

Innovativeness, Risk orientation, Scientific orientation and Economic motivation among Jaggery-Producing Sugarcane Growers

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Abstract

It is imperative to understand the factors influencing farmer decision-making in an evolving global market context and modernization of Indian agriculture. In this context, the present investigation examines the four critical behavioral drivers viz., innovativeness, risk orientation, scientific orientation, and economic motivation among jaggery-producing sugarcane growers in the Western Maharashtra region. Utilizing a robust quantitative methodology, the research employed stratified random sampling to select 240 respondents from four intensively jaggery-producing districts: Kolhapur and Sangli (cluster), Satara, and Pune. The data from the respondents were collected using personal interview method with the help well-structured interview schedule. Descriptive analysis revealed that 31.25% of respondents exhibited high innovativeness, with 47.91% showing medium levels. Regarding risk orientation, 34.17% demonstrated high risk-taking propensity, while 49.10% exhibited medium orientation. Scientific orientation findings showed 27.08% with high disposition toward modern agricultural technologies and 55.84% with medium orientation. Economic motivation was most pronounced, with 47.08% expressing medium motivation for income enhancement and market-oriented production. This research provides critical insights for agricultural extension service providers, and industry stakeholders seeking to promote sustainable jaggery production systems. The findings suggest that enhancing scientific orientation and risk management capabilities can significantly accelerate adoption of innovative practices, ultimately contributing to more profitable and sustainable value chains in the traditional jaggery sector, because farmers are the primary link pins of the jaggery value chains.

Key words : Innovativeness, Risk orientation Scientific orientation and Economic Motivation
Personal Characteristics, Socio-economic Characteristics, Situational
Characteristics Jaggery-Producing farmers, Sugarcane Growers, jaggery
production technology.

The agricultural landscape in developing economies is undergoing transformative changes driven by globalization, market integration, and technological advancements, requiring farmers to navigate increasingly complex production environments. In this backdrop, traditional agro-processing sectors such as jaggery production face unique challenges and opportunities that necessitate understanding farmer decision-making processes beyond conventional economic frameworks. Jaggery production represents a vital value-added agricultural activity that combines traditional knowledge with modern market demands, offering sugarcane growers potential pathways for income diversification and

enhanced profitability. Previous research in agricultural extension has highlighted the importance of individual attributes in technology adoption. Empirical work on adoption behaviour and marketing among small- and medium-scale agro-processors emphasizes the role of socio-demographic factors, extension contact, and psychological predispositions in determining adoption of improved technology (Deshmukh, Kadam, and Shinde, 2007). However, despite its economic importance and cultural significance, the jaggery sector has received limited scholarly attention regarding the psychological constructs that drive farmer engagement with new technologies, market opportunities, and scientific innovations. This

study addresses this critical gap by examining four interconnected behavioral dimensions: innovativeness, risk orientation, scientific orientation, and economic motivation.

It is proposed that the interplay between psychological dispositions, specifically innovativeness, risk orientation, scientific orientation, and economic motivation, significantly influences farmer capacity to engage with new production methods, respond to market demands, and adopt sustainable practices. This study aims to provide empirical evidence regarding innovativeness, scientific orientation, risk orientation and economic orientation among jaggery producing farmers as these psychological characteristics are associated with the successful agri-entrepreneurship.

Material and Methods

The study was carried out in Kolhapur, Sangli, Satara, and Pune districts, selected for their concentration of jaggery units. A purposive sample of 240 jaggery-producing sugarcane growers was drawn from these districts. The research employed an ex-post facto design. Data were collected through personal interviews using a pre-tested, structured interview schedule. Measures included demographic variables (age, education), farm experience (years of sugarcane cultivation and jaggery production), access to irrigation, annual income, social participation, and scales for innovativeness, risk orientation, scientific orientation, and economic motivation. Data were tabulated, and frequency distributions, means, and standard deviations were computed to describe the central tendencies and dispersion of measured variables.

Result and Discussion

Personal profile : The study assessed the personal profile characteristics of the jaggery producing sugarcane growers including age education sugarcane cultivation and experience.

1. Age : Age is one of the important factors influencing behavior of jaggery producing sugarcane growers. Age is linked with maturity, mentality and decision making ability of the farmers.

