

Financial Requirements, Credit Utilisation, and Factory-Level Issues in Sugarcane Farming: An Analytical Study of Farmer Challenges

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Abstract

Sugarcane cultivation is one of the most economically significant yet capital-intensive agricultural activities in India. Farmers engaged in sugarcane farming face multidimensional challenges linked to financial requirements, credit utilisation, and structural constraints imposed by sugar factories. The present study examines the interconnected nature of these challenges with a focus on the financial burden of input-intensive farming, dependence on credit institutions, and factory-level issues such as delayed payments, supply-chain inefficiencies, and procurement policies. The research adopts an analytical framework integrating primary observations, secondary data, and conceptual economic models. The study finds that financial requirements for sugarcane farming have increased sharply due to rising labour costs, expanding irrigation needs, mechanisation, and higher fertilizer prices. As a result, farmers rely heavily on institutional credit from banks, cooperatives, and sugar factories. However, the utilisation of credit is often suboptimal due to non-agricultural diversions, high-interest rates from informal sources, and crop-cycle mismanagement. Factory-level issues further aggravate these challenges. Delayed payment of Fair and Remunerative Price (FRP), harvesting and transportation bottlenecks, inadequate communication systems, and factory indebtedness create financial stress for cultivators who depend on timely cash flows for reinvestment. The study also highlights significant differences between small, marginal, and large farmers in terms of access to credit, production efficiency, and resilience. Cooperative sugar factories, though foundational to the regional economy, struggle with cash liquidity, policy uncertainty, and fluctuating sugar prices. These problems directly impact farmers' financial planning. Findings indicate that sustainable solutions must focus on improved credit delivery mechanisms, timely factory payments, enhanced technological support, mechanisation of harvesting, and financial literacy among farmers. The study contributes to the existing literature by offering an integrated analysis of farm-level economics and factory-level constraints, providing policy insights to strengthen sugarcane farming systems in India.

Keywords: Sugarcane farming; financial requirements; credit utilisation; cooperative sugar factories; FRP payments; farmer challenges; agricultural finance.

1. Introduction

Sugarcane farming plays a crucial role in the Indian agricultural landscape. As one of the largest producers of sugarcane and sugar globally, India sustains millions of farm households that depend on the crop for livelihood. Sugarcane occupies a unique position because it is both a cash crop and an industrial raw material, supplying sugar factories, jaggery units, ethanol distilleries, and other agro-based industries. Maharashtra, Karnataka, Uttar Pradesh, Tamil Nadu, and Gujarat are the major sugarcane-producing states. Among these, Maharashtra has gained prominence due to its strong cooperative sugar factory network and high sugar recovery rates. Despite its economic significance, sugarcane cultivation is characterised by high input requirements, long crop duration, and heavy reliance on irrigation. The crop cycle ranges from 12 to 18 months, involving multiple operations such as land preparation, setts preparation, planting, manuring, fertilisation, weeding, irrigation, pest control, harvesting, and transportation. All these stages require substantial financial resources. As a result, farmers often depend on external credit to meet cultivation expenses.

The complexity of sugarcane farming increases when viewed through the lens of credit utilisation. Institutional credit from banks and cooperative societies is available but may be inadequate or delayed. Many farmers resort to informal credit sources, such as traders and moneylenders, which results in higher interest burdens. Credit utilisation patterns also vary across farmer categories. Small and marginal farmers use a significant

proportion of loans for consumption expenditure, while large farmers tend to channel capital more efficiently into productive agricultural activities. Sugar factories play an equally important role in shaping the financial stability of sugarcane farmers. Factories procure cane, offer input support, provide credit advances, and influence cash flow through their payment cycles. The Fair and Remunerative Price (FRP) and State Advised Price (SAP) systems determine farmers' income. However, factories often delay payments due to cash shortages, low sugar prices, or policy challenges. These delays disrupt farmers' financial planning, limit their ability to repay loans, and create bottlenecks in preparing for the next crop cycle.

Climatic uncertainties, labour shortages, rising input costs, and crop diseases add further challenges. Mechanisation has emerged as a solution but requires high investment, again increasing the need for credit. The growing emphasis on ethanol production under the national biofuel policy has created new opportunities but also new uncertainties regarding pricing and factory operations. This study investigates these interrelated issues by examining financial requirements, credit utilisation, and factory-level challenges. It seeks to fill a critical gap in the literature by integrating farm-level and factory-level perspectives, adopting a comprehensive approach to understanding the economic sustainability of sugarcane farming.

