to GDP was 16.1 per cent of the Gross Value Added (GVA) during 2014–15 at 2011–12 prices. The agriculture forms the backbone of development by providing employment to the 52 % of India's work force. It is a source of livelihood and food security for a vast majority of low income, poor and vulnerable sections of the society. It fulfills the basic need of human beings and animals. It is an important source of raw material for many agro based industries. India's geographical condition is unique for agriculture because it provides many favorable conditions. There are plain areas, fertile soil, long growing season and wide variation in climatic condition

The Agricultural sector plays a significant role in the Maharashtra's economy. It is the main occupation of the state. The agriculture & allied activities contributes good amount to the State's income. Maharashtra state has 226.1 lakh hectares of land under cultivation. The principal crops grown in Maharashtra are Rice, Jawar, Bajara, Wheat, Pulses and Onion with several Oil seeds including Groundnut, Sunflower and Soyabean. The state has huge area under cash crops cultivation. Cotton and Sugarcane are the main cash crops in Kharip and Rabbi cropping seasons.

Cotton is an important fiber yielding crop of global importance. It is an important agriculture commodity traded all over the world. For many developing and underdeveloped countries cotton export is the main source of foreign exchange earnings. Cotton is cultivated on about 10.31 million hectares of land in the country which account 30% of the global cotton area and contributes to 22% of global cotton production. India is the second largest producer of cotton after China.

The increments in disposable income have accelerated consumption demand as well as export demand of cotton and to achieve this increased demand Indian Government have initiated many schemes in water management to increase the yield. The State Government has undertaken various major, medium and minor irrigation projects to create maximum irrigation potential. With the help of Sprinkler and drip irrigation systems nearly 25 to 40 per cent additional area brings under irrigation. The State Government encourages farmers to adopt these irrigation systems by giving them 50 per cent subsidy for general farmers and 60 per cent subsidy for small & marginal farmers. Government has provided financial assistant as well as subsidies for creating irrigation facilities such as well, Bore well, lift irrigation and canal.

REVIEW OF LITERATURE:

K.S. Bhaskar and others in Central Institute for Cotton Research Technical Bulletin No.30 on Micro Irrigation Management in Cotton says Irrigation in India has been practiced since Maurya's time who contributed the most in building ancient irrigation system in India. Cotton is one of the most important, cash, commercial and fibre crops of the country. Cotton productivity under rain fed situation in the Central and Southern zones, is the lowest in Maharashtra. Low yield of cotton in the region is mainly associated with cultivation under rain fed situation. Under such circumstances, economization of available water and its proper management in rainfed cotton is having paramount importance and that could be made possible through advance cultivation of rain fed cotton with drip and sprinkler irrigation as the total water availability is also decreasing over the years all most in all the cotton growing states in the country.

Irrigation through drip is a newly introduced system in the country and little work has been done on application and evaluation of drip for cotton in the country. In this system, water is directly delivered to the root zone of the individual plants by network of tubing. The tubing can be moved

around different locations, topography and slopes as per plan and convenience to deliver water at desired pressure through emitters / micro tubes to the plants.

Er Shri S.T. Deokule, Former Secretary of Irrigation of the Government of Maharashtra in his speech at FAO says the modernization of irrigation systems does not mean merely an improvement of the engineering parameters but also the application of a complex combination of field disciplines to irrigated agriculture. The modernization of existing projects had been taken along with their restoration and rehabilitation. Several individual efforts have also been made to modernize existing irrigation systems so as to achieve better water use. The Central Water Commission of the government of India has formulated guidelines for the modernization of existing irrigation projects. The Vidarbha Intensive Irrigation Development Program launched by Department of Agriculture and Cooperation, Government of India gives importance and guidelines for availability of irrigation facilities for cotton crop.

SIGNIFICANCE OF THE STUDY:

Cotton is the crop of tropical and sub-tropical areas and requires uniformly high temperature varying between 21°C and 30°C. The modest requirement of water can be met by an average annual rainfall of 50- 100 cm. It is successfully grown in areas of lesser rainfall with the help of irrigation. In India about one-third of the total area under cotton cultivation is irrigated. About 80 per cent of the total irrigated area under cotton is in Punjab, Haryana, Gujarat and Rajasthan.

