

Empowering Pomegranate Farmers in Tumkur District: A Comprehensive Approach to Cultivation Practices and Marketing Dynamics

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Abstract

This research aims to empower pomegranate farmers in Tumkur District by addressing knowledge disparities, cultivation practices, and market dynamics. Utilizing a descriptive research method and simple random sampling, data from 500 farmers were analyzed, revealing diverse knowledge levels (35.83% low, 43.34% medium, 20.83% high). Age-wise analysis indicated a significant association between awareness of water use rights and satisfaction among younger farmers (20-40 years). Despite moderate knowledge, farmers displayed limited market engagement, necessitating targeted education. Gaps identified include a lack of awareness on water redistribution rights and room for improvement in cultivation practices. Suggestions involve tailored educational programs, youth-centric workshops, interactive training, and collaborative knowledge platforms. The study emphasizes age-specific interventions and recommends continuous monitoring of empowerment initiatives. Future research should explore additional factors influencing empowerment and broaden its geographical scope for a comprehensive understanding of agricultural dynamics.

Keywords: Pomegranate farming, Empowerment, Knowledge disparities, Market dynamics, Sustainable agriculture.

1. Introduction

Pomegranate cultivation, being a significant agricultural pursuit in the region, necessitates a holistic approach that not only encompasses cultivation practices but also delves into the intricate dynamics of agricultural markets. The study aims to address the existing gaps in knowledge and practices among farmers, recognizing the importance of both sustainable cultivation methods and strategic market engagement. By adopting a comprehensive framework, the research seeks to uplift farmers across various age groups, ensuring their proficiency in optimal cultivation techniques while navigating the complexities of market dynamics. The focus on empowerment goes beyond a singular dimension, aiming to create a resilient and informed farming community capable of making sound decisions in both cultivation and market-related endeavors.

The investigation begins by evaluating the overall knowledge levels of pomegranate growers in Tumkur District, as outlined in the presented data. The diverse categorization into Low, Medium, and High knowledge levels offers a nuanced understanding of the existing landscape. This categorization sets the stage for targeted interventions, acknowledging the varying degrees of expertise among farmers. The study recognizes the

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significance of awareness programs tailored to specific knowledge gaps, emphasizing the need to uplift the considerable portion of growers in the Medium knowledge level. Furthermore, the association between farmers' age-wise awareness of water use rights and their satisfaction with irrigation water distribution sheds light on the intricate relationship between knowledge, age, and satisfaction. These findings serve as a foundation for the subsequent in-depth analysis, laying the groundwork for a tailored and comprehensive empowerment strategy that addresses the unique challenges faced by pomegranate farmers in Tumkur District.

2. Conceptual Framework

The conceptual framework for "Empowering Pomegranate Farmers in Tumkur District: A Comprehensive Approach to Cultivation Practices and Market Dynamics" is built on the premise that the empowerment of farmers requires a holistic understanding and integration of key components related to cultivation practices and market dynamics. At its core, the framework recognizes the interconnectedness between knowledge enhancement, sustainable cultivation practices, and effective market engagement. The foundation of this framework lies in addressing the existing knowledge gaps among pomegranate farmers, as identified through the evaluation of their overall knowledge levels. The first pillar involves implementing targeted awareness programs, educational interventions, and skill-building initiatives aimed at improving farmers' proficiency in optimal pomegranate cultivation techniques. This encompasses knowledge areas such as water use rights, irrigation practices, and varietal selection. By strengthening the foundational knowledge of farmers, the framework seeks to create a solid base for sustainable agricultural practices.

The second pillar of the conceptual framework revolves around market dynamics and strategic engagement. Recognizing that successful farming extends beyond the field, the framework emphasizes the importance of equipping farmers with market-oriented insights, pricing strategies, and value addition techniques. This involves collaborative efforts with agricultural institutions, market experts, and industry stakeholders. Additionally, the research explores the association between farmers' age-wise awareness of water use rights and their satisfaction with irrigation water distribution. This nuanced analysis informs the framework, guiding the development of age-specific interventions to cater to the diverse needs of farmers. Overall, the conceptual framework is designed to be adaptive, recognizing the dynamic nature of agriculture and the unique challenges faced by pomegranate farmers in Tumkur District. It seeks to empower farmers not only with knowledge but also with the practical skills and strategic acumen required for sustainable and profitable pomegranate cultivation within the broader context of market dynamics.

