

Problems and Coping Strategies of Pomegranate Farmers in Chitradurga District of Karnataka State

Raghunath D N

Assistant Professor
Department of Economics
HPPC Government First Grade College
Challakere, Chitradurga District, Karnataka State, India.

Abstract:

Karnataka is a leading state in horticulture, with 18 lakh hectares dedicated to horticultural crops, 17.67% of which are fruits. In 2013-14, pomegranate cultivation covered 6,911 hectares, primarily in Chitradurga (69,11), Bijapur (2,478), Bagalkot (2,293), Koppal (1,917), and Bellary (1,846). Chitradurga alone accounted for 10.79% of the state's pomegranate area. Karnataka, the second-largest pomegranate producer, contributes 19.2% to national production, totaling 198,600 Mt from 18,400 acres at a yield of 10.75 t/ha. This article addresses the challenges faced by pomegranate farmers in Chitradurga and includes an economic analysis of pomegranate cultivation in the district.

Keywords: Agriculture, horticulture, pomegranate cultivation, pomegranates, economic benefit

1.1 Introduction

India, with 65% of its population dependent on agriculture, derives significant revenue from the sector, including fruit production. The Mughals historically enhanced this with extensive mango orchards. Agriculture remains vital to the economy, with horticulture emerging as a profitable industry. India ranks tenth globally in fruit consumption, with notable potential for pomegranates. Karnataka established the first horticultural promotion department in 1965, and India now cultivates over 1.32 lakh acres of pomegranates, particularly in Maharashtra, where production exceeds one lakh MT, valued at around \$400. Pomegranates, originating in Iran circa 2000 B.C., are widely cultivated in several countries and rank 18th in global fruit production based on productivity. Karnataka state has emerged as one of the leading states in the field of Horticulture. The total area horticultural crops grown in the state is 18 lakh hectares, of which 17.67 percent was occupied by fruits. The pomegranate cultivated area in total of Karnataka state during 2013-14 was 6911 hectares; the predominant pomegranate growing districts are Chitradurga 6911, Bijapur 2478, Bagalkot 2293, Koppal 1917 and Bellary 1846 of pomegranate cultivation. In Chitradurga the total area of pomegranates cultivation tallies up to 10.79

percent of the total area pomegranates cultivated in the state. With 19.2% of the nation's total production, Karnataka is the second-largest producer of pomegranates. Additionally, the state is creating roughly Pomegranates from an area of 18,400 acres totaled 1,98,600 Mt. Pomegranate production in the state is 10.75 t/ha. The districts of Chitradurga, Bijapur, Tumkur, Dharwad, and Bagalkot are the main pomegranate-producing regions. With this context, the researcher has made an effort to reckon the economic analysis of pomegranate cultivation in Karnataka's Chitradurga District.

1.2 Statement of the problem

Pomegranate farmers face significant challenges, especially since 2010-11, due to pests and diseases leading to a decline in cultivation. Limited studies exist on how pomegranate farming impacts farmers' economic conditions and asset formation. This study aims to analyze the contribution of pomegranate cultivation to asset formation and energy usage in the Chitradurga district, addressing existing research gaps. Further details are provided in the second chapter of this thesis.