Maharashtra accounts for about 34% of the area under cotton cultivation, but Irrigated cotton percentage was only 4%. The cotton crop is grown in kharif season and sowing is generally done with the onset of monsoon. About 96% of the cotton cultivation is rain fed. The Irrigation for cotton crop is mainly dependent on the availability of Irrigation source to the cotton growing farmers of Maharashtra. The main irrigation sources available to cotton growing farmers are well, canal, Tube well and lift irrigation.

OBJECTIVES OF THE STUDY:

1. To study the availability of Irrigation facilities in Khandesh Region.
2. To study the Cotton cultivation type in Khandesh Region.
3. To study the use of Irrigation facilities for Cotton crop cultivation.
4. To study the correlation between Availability of Irrigation facilities and its use i.e. type of Cotton crop cultivation in Khandesh Region.

HYPOTHESIS:

H1: The Irrigation facilities available in Khandesh Region are limited.

H2: There is no significant correlation between availability of irrigation facility and Rain fed cotton crop cultivation.

H3: There is no significant correlation between availability of irrigation facility and Irrigated cotton crop cultivation.

RESEARCH METHODOLOGY:**Research Design:-**

It is a descriptive research study which is concerned with describing the various characteristics of Cotton Growing Farmers such as education, occupation, total land, land under cotton crop, production cost, total income, income from cotton crop.

Sampling Design:-

Sampling design is a definite plan for obtaining a sample from a decided population. The decided population is Cotton Growing Farmers of Khandesh Region.

Place of Study:-

This study was conducted in the Cotton Growing Farmers of Khandesh Region of Maharashtra state. The universe is whole Khandesh Region i.e. Jalgaon, Dhule and Nandurbar Districts of Maharashtra. (India)

Sampling Unit:-

The sampling unit is the area or field from where the sample will be collected. In the present study the sample units are Cotton Growing Farmers of Khandesh Region i.e. of Jalgaon, Dhule and Nandurbar Districts of Maharashtra.

Sampling:-

Sampling is the process of obtaining information about an entire population by examining only a part of it. In the present study samples were selected in two stages. I) Stratified Proportionate Sampling technique and II) Non-probability convenience sampling technique

Sampling Size:-

The sample of present study was selected 450 Cotton Growing Farmers of Khandesh Region. In total sample size 427 were from Jalgaon District, 14 from Dhule District and 09 from Nandurbar District.

Research Instrument:-

Structured Questionnaire was used for collecting responses of Cotton Growing Farmers from Khandesh Region.

Data Collection:-

Data collection is the process of gathering and measuring information on variables of interest. The Primary and Secondary data was collected for the present research. The Primary data was collected directly by the researcher from 450 Cotton Growing Farmers of the Khandesh Region through Questionnaire and Schedule method. The Secondary data was collected from Text Books, Journals and Websites.

DATA ANALYSIS:**1. Age of Cotton Growing Farmers.**

Response	Frequency	Percent
20-30	13	2.8
30-40	103	22.9
40-50	138	30.7
50-60	111	24.7
Above 60	85	18.9
Total	450	100

Only 2.8% cotton growing farmers are in young age group of 20 – 30 years, which shows that young farmers are less as compared with mature age group farmers.

2. The Educational Qualification of Cotton Growing Farmers.

Response	Frequency	Percent
Illiterate	4	0.9
Primary (up to IV std.)	47	10.4
Secondary (V to X)	182	40.4
Higher Secondary(XI& XII)	124	27.6
Any Diploma	41	9.1
Graduate	44	9.8
Post Graduate	8	1.8
Total	450	100

3. The Land Ownership of Cotton Growing Farmers.

Response	Frequency	Percent
Landowner	436	96.89
On-Lease	46	10.22
Landless	14	3.11

The cotton growing farmers cultivating cotton crop on their own land or take a land on lease from other farmer who is not interest or able to cultivate his land. The 96.89 percent farmers are landowner, 10.22 percent farmers are cultivating on lease land and 3.11 percent cotton growing farmers are landless farmers.

4. The Occupational Profile of Cotton Growing Farmers.

Response	Frequency	Percent
Full time farmer	382	84.9
Service + Farmer	45	10
Business + Farmer	23	5.1
Total	450	100

The 84.9% cotton growing farmers are full time farmers, while 10% are doing farming in combination with service and 5.1% are doing farming in combination with business.