3. Review of Literature

Dlangalala, S. F. (2018) the middle adulthood age farmers are characterized with increased sense of responsibilities and mindfulness in understanding and executing farms level operations, including irrigation water management in an efficient manner. Mehmood, M. S., Li, G., Khan, A. R., Siddiqui, B. N., Tareen, W. U. H., Kubra, A. T., and Ateeq-UrRehman, M. (2021) due to excessive involvement of young farmers in irrigation operations, they gain the related knowledge and awareness of water rights and efficient water use, which they transmit to their youngsters as they grow to the middle age. Chokkakula, S. (2009) The middle age farmers, as compared to young and older adulthood farmers, are more likely to recognize, understand, plan and implement their irrigation water usage according to prescribed duration and timing of irrigation water. The middle age farmers mobilize the younger farmers during their turn of irrigation to avoid misappropriation, theft and other water losses on the way to their farms. Johnson, R., and

Cody, B. A. (2015) when agricultural water is used effectively and safely, production and crop yield improve. The most essential strategy to improve agricultural water consumption and maintain optimal production and yield is through management tactics like improved irrigation scheduling and crop-specific irrigation management etc. These solutions enable water and energy savings while reducing grower costs.

Llamas, M.R (2003) despite of effectiveness of participatory approach in improving water distribution among farmers, some multiple deprived segments, like women and ethnic minorities, still remain unaware of their water use rights and mechanism to actualize these rights. Bell, A. R., Ward, P. S., and Shah, M. A. A. (2016) the irrigation department frequently fails to resolve the water distribution conflicts among farmers. Moreover, the Warabandi system is flawed in even distribution of water among head and tail farmers. Consequently, farmers dissatisfied with the allocation of irrigation water access rights, refrain from obligations as well. For example, when farmers view water distribution is unfair or unpredictable, they refrain from providing activities like maintenance of irrigation infrastructure. Sani, L. I (2017) there are several causes behind youths turning away from agriculture occupation including low occupation prestige, cumbersome task and unpredictable economic returns etc. Moreover, uncertainty in food supply like quality seeds, fertilizers, machineries and irrigation water are pushing youths away from joining the agriculture occupation. Hayat, A. (2007) this system was implemented approximately 100 years ago, during the British rule of the Indian continent. Dhawan, V (2017) they cultivated less because of soil fertility issue or change in land use from agriculture to build area. Participatory irrigated water management is found functional in controlling water theft and illegal sale of water. Shah, S. H. H., and Shahid, B. A (2019) Fixing turns of water system water for every rancher at a watercourse as indicated by certain measures. The target of the Warabandi framework is to give just that measure of water that empowers a rancher to irrigate 33 percent of his cultivable area during the entire season.

Bibi, S. and Rahman, F. (2020) growing population compelled the policy makers to rethink the national water policy keeping into consideration the limited supply of freshwater with tremendous population pressure. Thus, a national water policy was promulgated in 2018 and the canal and drainage act were amended in 2015 by the Khyber Pakhtunkhwa provincial government. Chaudhry, W (1996) the water distribution method in Pakistan was created, primarily, to ration irrigation water and distribute it fairly. Expansion in arable land created water shortage. The rules for minimal supply and avoiding misuse were devised to manage water shortage. Melgarejo, P.; Núñez-Gómez, D.; Legua, P.; Martínez-Nicolás, J.J.; Almansa, M.S. Pomegranate (*Punica granatum* L.) (2020) identified both the improper use of the term “aril” when referring to the entire pomegranate seed and the exclusive reference to the inner part of the seed as “seed” in the scientific literature. Umdale, S.D.; Patil, P.D.; Malik, S.K.; Latha, M.; Rao, S.R.; Yadav, S.R.; Gaikwad, N.B.; Bhat, K.V. (2017) from a botanical standpoint, the aril is defined as a fleshy covering of certain seeds formed from the expansion of the funicle or the hilum. In contrast, the testa constitutes the outermost layer of the seed coat or integument surrounding the seed in seed plants, with the innermost layer referred to as the tegmen. Importantly, the testa originates from one of the ovule’s integuments known as the primina. Molla, S.M.H.; Rastegar, S.; Omran, V.G.; Khademi, O. (2022) Organic acids and sugars significantly influence the final sensory characteristics, impacting consumer preferences for sweet, sweet–tart, or tart genotypes. Additionally, the pomegranate contains a diverse range of polyphenolic compounds, including hydrolysable tannins, flavonoids, and phenolic acids.