1.3 Significance of the study

Pomegranate is highly sought after for both domestic consumption and export in both national and international markets. As a result, there is a strong emphasis on increasing its production and productivity. India holds the top position globally in terms of pomegranate cultivation, with an area of 1.25 lakh hectares and a production of 8.21 lakh tonnes. Among the states in India, Maharashtra leads with an area of 0.99 lakh hectares and a production of 5.56 lakh tonnes, followed by Karnataka, Andhra Pradesh, and Gujarat. However, the productivity of pomegranate in India is relatively low at 6.57 tonnes per hectare compared to countries like Spain (18.5 tonnes per hectare) and the USA (18.3 tonnes per hectare) where pomegranate cultivation is significant. All six taluks in the Chitradurga district of Karnataka are situated in the Central Dry Zone (Zone IV). The district experiences an average normal rainfall of 534.8mm spread over 32 rainy days. The rainfall in the district is meager and unevenly distributed, and the soils are shallow and of poor quality. The majority of the rainfall occurs during the southwest monsoon season, which lasts from June to October. The net sown area in the district is 3.98 lakh hectares, out of which 22.1% (0.86 lakh hectares) is irrigated, and the remaining 77.9% is dependent on rainwater. The canal network provides limited irrigation facilities to farmers in the Hiriyur taluk. Agriculture in the district heavily relies on timely and sufficient rainfall. This study also helpful to explore and address the constraints of pomegranate growers in Chitradurga district. This research led a significant contribution in the field of agricultural economics. This has been significantly beneficial to Government agencies, Agricultural boards, horticulture departments, farmers, stakeholders and interested academicians and research scholars to perceive the further focus on pomegranate cultivation.

1.4 Objectives of the study

The main objective of the research is to have an Economic Analysis of pomegranate cultivation

in Chitradurga district of Karnataka”. The Specific objectives of the study are stated below:

- To know the socio-economic profile of Pomegranate growers in Chitradurga district.
- To analyze the cost and returns in Pomegranate Cultivation.
- To know the challenges faced by pomegranate farmers in Chitradurga and includes an economic analysis of pomegranate cultivation in the district.

1.5 Hypothesis of the study

- There is significant increase in income of farmers after pomegranate farming.
- Listed constraints are not significantly affecting pomegranate farmers in the study area.
- There is a significant difference among constraints faced by the pomegranate farmers in Chitradurga district.

1.6 Scope of the study

The researcher has found, there are three types of scope has been observed for the study with the help laborious literature review, one is subject gap, as for as concerned very little studies carried on economic analysis of pomegranate cultivation. From Literature review it is found that till now major study on pomegranate was related with pomegranate cultivation and its medicinal values. Another one is geographical scope, as there are almost studies carried out in and around the Karnataka state and found many in out of Karnataka, but very less study had on an economic analysis of pomegranate cultivation by covering all the taluks of Chitradurga district. further one is time bound scope has observed, as for as studies completed are older one and not so relevant for the present context as present days, there are many hurdles and deceases taken place in pomegranate cultivation due to climate change and global warming. Therefore, present study in necessitated to explore an economic analysis of pomegranate cultivation in Chitradurga district of Karnataka.

Despite the several advantages of the study, this research has the following limitations. They are as follows;

- The present study has limited to the opinion of select pomegranate growers of the Chitradurga district and the views of the other farmers are excluded from the study.
- This research is confined only to “An Economic Analysis of Pomegranate Cultivation in Chitradurga district of Karnataka”.
- In this study, only selected areas of Taluks in Chitradurga district and other regions of Karnataka were not included in the study.
- In this study, the researcher has utilized both primary and secondary data. Primary data has collected from only 495 sample pomegranate growers in the study area.
- The current findings are valid for pomegranate growers in the study area and cannot be applied to other regions, states and countries.
- The survey requires participants to have personal bias to provide accurate and reliable

information.

1.7 Research Methodology

Research Methodology is like a toolkit of methods, steps, and approaches that researchers use to solve a research problem. It's a guide that helps them know how to go about their study and what steps to follow. It's like having a roadmap for their research. This study attempts to understanding present socio-economic conditions of pomegranate growers and analyze the impact of pomegranate production on asset formation at the farm level and farmers' income. And also, researcher tries to ascertain the constraints in the pomegranate cultivation. To achieve the objectives of the study, the researcher has collected the primary as well as secondary data and employed the descriptive and inferential statistics. Other information about Research methodology, research design and details of research procedures of the study are discussed in detail and presented in the following sections. The research design refers to the strategies and procedures used by a researcher in doing research. The researchers' design allows them to apply appropriate methodologies for the study and successfully set up their investigations in the future; for this study, the researchers used the descriptive and analytical research design. In this study, the sample size required was determined using the Cochran formula, which calculates the optimal sample size based on the desired confidence interval and precision. The Cochran formula is as follows:

$$n = Z^2 pq / e^2$$

In the given scenario, the sample size is denoted by n, where Z represents the standard value for a specific confidence level (assuming a 95% confidence level), p is the estimated population, q is 1 minus p, and e signifies the proportion of the sampling margin of error. In this instance, the confidence interval (CI) ranges from 0.04 to 0.05, indicating a sampling error allowance of 4% to 5%. Consequently, the formula for calculating the sample size for this study is as follows:

$$Z = 1.96 \text{ (Z table value)}, p = 0.5, q = 1 - p = 1 - 0.5 = 0.5, e = 0.05$$

Hence, $n = (1.96)^2 (0.5) (0.5) / (0.05)^2 = 384$ (if margin of error CI is 5 %)

$$n = (1.96)^2 (0.5) (0.5) / (0.04)^2 = 600 \text{ (if margin of error CI is 4 %)}$$

Utilizing the given formula, a 5% standard error yields a sample size of 384 while a 4% margin error yields 600. Thus, an ideal sample size for the study is between 384 and 600.

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Pomegranate manufacturers of Chitradurga district are the population for this have a look at. Multistage random sampling technique has been used for the selection pattern farmers. in the first stage all the six taluks of Chitradurga district have been selected. For each taluks

list of villages in which pomegranate farmers are available has been organized with the help of taluka horticulture officers. From each taluk 6 villages were randomly selected. Therefore, totally 36 villages have been randomly selected for the entire district. From each village selected for the survey list of farmers growing pomegranate have been prepared. From each list 14 farmers have been randomly selected. Thus, totally 504 pomegranate farmers were planned to select. But in 3 village adequate number of pomegranate farmers were not available. In one village there was shortage of one farmer and in another two village there was shortage of 4 farmers each. Though it was planned to select 504 famers but actually 495 farmers were selected through the multistage random sampling procedure.

1.8 Statistical Techniques used

The collected data underwent computation, analysis, and interpretation utilizing elementary statistical methodologies aligned with the study's objectives. The dataset encompasses both quantitative and qualitative components, warranting the application of both parametric and non-parametric tests for comprehensive analysis. Statistical tools, including tables and charts, were instrumental in the processing and analysis of the collected data. Descriptive statistics involved statistical measures such as mean and standard deviation. Hypothesis testing was conducted using one-sample t-test, independent sample t-test, ANOVA Post-hoc test, and Chi-Square test to validate hypotheses set for this study. The data analysis has done with the help of SPSS version 26 and Microsoft Excel.

1.9 Constraints of Pomegranate Farmers in Chitradurga, Karnataka

Analyzing the constraints faced by pomegranate farmers in the study area is of utmost importance as it directly impacts farmers' livelihoods, agricultural sustainability, food security, market opportunities, resource allocation, environmental impact, community well-being, policy formulation, knowledge transfer, and overall resilience in the face of various challenges. Understanding and addressing these constraints is essential for promoting economic development, food security, and sustainable farming practices in the region while improving the well-being of the farming community and the environment.

Comprehensive overview of constraints and challenges faced by pomegranate farmers in the Chitradurga district these challenges are categorized into distinct areas, including adverse weather conditions, difficulties related to climate and weather patterns, pest and disease management, marketing and selling obstacles, and regulatory or policy constraints. The table presents both the number of respondents (N) and the percentage distribution of their responses, ranging from "Strongly Agree" (SA)" to Strongly Disagree" (SD), offering valuable insights into the primary concerns and hurdles that pomegranate farmers encounter in their agricultural practices. This data is essential for stakeholders, policymakers, and agricultural experts in understanding and addressing the specific challenges facing pomegranate farming in this region, ultimately facilitating the development of strategies and

support measures to enhance the resilience and sustainability of this agricultural sector see table 1.1