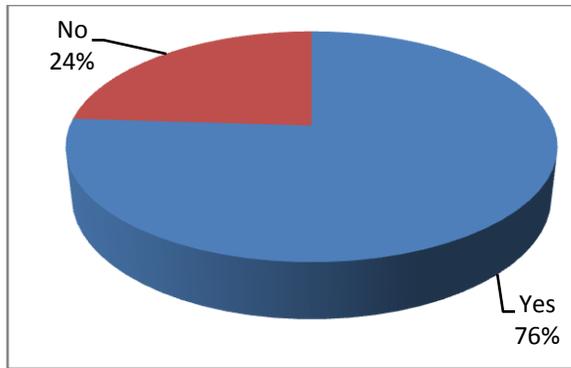
5. Land under Cotton Cultivation.

Response	Frequency	Percent
01 - 05 Acre	336	74.7
05 – 10 Acre	78	17.3
10 – 20 Acre	24	5.3
Above 20 Acre	12	2.7
Total	450	100

The maximum 92 percent cotton growing farmers have cotton cultivation up to 10 acre. The cotton growing farmers above 10 acre of land under cotton cultivation is 8 percent only due to problems associated with this crop.

6. The Irrigation Facility availability to Cotton Growing Farmers.

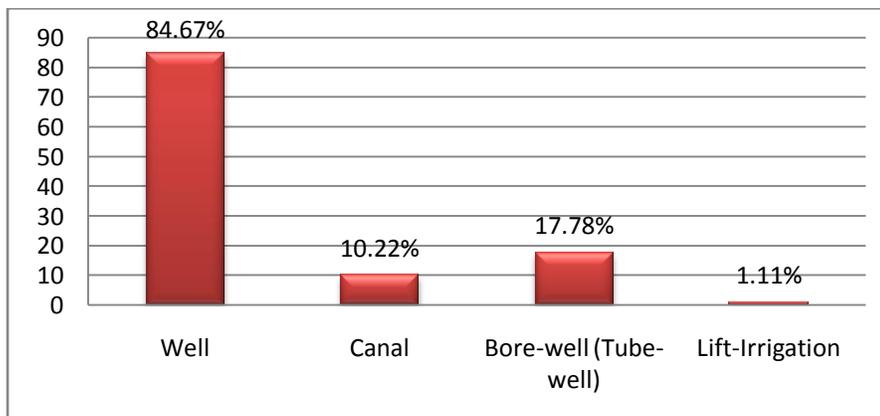
Response	Frequency	Percent
Yes	342	76
No	108	24
Total	450	100



The 76 percent cotton growing farmers have irrigation facility to provide irrigation for their cotton crop while 24% cotton growing farmers not having any irrigation facility to protect their cotton crop in irregular rainfall.

7. The Type of Irrigation Facility available to Cotton Growing Farmers.

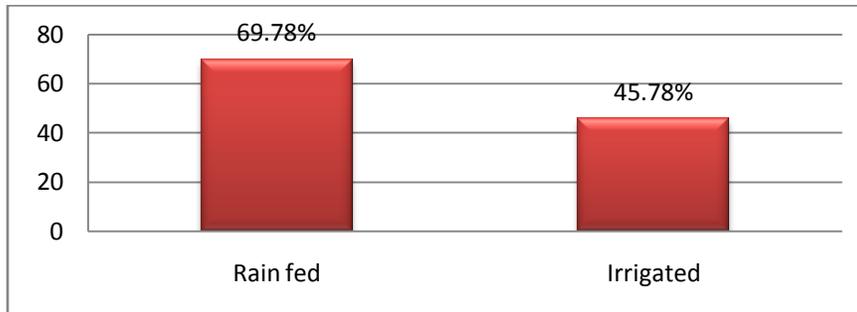
Response	Frequency	Percent
Well	289	84.67
Canal	46	10.22
Bore-well (Tube-well)	80	17.78
Lift-Irrigation	05	1.11
Note: Farmers have more than one Irrigation facilities		



The 84.67 percent cotton growing farmers have well as only or with other irrigation facility, while bore well or tube well is the only or with other irrigation facility available to 17.78 percent cotton growing farmers. The 10.22 percent cotton growing farmers have canal as only or with other irrigation facility available to them. The lift irrigation facility is available as only or with other irrigation facility to 1.11 percent cotton growing farmers.