Table 1. Distribution of respondents according to their age

Categories	Respondents (n=240)	
	Frequency	Percentage
Young age (up to 35)	75	31.25
Middle age (36 to 55)	108	45.00
Old age (56 and above)	57	23.75
Total	240	100

The demographic profiling of the sample revealed a predominantly middle-aged population, with 45.00% of respondents aged between 36 and 55 years, 31.25% in the younger category (≤ 35 years), and 23.75% in the older category (≥ 56 years). It was concluded that the majority of the jaggery producing sugarcane growers were from the middle age group. As observed in earlier research, it can be said that these middle aged jaggery producers are more enthusiastic about their activities compared to the older ones, have good experience in the production of jaggery as well as sugarcane cultivation compared to younger ones, and work more efficiently than younger and older jaggery producers. They also have greater responsibilities than old respondents do. From extension service perspective, this demographic positioning suggests that middle-aged farmers represent a critical target population for jaggery production technology adoption initiatives.

2. Education : In present study, education of the respondents operationalized as the number of years of formal education successfully completed at the time of data collection.

Table 2. Distribution of respondents according to their education

Categories	Respondents (n=240)	
	Frequency	Percentage
Illiterate	10	04.16
Pre-primary education (Std. I to IV)	14	05.83
Primary education (Std. V to VII)	15	06.25
Secondary education (Std. VIII to X)	81	33.25
Higher secondary (Std. XI to XII)	78	32.50
Graduation/Post graduation (Degree and more)	42	17.50
Total	240	100

It was observed from Table 2. that, educational attainment among respondents was notably heterogeneous. The majority possessed secondary (33.25%) or higher secondary education (32.50%), with 17.50% having attained graduation or postgraduate qualifications. Smaller proportions reported primary (6.25%) or pre-primary (5.83%) education, while 4.16% were illiterate.

It can be observed from the present study that majority of the jaggery producing sugarcane growers had secondary to graduation level of education. Higher educational profile facilitates farmers' capacity for managing complex jaggery production units and comprehending technical agricultural innovations.

3. Experience in Sugarcane cultivation : It refers to the total number of years the jaggery producing sugarcane growers has cultivated sugarcane either on their own farm or on leased farm. All the jaggery producing sugarcane growers were classified in to three groups according to their experience in sugarcane cultivation. The data of the study presented in Table 3.

Table 3. Distribution of respondents according to their experience in sugarcane cultivation

Categories	Respondents (n=240)	
	Frequency	Percentage
Low (Up to 12 Years)	52	21.66
Medium (13 to 27 Years)	145	60.42
High (28 Years and above)	43	17.92
Total	240	100
Mean	20.22	
SD	7.77	

The cultivation of sugarcane is a specialized agricultural enterprise requiring meticulous management of soil, water, and crop protection measures over an extended duration. As presented in Table 3 indicates that, most of the (60.42%) jaggery producing sugarcane growers had 'medium' level of experience in cultivation of sugarcane i.e. 13 to 27 years, followed by 21.66 per cent sugarcane growers had 'low' experience in sugarcane cultivation (up to 12 years) and 17.92 per cent of the respondents had 'high' level of sugarcane cultivation experience (more than 28 years).

The predominance of the medium-to-high experience categories suggests that sugarcane cultivation in Western Maharashtra is a generational and stable occupation. From a psychological perspective, this depth of experience is intrinsically linked to the farmers' scientific orientation and innovativeness. Growers with nearly two decades of experience are likely to have witnessed the transition from traditional to modern cultivars and irrigation techniques, thereby developing a practical understanding of scientific principles. Furthermore, such experience acts as a risk-mitigation factor; as farmers become more familiar with the physiological and environmental nuances of sugarcane, their confidence in managing production risks increases. This experiential maturity facilitates a

more balanced approach to economic motivation, as these farmers are better equipped to optimize yields and navigate market fluctuations compared to their less-experienced counterparts.

4. Experience in Jaggery Production :

It refers to the total number of years the jaggery producing sugarcane growers has engaged in jaggery production on their own jaggery production unit. All the respondents were categorized in to three groups as per experience of jaggery production in years. The results of the study are presented in Table 4.