Table 1.1: Pomegranate Farmer's Response on Constraints Faced by the Farmers

Constraints	F	SA	A	N	D	SD	Total
Major Constraints in growing pomegranates							
Adverse weather conditions (e.g. drought, frost, heavy rain)	N	158	95	76	82	84	495
	%	31.9	19.2	15.4	16.6	17	100
Pest and disease management	N	232	79	33	65	86	495
	%	46.9	16	6.7	13.1	17.4	100
High input costs (e.g. fertilizers, irrigation, labor)	N	194	109	59	70	63	495
	%	39.2	22	11.9	14.1	12.7	100
Limited access to financing or credit	N	143	122	31	103	96	495
	%	28.9	24.6	6.3	20.8	19.4	100
Constraints related to climate or weather patterns							
Drought or water scarcity	N	314	79	44	42	16	495
	%	63.4	16	8.9	8.5	3.2	100
Excessive rainfall or flooding	N	14	22	23	52	384	495
	%	2.8	4.4	4.6	10.5	77.6	100
Frost or freezing temperatures	N	21	45	41	103	285	495
	%	4.2	9.1	8.3	20.8	57.6	100
Extreme heat or heat waves	N	72	97	211	73	42	495
	%	14.5	19.6	42.6	14.7	8.5	100

Constraints relating to Pests or diseases							
Pomegranate fruit borer	N	174	122	60	71	68	495
	%	35.2	24.6	12.1	14.3	13.7	100
Pomegranate butterfly	N	257	75	47	53	63	495
	%	51.9	15.2	9.5	10.7	12.7	100
Pomegranate mealy bug	N	164	133	71	63	64	495
	%	33.1	26.9	14.3	12.7	12.9	100
Aphids	N	163	118	56	78	80	495
	%	32.9	23.8	11.3	15.8	16.2	100
Scale insects	N	192	151	44	52	56	495
	%	38.8	30.5	8.9	10.5	11.3	100
Constraints related to marketing							
Limited market demand or oversupply	N	171	133	70	61	60	495
	%	34.5	26.9	14.1	12.3	12.1	100
Low market prices or price fluctuations	N	165	138	61	69	62	495
	%	33.3	27.9	12.3	13.9	12.5	100
Lack of market access or distribution channels	N	266	115	48	42	24	495
	%	53.7	23.2	9.7	8.5	4.8	100
Difficulties in meeting quality or certification standards	N	211	137	74	48	25	495
	%	42.6	27.7	14.9	9.7	5.1	100

1.9.1 Major Constraints in Pomegranate Cultivation: For the constraint of adverse weather conditions, about one-third of the farmers (31.9%) strongly agreed that this was a challenge, while 19.2% agreed. For the constraint of pest and disease management, nearly half of the farmers (46.9%) strongly agreed that this was a challenge, while 16% agreed and only 6.7% were neutral. The remaining respondents either disagreed or strongly disagreed. For the constraint of high input costs, about two-fifths of the farmers (39.2%) strongly agreed that this was a challenge, while 22% agreed and 11.9% were neutral. The remaining respondents either disagreed or strongly disagreed. For the constraint of limited access to financing or credit, about 29% of the farmers strongly agreed that this was a challenge, while 24.6% agreed and 6.3% were neutral.

1.9.2 Climate or weather constraints: The above table shows that drought or water scarcity is the most significant difficulty related to climate or weather patterns faced by pomegranate farmers in the Chitradurga district, with 63.4% of respondents strongly agreeing that they have experienced this difficulty. Excessive rainfall or flooding and freezing temperature are not a major constraint in growing pomegranate in Chitradurga as the rainfall is relatively low and temperature is relatively moderate in this district. Although, nearly 1/3 of the farmers opined that extreme heat is a constraint in growing pomegranate, it is not a major constraint in Chitradurga. 2/3 of the respondents expressed altogether different opinion or they are neutral.