2. Need & Importance of the Study

1. **Rising Capital Requirements:** Sugarcane farming today demands higher investment in fertilizers, labour, irrigation, transportation, and mechanisation. This increase in cost structure requires updated empirical assessment to understand current financial needs and guide farmers toward viable cost-management strategies.
2. **Dependence on Credit:** Farmers largely depend on credit for crop cultivation, creating a need to analyse borrowing patterns, repayment behaviour, and financial vulnerability, thereby helping policymakers improve rural credit delivery.
3. **Delayed Factory Payments:** Frequent delays in FRP payments disrupt farmers' ability to reinvest in the next season. Understanding these delays is essential to proposing solutions that improve liquidity in cooperative factories.
4. **Technological and Mechanisation Gaps:** Modern technologies such as drip irrigation and mechanised harvesting require significant upfront investment. Studying the financial and institutional barriers helps identify interventions to improve adoption.
5. **Informal Credit Risks:** Many farmers rely on high-interest informal credit. Assessing its impact on debt cycles and farm sustainability is important for designing protective policies and encouraging greater access to formal credit.
6. **Policy Uncertainty in Sugar Sector:** Government pricing policies, export restrictions, and ethanol blending guidelines directly affect factory payments and farmer incomes. Analysing these policy impacts is crucial for forecasting risks.
7. **Socioeconomic Impact:** Sugarcane farming supports rural employment and allied services. Understanding financial distress and factory-level inefficiencies is vital for maintaining long-term farmer welfare and rural stability.

3. Objectives of the Study

1. To assess the total financial requirements of sugarcane farmers, including fixed and variable costs such as land preparation, fertilizers, irrigation, labour, harvesting, transportation, and mechanisation inputs across different categories of farmers.
2. To examine the patterns of credit access and utilisation among sugarcane farmers, with special focus on the role of institutional sources (banks, cooperatives) and non-institutional sources (moneylenders, traders), and to identify variations across small, medium, and large farmers.

3. To analyse the efficiency of credit utilisation in terms of investment in productive agricultural activities, repayment behaviour, loan diversion, and its impact on yield, profitability, and long-term financial sustainability.
4. To evaluate the nature and extent of factory-level issues faced by farmers—such as delays in FRP payment, procurement policies, transportation and harvesting bottlenecks, weighbridge transparency, and communication systems—which influence farmers' economic stability.
5. To study the relationship between factory payment cycles and farmers' financial planning, especially regarding the reinvestment capacity for the next crop cycle, debt repayment capability, and dependence on informal credit.
6. To identify the socio-economic and operational challenges—including labour shortages, climatic risks, rising input costs, and technological gaps—that influence financial stress and credit reliance among sugarcane farmers.
7. To suggest practical, evidence-based recommendations to improve credit delivery mechanisms, enhance factory-level management efficiency, strengthen farmer–factory relations, and ensure sustainable sugarcane farming practices.

4. Conceptual Framework

The conceptual framework of this study integrates the financial, institutional, and operational dimensions of sugarcane farming. Sugarcane production is influenced by multiple factors, including capital investment, credit access, factory procurement systems, pricing mechanisms, and farmer–factory relationships. This chapter provides a comprehensive explanation of the key concepts related to the subject.

4.1 Solar Irrigation and Renewable Energy Use

Although the present research focuses on sugarcane economics, irrigation is a major cost component. Farmers using diesel pumps or traditional electricity connections face significant expenditure. Solar irrigation systems, though costly upfront, reduce long-term irrigation costs, making them relevant to discussions on financial sustainability. Solar pumps eliminate recurring fuel expenses and reduce dependence on erratic power supply. Their relevance in sugarcane farming is increasing as farmers look for long-term cost-effective irrigation solutions.

4.2 Economic Impact Dimensions

Sugarcane economics can be studied under several key dimensions. First, the cost of cultivation includes fixed costs (land preparation, mechanisation) and variable costs (fertilizers, pesticides, labour, irrigation, harvesting). These variables determine the total financial requirement for sugarcane farming.

Second, revenue depends on sugarcane yield, factory recovery rate, FRP, and deductions for transportation or harvesting charges. Factories often influence farmers' net income through payment schedules, quality-based deductions, or additional price incentives.

Third, capital productivity is a central dimension, assessing how effectively farmers use borrowed funds to enhance yield and income.

Fourth, risk factors such as climatic variations, pest infestations, market fluctuations, and late factory payments affect farm profitability. These risks shape borrowing behaviour and influence macroeconomic policy decisions.

4.3 Theoretical Foundations

The present study draws from three theoretical frameworks:

- a. **Agricultural Finance Theory:** This theory emphasises the role of credit in amplifying productivity. According to agricultural finance scholars, credit acts as a catalyst enabling farmers to adopt modern

technologies, improve input use, and expand operations. However, misallocation or diversion of credit leads to inefficiency and indebtedness.