8. The Type of Cotton Cultivation in Maharashtra.

Response	Frequency	Percent
Rain fed	314	69.78
Irrigated	206	45.78
Note: Farmers have combined cotton cultivation.		



The maximum i.e. 69.78 percent cotton cultivation from this region is rain fed as compared with irrigated cotton cultivation. The Irrigated cotton cultivation is 45.78 percent, which is partial plus full irrigated.

HYPOTHESIS TESTING:

H1: The Irrigation facilities available in Khandesh Region are limited.

This hypothesis was tested by using Chi Square test in SPSS software.

Availability of Irrigation facilities			
	Observed N	Expected N	Residual
No	108	225.0	-117.0
Yes	342	225.0	117.0
Total	450		

Test Statistics	
	Irrigation facilities
Chi-Square	121.680 ^a
df	1
Asymp. Sig.	.000
a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 225.0.	

The chi-square statistic 121.680, “df” is the degree of freedom which is 1 and the significance value i.e. p value is 0.00. None of the cells (categories) have expected frequencies less than 5. Thus, the assumption has been satisfied.

Since the significance value of the test is less than the α level 0.05, we reject the null hypothesis and accept the alternate hypothesis with inference that the Irrigation facilities available in Khandesh Region are not limited.

H2: There is no significant correlation between availability of irrigation facility and Rain fed cotton crop cultivation.

Correlations			
		Availability of Irrigation facilities	Rain fed
Availability of Irrigation facilities	Pearson Correlation	1	.347**
	Sig. (2-tailed)		.00
	N	450	45
Rain fed	Pearson Correlation	-.347**	1
	Sig. (2-tailed)	.000	
	N	450	45
**. Correlation is significant at the 0.01 level (2-tailed).			

Since the significance value of the test is 0.000, which is less than 0.05, so we reject null hypothesis and say that there is a significant correlation between Availability of Irrigation facilities and Rain fed cotton crop cultivation.

The Pearson Correlation coefficient is -.347, which proves average correlations in variables. This value range from -1 to +1 with negative numbers, which represents negative correlation exist between Availability of Irrigation facilities and Rain fed cotton cultivation.

H3: There is no significant correlation between availability of irrigation facility and Irrigated cotton crop cultivation.

Correlations			
		Availability of Irrigation facilities	Irrigated
Availability of Irrigation facilities	Pearson Correlation	1	.506**
	Sig. (2-tailed)		.000
	N	450	45
Irrigated	Pearson Correlation	.506**	1
	Sig. (2-tailed)	.000	
	N	450	45
**. Correlation is significant at the 0.01 level (2-tailed).			

Since the significance value of the test is 0.000, which is less than 0.05, so we reject null hypothesis and say that there is a significant correlation between Availability of Irrigation facilities and Irrigated cotton crop cultivation.

The Pearson Correlation coefficient is .506, which proves good correlations in variables. This value range from -1 to +1 with positive numbers, which represents positive correlation exist between Availability of Irrigation facilities and Irrigated cotton crop cultivation.

CONCLUSION:

- ❖ From the inference of hypothesis test it is proved that the Irrigation facilities available in Khandesh Region are sufficient (not limited). From the frequency distribution 76 percent cotton growing farmers of Khandesh Region has Irrigation facilities available to them.
- ❖ From the inference of hypothesis testing it is proved that there is a significant correlation between Availability of Irrigation facilities and Rain fed cotton crop cultivation. The correlation exist between Availability of Irrigation facilities and Rain fed cotton crop cultivation is negative correlation that means if availability of Irrigation facilities increases, Rain fed cotton cultivation decreases and vice versa.
- ❖ The hypothesis testing proved that that there is a significant correlation between Availability of Irrigation facilities and Irrigated cotton crop cultivation. The correlation exist between Availability of Irrigation facilities and Irrigated cotton crop cultivation is positive correlation, which means if availability of Irrigation facilities increases, Irrigated cotton cultivation increases and vice versa.
- ❖ Well as irrigation source available to maximum i.e. 84.67 percent cotton growing farmers as compare with Bore well, Canal and Lift Irrigation available for cotton crop.
- ❖ The 69.78 percent cotton crop cultivation is rain fed and only 24 percent is completely irrigated type. (45.78 percent is complete irrigated plus occasionally irrigated).
- ❖ From the above it is analyzed that cotton growing farmers of Khandesh Region has sufficient sources of irrigation available to them for cotton crop.

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