1.9.3 Pests or disease constraints: According to the data in above table, the Scale insects is the most problematic pest, with 69.3 % (38.8 Strongly agreed & 30.5 agreed) of respondents identifying it as a major problem. The pomegranate butterfly is another major constraint in pomegranate cultivation for which 51.9 % farmers strongly agreed and another 15.2% agreed for this. The pomegranate mealy bug is also another pest that farmers identified as problematic, with 33.1% of respondents strongly reported that it is a significant issue in addition to this 26.9 percent of the farmers agreed. According to the data in above table, the pomegranate fruit borer is also threat to the farmers, with 35.2% of respondents identifying it as a major problem.

1.9.4 Marketing or selling constraints: The above table indicates that the most commonly reported challenge is lack of market access for which 53.7 percent of the sample farmers strongly agreed and 23.2 percent of the farmers simply agreed. The second most commonly reported challenge is difficulty in meeting the quality standards, with 42.6% strongly agreed and 27.7% agreeing with this statement. In addition to this about 1/3rd of the sample farmers strongly reported that there is limited market demand for the pomegranate fruit. Thus, farmers who are growing pomegranate fruits are facing couple of issues related to the marketing of the pomegranate fruit.

1.10 Important Findings

- a) These findings highlight the multifaceted nature of asset formation among pomegranate farmers and emphasize the importance of financial support, education, market opportunities, and technological advancements in enhancing their economic well-being.
- b) Drought or water scarcity is the most significant difficulty related to climate or weather patterns faced by pomegranate farmers in the Chitradurga district, with 63.4% of respondents strongly agreeing that they have experienced this difficulty. Excessive rainfall or flooding and freezing temperature are not a major constraint in growing pomegranate in Chitradurga as the rainfall is relatively low and temperature is relatively moderate in this district.
- c) The Chi-Square test result indicates that there is a significant difference among the factors influencing assets formation of pomegranate farmers in the study area

1.11 Major Suggestions

- i. While private banks are considered more accessible, concerns about high-interest rates exist. Farmers should explore the possibility of securing loans from public banks or agricultural cooperatives, which may offer more favorable terms.
- ii. Farmers should collaborate with local agricultural cooperatives or associations to gain better access to markets. Networking and participation in farmer groups can help in negotiating favorable terms.
with buyers. Farmers should consider adopting modern agricultural technologies and practices to enhance productivity.
- iii. Develop risk mitigation strategies, such as crop insurance, to protect against market price fluctuations. This can provide financial security during periods of low pomegranate prices.
- iv. Farmers with orchards below 2 acres should consider implementing efficient irrigation methods like drip irrigation to optimize water use and minimize waste. For those with larger orchards (4 acres and above), segment their irrigation system to target specific areas for watering, ensuring more precise and efficient water distribution.
- v. The government could work with financial institutions to provide better access to credit for pomegranate farmers. This could include offering subsidies or loan guarantees, as well as providing education and training to farmers on how to access financing.

1.12 Conclusion

This research aims to comprehend and analyze the economic conditions of pomegranate farmers in the Chitradurga district of Karnataka, India. Additionally, it highlights the various factors that influence these farmers' decision to cultivate pomegranates, including motivational factors, location advantages, information and support systems, crop benefits, and financial incentives. The study reveals that expenses related to pomegranate farming significantly affect farmers' income and identifies the pomegranate-related factors that contribute to asset formation in the region. Furthermore, the analysis indicates that

pomegranate farmers have experienced improved price realization due to heightened demand for their products and enhanced market access. However, these farmers face numerous production challenges, including significant obstacles in growing pomegranates, issues related to climate and weather, pest and disease management, marketing difficulties, and regulatory constraints. Additionally, there is a notable lack of sufficient government support in areas such as technological and agricultural research, timely provision of seeds and inputs, subsidies, fiscal and monetary assistance, and incentives. The study also emphasizes critical post-harvest and marketing issues. Based on the findings, constructive insights and relevant recommendations have been provided, aligned with the study's objectives and conclusions.

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