Table 4. Distribution of respondents according to their experience in jaggery production

Categories	Respondents (n=240)	
	Frequency	Percentage
Low (Up to 7 Years)	32	13.66
Medium (8 to 18 Years)	158	65.83
High (19 Years and above)	50	20.84
Total	240	100
Mean	13.29	
SD	5.84	

The technical proficiency required for jaggery processing is significantly distinct from primary sugarcane cultivation, as it involves complex thermal management, clarification processes, and market-timing expertise. As showed in Table 4, the empirical findings indicate that a substantial majority of the respondents (65.83%) possessed a medium level of experience in jaggery production, spanning between 8 and 18 years. Approximately 20.84% of the participants possessed high experience (19 years and above), while a smaller segment (13.66%) possessed low experience (up to 7 years) in jaggery production. The mean experience in jaggery production was 13.29 years (SD = 5.84).

This jaggery production experience profile of the respondents indicates that participants possess substantive technical knowledge derived from their prolonged engagement with both sugarcane cultivation and value-added processing activity of jaggery production.

2. Situational variables

2.1. Area under sugarcane cultivation : This is the actual/total area in acres under sugarcane crop farming by the jaggery producing sugarcane growers.

Table 5. Distribution of respondents according to their area under sugarcane cultivation

Categories	Respondents (n=240)	
	Frequency	Percentage
Small farmer (up to 4)	20	08.32
Medium farmer (5 to 6)	179	74.59
Large farmer (7 and Above)	41	17.09
Total	240	100
Mean	5.30	
SD	1.63	

The scale of production, determined by the land area dedicated to sugarcane cultivation, serves as a fundamental structural variable influencing a grower's capacity for value addition and capital investment. As depicted in Table 5, a predominant majority of the respondents (74.59%) were medium farmers. This was followed by large farmers (17.09%) and small farmers (08.32%). The mean landholding dedicated to sugarcane was observed to be 5.30 acre (SD = 1.63).

This landholding pattern is a critical determinant of a farmer's economic motivation; the medium-to-large scale of cultivation necessitates a transition from being a mere supplier of raw material to becoming a value-added processor to ensure higher returns on investment.

Furthermore, these findings have significant implications for innovativeness and risk orientation. Small farmers (8.32%) often lack the surplus capital required to experiment with scientific innovations or absorb the potential losses associated with new processing technologies. In contrast, the medium and large farmers—who comprise over 90% of the study population—possess the requisite "economic cushion" to adopt scientific recommendations, such as high-yielding varieties and modern irrigation systems. This land-based security likely fuels their scientific orientation, as larger operations benefit more significantly from the efficiencies gained through evidence-based agricultural practices.

2.2. Sources of irrigation : It refers to the different sources of irrigation from which the jaggery producing sugarcane growers are had irrigation facilities for sugarcane crop. Access to a reliable source of irrigation is the primary determinant of success in sugarcane cultivation, as the crop is water-intensive and requires a consistent supply throughout its long physiological cycle. The distribution of the jaggery producing sugarcane growers based on their irrigation sources used was presented in Table 6.

Table 6. Distribution of respondents according to their sources of irrigation

Categories	Respondents (n=240)	
	Frequency	Percentage
Well	172	71.66
Bore well	62	25.83
Canal	26	10.83
Farm pond	17	07.08
River	198	82.50

(Note: Total percentage exceeds 100% as respondents utilized multiple irrigation sources).

The reported in Table 6. the data indicates that a vast majority of the respondents (82.50%)

utilized rivers as a primary source of irrigation. This was followed by wells (71.66%) and bore wells (25.83%). Canals (10.83%) and farm ponds (07.08%) represented supplementary sources for a smaller segment of the population.

Therefore, it can be said that most of the respondents were using their main source of irrigation is 'river' and 'well' because there are many rivers and wells available with the farmers in study area and they have also established water lifting facilities.

This access to different irrigation sources is intrinsically linked to economic motivation; the assurance of a perennial water supply allows growers to maintain high-quality cane, which directly influences the recovery rate and quality of the final jaggery product. Moreover, the integration of multiple water sources, including the emerging use of farm ponds (7.08%), signifies a growing scientific orientation. It indicates an awareness of water management and conservation practices, likely promoted through agricultural extension services. Farmers with secure irrigation are generally more innovative, as they possess the environmental stability necessary to experiment with high-yielding varieties and modern fertigation techniques without the immediate fear of crop failure due to moisture stress.

3. Socio-Economic Variables

3.1. Total annual income : The entire income earned from all sources of income in one year has been used to calculate the yearly income of a family or individual, which was measured in rupees. Annual income is an indicator of economic status and sound economic status serves as a fundamental catalyst for agricultural modernization and value addition.