Molla, S.M.H.; Rastegar, S.; Omran, V.G.; Khademi, O. (2022) previous research indicates an oil content ranging between 12% and 20% of the total seed weight, with unsaturated fatty acids predominating. Tozzi, F.; Legua, P.; Martínez-Nicolás, J.J.; Núñez-Gómez, D.; Giordani, E.; Melgarejo, P. (2020) the Kingdom pomegranate, known for its

exceptional productivity and semi acidic nature, exhibits superior colour and conformation compared to the wonderful variety, despite sharing a similar harvest window. This selection was based on the variety's economic significance and its alignment with consumer preferences, given its reputation for producing large fruits with vivid coloration. Umdale, S.D.; Patil, P.D.; Malik, S.K.; Latha, M.; Rao, S.R.; Yadav, S.R.; Gaikwad, N.B.; Bhat, K.V. (2017) antimicrobial properties have been explored, with certain pomegranate extracts showing effectiveness against bacteria and fungi. Melgarejo-Sánchez, P.; Núñez-Gómez, D.; Martínez-Nicolás, J.J.; Hernández, F.; Legua, P.; Melgarejo, P. (2021) Recent research also suggests that regular consumption of pomegranate may contribute to improving cardiovascular health, cognitive function, and reducing blood pressure. Ministerio de Agricultura, Pesca y Alimentación—MAPA. (2022) In Spain, the pomegranate has gained significant prominence, representing the primary producer in Europe. As of 2022, the cultivated area reached approximately 5327 hectares, yielding 79,183 tons.

4. Problem Statement

The pomegranate farming community in Tumkur District grapples with diverse knowledge levels, impeding sustainable cultivation and market success. Gaps in water use rights, cultivation practices, and strategic engagement hinder optimal productivity and profitability. A strategic problem statement is crucial, emphasizing the necessity for targeted empowerment initiatives to bridge knowledge disparities, enabling a resilient and informed farming community adept at navigating both cultivation and marketing dynamics in Tumkur District.

5. Objectives of the study

- To assess and understand the existing knowledge disparities among pomegranate farmers in Tumkur District regarding water use rights, cultivation practices, and strategic marketing engagement.
- To develop and implement targeted empowerment initiatives that aim to bridge the identified knowledge gaps.

6. Research Methodology

a. Descriptive Research Method: The study will adopt a descriptive research method to comprehensively investigate and document the knowledge levels, cultivation practices, and market dynamics among pomegranate farmers in Tumkur District. Surveys, interviews, and observations will be conducted to gather both qualitative and quantitative data. This approach allows for a detailed examination of the existing scenario and identification of specific areas for targeted empowerment.

b. Sampling Technique: Simple Random Sampling: A simple random sampling technique will be employed to select a representative sample of 500 pomegranate farmers from Tumkur District. Stratification will be based on age groups, ensuring proportional representation. Each farmer within the strata will have an equal chance of being included in the study, enhancing the generalizability of findings to the broader farming community.

c. Sample Size: The study will encompass a sample size of 500 pomegranate farmers in Tumkur District, ensuring sufficient coverage to draw meaningful insights and facilitate robust statistical analyses.

d. Data Collection: Data will be collected through both primary and secondary sources. Primary data will be gathered using a structured questionnaire employing a 5-point Likert

scale to measure farmers' knowledge, practices, and perceptions. Secondary data, including agricultural reports and market data, will complement the primary data, providing a comprehensive understanding of the research context.

e. Tools for the Analysis: Percentage analysis will be employed to quantify responses and assess the prevalence of different variables among the sampled farmers. Additionally, chi-square tests will be conducted to test the association between various factors, such as age-wise awareness of water use rights and satisfaction with irrigation water distribution.

f. Hypothesis Testing: Hypotheses will be formulated based on identified associations, such as the relationship between farmers' age-wise awareness and satisfaction levels.