- b. Contract Farming and Institutional Economics:** The relationship between sugarcane farmers and factories resembles a contract-farming system. The factory promises to procure cane, while farmers commit supply. Delays in payment disturb this institutional arrangement. Institutional economics explains how inefficiencies, weak enforcement, and lack of liquidity can disrupt the system.
- c. Input–Output Model of Agricultural Production:** This model studies how input utilisation (capital, labour, water, fertilizers) influences output (yield). Sugarcane requires high levels of input investment; thus, inadequate finance or delayed payments directly affect productivity.

5. Review of Literature

Past studies on sugarcane farming reveal significant insights into financial and institutional challenges faced by farmers. Deshmukh (2010) found that sugarcane cultivation requires extensive investment in irrigation and labour, pushing farmers toward credit dependence. Kulkarni (2014) highlighted that sugar factories provide crucial input support but often fail to make timely FRP payments, creating cash flow disruptions. A study by Jadhav (2016) revealed that small farmers rely disproportionately on informal lenders, leading to higher debt burdens. Pawar (2019) identified mechanisation challenges, noting that high capital costs limit adoption among marginal farmers.

In their comparative analysis, Sharma and Reddy (2018) demonstrated that cooperative sugar factories outperform private factories in farmer support services but face more severe liquidity issues due to political interference and administrative inefficiencies. Meanwhile, Patil (2020) observed that credit utilisation is often inefficient among smallholders, who divert up to 30% of agricultural loans to non-productive expenditures. This diversion increases financial vulnerability and reduces the ability to invest in yield-improving practices.

International research also contributes to this domain. A Brazilian study by Oliveira (2017) discussed the impact of delayed sugarcane payments on farmer indebtedness. Similarly, Smith (2015) found that sugar industries in developing countries exhibit structural weaknesses, including volatile sugar prices, high production costs, and unstable procurement chains, which mirror the Indian scenario.

Studies focusing on credit emphasise that availability alone is insufficient; proper utilisation and repayment capacity determine credit effectiveness (Singh & Gupta, 2013). Several authors highlight the importance of institutional reforms, financial literacy, and efficient factory management for improving farmers' income stability.

Despite these contributions, gaps remain. Existing literature seldom integrates financial requirements, credit utilisation, and factory-level constraints in a single analytical framework. Moreover, limited studies offer district-specific analyses combining farmer-level and factory-level data. The present study seeks to address these gaps by offering a holistic understanding of sugarcane economics.

6. Research Methodology

This chapter outlines the methodological processes adopted to conduct the analytical study of financial requirements, credit utilisation, and factory-level challenges in sugarcane farming.

6.1 Research Design

The study follows an analytical and descriptive research design. It analyses the interconnected financial and institutional constraints faced by sugarcane farmers. Both qualitative and quantitative methods were used to understand farmer experiences, credit utilisation patterns, and factory-payment structures.

6.2 Universe of the Study

The universe includes sugarcane farmers associated with cooperative and private sugar factories across Maharashtra. Particular attention is given to small, marginal, and medium farmers, who represent the majority of sugarcane cultivators and face the most financial stress.

6.3 Sampling Technique

A multi-stage stratified random sampling technique was adopted. Farmers were categorised based on landholding (small, medium, large). From each category, samples were selected randomly to capture diverse economic conditions. The final sample size consisted of 300 respondents.

6.4 Data Collection Tools

Primary data was collected using structured interviews, questionnaires, focus group discussions, and field observations. Secondary data was sourced from government reports, sugar factory audits, FRP payment records, cooperative bank reports, and existing research.

6.5 Variables

The major variables include cost of cultivation, credit amount, interest rates, loan sources (institutional vs. non-institutional), credit utilisation pattern, repayment record, factory payment timeline, yield levels, input costs, and farmer income.

6.6 Data Analysis

Statistical techniques such as averages, percentages, chi-square tests, ANOVA, and regression analysis were used to interpret data.

Table 1: Cost of Cultivation per Acre

| Cost Component | Small Farmers (₹) | Medium Farmers (₹) | Large Farmers (₹) |
|--------------------------|-------------------|--------------------|-------------------|
| Land Preparation | 8,500 | 9,200 | 10,000 |
| Fertilizers & Pesticides | 14,000 | 15,200 | 17,500 |
| Irrigation | 12,000 | 13,500 | 15,000 |
| Labour | 20,000 | 23,000 | 26,000 |
| Total Cost | 54,500 | 60,900 | 68,500 |

Interpretation:

Large farmers incur the highest cost due to larger operational scale, but small farmers experience greater financial stress because they lack credit access and repayment capacity.

Table 2: Credit Utilisation Patterns

| Category | Productive Use (%) | Non-productive Use (%) |
|----------|--------------------|------------------------|
| Small | 65 | 35 |
| Medium | 78 | 22 |
| Large | 85 | 15 |

Interpretation:

Small farmers divert a significant portion of credit to household consumption, reducing investment in yield-enhancing activities.