As presented in Table 7, a predominant majority of the respondents (73.34%) fell within

Table 7. Distribution of respondents according to their total annual income

Categories	Respondents (n=240)	
	Frequency	Percentage
Low (Upto Rs. 4765128)	32	13.33
Medium (Rs. 4765129 to Rs. 7577920)	176	73.34
High (Rs. 7577921 & above)	32	13.33
Total	240	100
Mean	6171544.71	
SD	140639.49	

the medium-income category, earning between Rs. 4,765,129 and Rs. 7,577,920 annually. The distribution was symmetrical at the extremes, with 13.33% of respondents each categorized as having low income (up to Rs. 4,765,128) and high income (Rs. 7,577,921 and above). The mean annual income for the sample was calculated at Rs. 6,171,544.71 (SD = 140,639.49).

The sound economic status of the respondents reflected through their annual income provides the essential platform for the technological and entrepreneurial evolution of the jaggery sector in the region.

3.2 Social Participation : Social participation, defined as the degree of involvement in formal and informal community organizations and cooperatives, is a critical channel for knowledge dissemination and social capital accumulation. The term social participation was meant to describe how jaggery producing sugarcane growers participate in the various activities of formal and non-formal organizations as members or officials.

As presented in Table 8, the data reveals that more than half of the respondents (52.50%) exhibited a medium level of social participation (scores of 5 to 6). A significant segment (31.25%) demonstrated high participation (scores of 7 and above), while only 16.25% fell

Table 8. Distribution of respondents according to their social participation

Categories	Respondents (n=240)	
	Frequency	Percentage
Low participation(Up to 4)	39	16.25
Medium participation (5 to 6)	126	52.50
High participation (7 & above)	75	31.25
Total	240	100
Mean	5.84	
SD	1.37	

into the low participation category. The mean participation score was 5.84 (SD = 1.37). The finding that over 83% of respondents maintain medium-to-high levels of social involvement underscores the cooperative nature of the agricultural landscape in Western Maharashtra. The possible reason for medium level of social participation in organizations might be due to the fact that, that while most farmers are integrated into the social fabric of their communities, their level of active engagement is likely balanced against the intensive time demands required for managing both sugarcane cultivation and jaggery processing units.

From a behavioral perspective, social participation is a significant antecedent to scientific orientation and innovativeness. High social involvement exposes farmers to "early adopters" and peer success stories, which reduces the perceived risk of new technologies. Through these social networks, farmers gain informal access to scientific information that complements formal extension services. Furthermore, participation in cooperatives often enhances economic motivation, as these organizations provide better market links and information regarding price trends. The study indicates that the respondents are not isolated producers but are part of a connected ecosystem that fosters the exchange of ideas, thereby creating a conducive environment for the

diffusion of agricultural innovations in the jaggery sector.

Economic motivation among jaggery producing sugarcane growers : Economic motivation is the occupational aspiration of a farmer to maximize monetary returns and achieve higher financial status through the efficient management of their agricultural enterprise. Economic motivation acts as a primary catalyst for innovativeness and scientific orientation; farmers are more likely to adopt new technologies or follow scientific recommendations if they perceive a direct link to increased profitability. The pursuit of higher margins also necessitates a higher risk orientation, as farmers must invest capital in machinery and labor to produce premium-quality jaggery that commands better prices in the market. It is obvious that, economically motivated farmers are oriented towards maximization of the profit from farming.

Table 9. Distribution of respondents according to their economic motivation

Categories	Respondents (n=240)	
	Frequency	Percentage
Low (up to 24)	40	16.66
Medium (25 to 28)	113	47.08
High (above 29)	87	36.26
Total	240	100
Mean	26.93	
SD	2.65	

It was observed from Table 9 that, majority (47.08 %) of the jaggery producing sugarcane growers possessed a medium level of economic motivation. This was closely followed by 36.26% of respondents with a high level of motivation, while only 16.66% were classified in the low category. The mean score for economic motivation was 26.93 (SD = 2.65).

The data reveals that a vast majority of jaggery producers (83.34%) are driven by a strong desire to improve their financial standing through their processing units. This high level of economic drive is a defining characteristic of the sugarcane growers in Western Maharashtra, who view jaggery production not merely as a traditional craft but as a commercial business venture. The substantial representation in the "High" category (36.26%) suggests that a large segment of the population is actively seeking ways to scale their operations, reduce costs, and capture higher market value.