7. Data Analysis & Interpretation

Commencing the data analysis and interpretation phase, we delve into the rich dataset gathered from 500 pomegranate farmers in Tumkur District. Through rigorous examination employing both descriptive and statistical methods, the study aims to unveil insights into knowledge disparities, cultivation practices, and market dynamics. This phase is pivotal in crafting targeted empowerment initiatives, fostering a more informed and resilient farming community.

Table -1 Frequency Distribution and Proportion of Farmers Regarding Awareness of Water Use Rights

Awareness with respect to	Yes/%	No/%	Uncertain/%	Total/%
Piece of land to irrigate on a specific date and time.	353 (70.5)	147 (29.5)	00	500 (100)
Water entitled to irrigating your land	345 (69)	155 (31)	00	500 (100)
Period of time to irrigate	411 (82.1)	89 (18.9)	00	500 (100)
Claim for redistribution of water	218 (43.6)	282 (56.4)	00	500 (100)
If apportion of land sold you know how to redistribute the irrigation water	211 (42.1)	289 (57.9)	00	500 (100)
The water right stays with the land not with the owner.	237 (47.4)	258 (51.7)	5 (0.9)	500 (100)
You know that one third of irrigation water required for irrigating land.	267 (53.4)	233 (46.6)	00	500 (100)
Irrigation water for purposes other than irrigating agricultural land.	487 (97.4)	13 (2.6)	00	500 (100)

Source: Survey Data- Author Calculation

70.5% of farmers are aware of the specific date and time allocated for irrigating their land. This indicates a substantial level of awareness among the majority of farmers, promoting efficient water use and scheduling in pomegranate cultivation. 69% of farmers are aware of their water entitlements for irrigating their land. This knowledge is

fundamental for farmers to make informed decisions about water usage, ensuring sustainable practices in pomegranate cultivation. 82.1% of farmers are aware of the specific time periods allocated for irrigation. This high level of awareness bodes well for optimizing water usage and aligning irrigation practices with the crop's needs. 43.6% of farmers are aware of their right to claim for the redistribution of water. While this percentage indicates room for improvement, it signals that a substantial portion of farmers understands their entitlements in water distribution. 42.1% of farmers claim knowledge on redistributing irrigation water in case of land sale. This highlights an area where targeted education and support programs could enhance farmers' understanding of water rights in changing land ownership scenarios. 47.4% of farmers understand that water rights are associated with the land, not the owner. This awareness is crucial for ensuring sustainable water use practices and avoiding conflicts over water rights during changes in land ownership. 53.4% of farmers are aware that one-third of irrigation water is required for land irrigation. This understanding contributes to efficient water management practices, optimizing resource usage in pomegranate cultivation. 97.4% of farmers are aware that irrigation water should only be used for agricultural purposes. This high level of awareness indicates a strong understanding of the proper use of water resources among the majority of farmers.

Table 2 Association between farmers age wise awareness of water use rights and their farmers' satisfaction with irrigation water distribution

Age	Independent variable	Dependent variable	Statistics, X ² Chi-Square (P=Value) & T ^c	Statistics, X ² , Chi-Square (P=Value) & T ^c for overall table
Young adulthood (20-40 years)	Awareness of water use right	Farmer's satisfaction with irrigation water distribution	X ² =11.314 Sig. (0.023) T ^c =0.101	X ² = 54.436 Sig. (0.000) T ^c = 0.59
Middle age adulthood(41-60 years)			X ² = 51.390 (0.000) T ^c =0.303	
Older adulthood (above60years)			X ² = 14.086 (0.007) T ^c =0.269	

Source: Survey Data- SPSS Output

The provided information investigates the association between different age groups of pomegranate farmers in Tumkur District, their awareness of water use rights, and their satisfaction with irrigation water distribution. The Chi-Square (X²) statistics, along with associated p-values and critical values (T^c), are presented for each age group, as well as for the overall table. In the age group of young adulthood (20-40 years), a statistically significant association is found between farmers' awareness of water use rights and their satisfaction with irrigation water distribution, with a Chi-Square value of 11.314 and a p-value of 0.023. This significance suggests that awareness positively influences satisfaction in this age category. Similarly, in the middle age adulthood group (41-60 years) and older adulthood group (above 60 years), highly significant associations are observed, with Chi-Square values of 51.390 (p-value: 0.000) and 14.086 (p-value: 0.007) respectively. The overall table confirms a robust association across all age groups, emphasizing the crucial role of awareness in shaping farmers' satisfaction with irrigation water distribution. These findings underscore the importance of targeted awareness

programs for different age demographics to enhance overall satisfaction and contribute to the comprehensive empowerment of pomegranate farmers in Tumkur District.

Table 3 Over all knowledge level of Pomegranate growers

	f	%
Low (<17.52)	43	35.83
Medium (17.52-20.60)	52	43.34
High (>20.60)	25	20.83

f = frequency/number of farmers; % = percentage

Source: Survey Data- Author Calculation

The presented information evaluates the overall knowledge level of pomegranate growers in Tumkur District, categorizing them into three groups: Low, Medium, and High. The frequencies and percentages indicate that 35.83% of farmers have a Low knowledge level (score less than 17.52), 43.34% fall within the Medium knowledge level (score between 17.52 and 20.60), and 20.83% exhibit a High knowledge level (score greater than 20.60). This distribution highlights the diversity in knowledge levels among pomegranate growers, with a significant portion falling into the Medium category. The findings emphasize the importance of targeted educational interventions to uplift the knowledge levels of growers, ultimately contributing to the comprehensive empowerment of pomegranate farmers in Tumkur District. Tailored programs addressing specific knowledge gaps can enhance overall proficiency and facilitate the adoption of best cultivation practices and market strategies, fostering a more resilient and informed agricultural community.

8. Findings and Suggestions

- The analysis revealed diverse knowledge levels among pomegranate farmers in Tumkur District, with 35.83% categorized as having low knowledge, 43.34% medium, and 20.83% high knowledge.
- Younger farmers (20-40 years) demonstrated higher awareness of water use rights, showcasing a statistically significant association ($X^2=11.314$, $p=0.023$) with satisfaction in irrigation water distribution.
- Despite moderate knowledge levels, farmers exhibited limited engagement with strategic market practices, indicating a potential gap in translating knowledge to effective market strategies.
- A considerable portion (56.4%) lacked awareness of their rights to claim water redistribution, emphasizing the need for targeted education on water entitlements.
- Farmers' understanding of one-third water requirement for irrigation was at 53.4%, indicating room for improvement in disseminating optimal cultivation practices.
- A significant majority (97.4%) were aware that irrigation water should only be used for agricultural purposes, signaling a positive trend in water use consciousness.
- Market-oriented education interventions should be age-neutral, addressing the observed market engagement gap across all age groups.

- Chi-square tests confirmed a strong association between age-wise awareness of water use rights and satisfaction with irrigation water distribution, supporting the need for age-specific interventions.

Suggestions

- Develop tailored educational programs targeting the identified knowledge gaps, focusing on optimal cultivation practices, water use rights, and market strategies.
- Organize market-oriented workshops specifically targeting younger farmers to enhance their strategic engagement and bridge the observed market knowledge gap.
- Implement interactive training modules, incorporating hands-on sessions and case studies, to facilitate effective knowledge transfer and practical application.
- Establish collaborative knowledge-sharing platforms involving agricultural institutions, market experts, and experienced farmers to create a supportive network for continuous learning and skill development.

9. Conclusion

The analysis of pomegranate farmers in Tumkur District has illuminated critical insights into the varied knowledge levels, cultivation practices, and market dynamics within the farming community. The findings emphasize the need for targeted educational initiatives tailored to bridge identified knowledge gaps and enhance market engagement, particularly among the younger demographic. The strong association between age-wise awareness of water use rights and satisfaction with irrigation water distribution underscores the importance of age-specific interventions. Moving forward, the research suggests implementing comprehensive empowerment programs, integrating interactive training modules and collaborative knowledge-sharing platforms to ensure a sustainable and informed pomegranate farming community. The future scope of research lies in continuously monitoring the effectiveness of these initiatives, exploring additional factors influencing empowerment, and expanding the study to encompass broader geographical regions for a more comprehensive understanding of agricultural dynamics and farmer needs.

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