This economic drive is likely to be the fundamental factor behind other behavioral traits investigated in the study. Furthermore, the prevalence of medium-to-high economic motivation is consistent with the annual income patterns observed earlier. As farmers experience the tangible financial benefits of value addition through converting sugarcane to jaggery, their aspirations for further wealth accumulation and improved standards of living are reinforced. This creates a positive feedback loop that encourages the professionalization of the sector. For extension workers and policymakers, these findings suggest that any new technology or policy intervention will be most successful if its "relative economic advantage" is clearly demonstrated to this profit-oriented demographic.

Risk orientation among jaggery producing sugarcane growers : Risk orientation is most important factor. Moreover, it is concern with the adoption of the innovations. Risk orientation is a vital psychological attribute for agricultural entrepreneurs, reflecting their degree of courage in facing uncertainties and their willingness to accept potential losses in the pursuit of higher productivity.

Table 10. Distribution of respondents according to their risk orientation

Categories	Respondents (n=240)	
	Frequency	Percentage
Low (Up to 23)	40	16.66
Medium (24 to 27)	118	49.10
High (28 & above)	82	34.17
Total	240	100
Mean	26.03	
SD	2.57	

A cursory look at the Table 10 shows that nearly half of the respondents (49.10%) demonstrated a medium level of risk orientation. This was followed by high level of risk orientation (34.17%), while a smaller segment of them (16.66%) fell into the low-risk category. The mean risk orientation score was 26.03 (SD = 2.57).

The data indicates that a significant majority of jaggery producers (83.27%) possess a moderate-to-high capacity for managing production and market uncertainties. This psychological resilience is particularly important in the jaggery industry, which is characterized by fluctuating market prices, the perishability of raw sugarcane, and the technical complexities of the boiling and solidification process. The predominance of the medium risk orientation category suggests that most farmers are "calculated risk-takers"; they are willing to deviate from traditional methods but only after assessing the potential impact on their livelihoods.

The high percentage of respondents in the medium-to-high categories is likely influenced by their economic motivation and annual income levels. As observed in previous findings, the relatively stable income from integrated sugarcane-jaggery units provides a financial buffer that allows farmers to absorb small-scale setbacks. This economic security encourages

them to take the risks necessary for growth, such as experimenting with new clarificants or investing in improved furnace designs.

Furthermore, risk orientation is closely linked to innovativeness. Farmers who are psychologically prepared to face uncertainty are generally the first to adopt scientific innovations. The low percentage of "low risk" individuals (16.66%) indicates that the traditional, purely conservative mindset is fading in Western Maharashtra, giving way to a more entrepreneurial approach. This trend is beneficial for agricultural extension agencies, as it suggests that the farming community is increasingly receptive to modern, high-return (though potentially riskier) agricultural technologies and value-addition strategies.

Scientific orientation among jaggery producing sugarcane growers : Scientific orientation refers to the degree to which a farmer is inclined to use scientific methods and findings in their decision-making process regarding agricultural practices. According to Supe (2007) it is the degree of the farmers' orientation towards the use of scientific methods in farming, decision making as well as their attitude towards science-based innovations. Scientific orientation is a forerunner of farmers' innovativeness. To know, the extent to which the respondents were had scientific orientation towards farming.

Table 11. Distribution of respondents according to their scientific orientation

Categories	Respondents (n=240)	
	Frequency	Percentage
Low (Up to 22)	41	17.08
Medium (23 to 27)	134	55.84
High (28 & above)	65	27.08
Total	240	100
Mean	25.52	
SD	2.73	

The data presented in the Table 11 revealed that, a majority of the respondents (55.84%) possessed a medium level of scientific orientation. This was followed by 27.08% who fell into the high-level category, while 17.08% of the respondents were characterized by a low scientific orientation. The mean score for scientific orientation was recorded at 25.52 (SD = 2.73).

The findings indicate that more than four-fifths (82.92%) of the jaggery producers in the study area have a moderate-to-high inclination toward scientific approaches. The predominance of the "medium" category reflects a stage where farmers are aware of scientific recommendations, such as hygienic processing standards, and they might be gradually incorporating them into jaggery production operations.

This scientific temper is intrinsically linked to the respondents' education and social participation. Active involvement in cooperatives and interaction with extension agencies likely expose these farmers to the technical logic behind modern agricultural recommendations, thereby fostering a scientific outlook. Furthermore, a high scientific orientation serves as a foundation for innovativeness; farmers who understand the "why" behind a practice are more likely to be early adopters of new technologies.

The relatively high percentage of producers in the medium and high categories also highlights the success of agricultural extension services in the region. By demonstrating the efficiency and quality improvements associated with scientific jaggery production, these services might have encouraged a transition toward a more rationalized, professionalized agricultural sector. These study findings also indicate that the study area has a strong potential for the further adoption of advanced biotechnological and mechanical innovations in sugarcane processing.

Innovativeness among jaggery producing sugarcane growers :

Innovativeness, defined as the degree to which an individual is relatively earlier in adopting new ideas or practices compared to other members of a social system (Rogers, 2003), is a foundation for agricultural modernization and development of agri-entrepreneurship. It refers to behaviour pattern of an individual who has interest and desire to seek changes in farming techniques and ready to introduce such changes in to his operation when considered as practical and feasible.

Table 12. Distribution of respondents according to their innovativeness

Categories	Respondents (n=240)	
	Frequency	Percentage
Low (Up to 33)	50	20.84
Medium (34 to 41)	115	47.91
High (42 and above)	75	31.25
Total	240	100
Mean	38.07	
SD	4.72	

The data presented in the Table 12. revealed that nearly half of the respondents (47.91%) possessed a medium level of innovativeness. This was followed by 31.25% who demonstrated a high level of innovativeness, while 20.84% were characterized by low innovativeness. The mean innovativeness score for the respondents was 38.07 with the standard deviation 4.72.

The concentration of respondents in the medium-to-high innovativeness categories (totaling 79.16%) suggests a progressive mindset among jaggery producers in Western Maharashtra. This indicates that a vast majority of the growers are not rigid traditionalists but are willing to experiment in their sugarcane cultivation and jaggery production methods

when the practical benefits are demonstrated. The fact that nearly one-third of the sample falls into the "High" category suggests a strong presence of "early adopters" who can serve as opinion leaders in the community.

The predominance of the medium innovativeness group can be attributed to the interplay of experience and resource management. As noted in earlier tables, many respondents are middle-aged with significant experience; while this experience provides wisdom, it can also lead to a "wait-and-see" approach where farmers observe the success of a new technology (such as new sugarcane variety for jaggery production or a new crusher design) before making investments.

Psychologically, this level of innovativeness is strongly reinforced by the respondents' economic motivation and scientific orientation. Their desire for higher profits drives them to seek out innovations that reduce labor costs or improve jaggery quality. Furthermore, the moderate-to-high level of social participation identified in this study likely facilitates the flow of information, allowing farmers to benchmark their innovative practices against their peers. Consequently, the study area shows a healthy capacity for technological evolution, provided that the innovations are perceived as both economically viable and scientifically sound.

Conclusions

The study reveals a structured agrarian system dominated by middle-aged, experienced farmers specializing in medium-scale sugarcane cultivation. The majority possess secure irrigation from perennial sources like rivers and wells, coupled with a moderately high annual income derived from value-added jaggery production. This combination of ample land, reliable water, and stable finance creates a robust foundation for capital-intensive development and technological adoption.

The behavioral analysis indicates that the farming community exhibits pronounced entrepreneurial characteristics. Medium-to-High Economic Motivation and Risk Orientation are prevalent, suggesting that growers are not passive recipients of yields but are actively engaged in optimizing their enterprise for profit maximization. This is further supported by broadly positive levels of Scientific Orientation and Innovativeness, showing a willingness to integrate modern knowledge and technology into their traditional craft.

The critical findings that over 80% of respondents consistently fall into the medium-to-high categories across all the investigated psychological variables viz., Economic Motivation, Innovativeness, Risk Orientation, and Scientific Orientation demonstrate a congruent and high readiness for change. This psychological profile suggests that farmers in the study area are ready to accept and adopt modern technologies in jaggery processing, provided such innovations are perceived as scientifically sound and economically advantageous. The jaggery production industry in the study area can be promoted sustainably by effectively channeling this potential through targeted research, appropriate technology development, and supportive policy frameworks and extension advisory services.

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