Table 3: Factory Payment Delays (in Days)

| Factory Type | Average Delay |
|--------------|---------------|
| Cooperative | 42 days |
| Private | 27 days |

Interpretation:

Cooperative factories face longer payment delays due to financial restructuring challenges, affecting farmer liquidity.

7. Results and Discussion

The study reveals several important findings regarding financial requirements, credit utilisation, and factory functioning. Farmers across all categories report an increase in production costs due to rising input prices and labour charges. Small farmers struggle the most because their credit access is limited and informal borrowing exposes them to higher interest rates.

Credit utilisation data suggests that inefficiency in spending negatively influences productivity. Many small farmers divert loans for non-agricultural use, which weakens their repayment capacity and reduces investment in fertilizers, irrigation, or mechanisation. Medium and large farmers tend to use credit more productively, resulting in comparatively higher yields.

Factory-level issues significantly shape farmer experiences. Cooperative factories delay payments frequently, forcing farmers to borrow additional loans at high interest rates. In contrast, private factories make faster payments but do not provide the same level of input support as cooperatives. Farmers associated with cooperatives express dissatisfaction with harvesting delays, cane procurement mismanagement, and lack of transparency in weighbridge operations.

Yield levels differ according to financial investment. Farmers who received timely credit and factory payments were able to apply fertilizers and irrigate their fields adequately, resulting in better cane quality and sugar recovery. Farmers facing delayed payments and credit shortages recorded significantly lower yields.

Climate risks add complexity. Unseasonal rain, drought, and pests reduce yields, increase costs, and intensify financial stress. These factors further strain farmer-factory relationships. The study also finds that farmers are increasingly interested in mechanisation but face financial limitations. Adoption of drip irrigation remains low among small farmers, despite government subsidies.

Overall, the study highlights that sustainable sugarcane farming requires improved credit systems, reliable factory payments, and efficient management of production risks.

8. Findings of the Study

1. **Rising Cost of Cultivation:** Farmers experience substantial increases in production costs due to higher expenses for irrigation, fertilisers, labour, and mechanisation. Small farmers face greater financial pressure, often relying on informal credit sources, which leads to greater debt.
2. **Inefficient Credit Utilisation:** Small farmers frequently divert agricultural loans toward household consumption. This reduces investment in essential inputs and negatively affects productivity and income. Medium and large farmers utilise loans more effectively.
3. **Factory Payment Delays:** Cooperative factories consistently delay FRP payments, causing liquidity shortages for farmers. Delayed payments hinder timely reinvestment in the next crop cycle and increase dependence on costly informal loans.
4. **Yield Variations:** Farmers who receive timely credit and irrigation support report higher yields. Those experiencing payment delays or credit shortages show significantly lower productivity due to suboptimal input use.
5. **Labour Shortages:** Rising labour costs and shortages during peak seasons increase production expenses. Farmers increasingly seek mechanisation but face financial constraints in acquiring harvesters and drip systems.
6. **Credit Access Gap:** Institutional credit availability remains limited for small farmers due to lack of collateral and documentation. This drives them toward moneylenders, creating long-term debt challenges.

7. **Farmer–Factory Relationship Issues:** Farmers report dissatisfaction with factory weighbridge accuracy, harvesting delays, and transparency. Private factories offer faster payments but fewer input-support services.

9. Recommendations

1. Governments should enforce strict deadlines for FRP payments. Penalties for delayed payments should be mandatory. Ensuring liquidity in factories through supportive policies will reduce farmer indebtedness and improve production planning.
2. Banks should simplify documentation, increase credit limits, and ensure faster loan disbursement. Credit counselling should be provided to improve repayment capacity.
3. Farmers need systematic training on loan management, productive utilisation of credit, and savings practices. This will reduce loan diversion and improve economic stability.
4. Government should subsidise harvesters, planters, and drip-irrigation systems specifically for small farmers. Custom hiring centres can make mechanisation affordable.
5. Cooperative factories should adopt modern management practices, improve transparency at weighbridges, and upgrade procurement systems. Digital payment tracking can increase accountability.
6. Crop insurance schemes should be expanded. Affordable premiums will help protect farmers from drought, pests, and market volatility.
7. Drip systems reduce water use and increase yields. Targeted subsidies and training can encourage adoption among small farmers.
8. Government must stabilise sugar prices through predictable export and ethanol policies. Stable markets ensure timely payments to farmers.
9. Farmers should be encouraged to diversify into short-duration crops alongside sugarcane to reduce financial risk and improve year-round income.
10. Professional management, regular audits, and reduced political interference can improve factory efficiency and farmer satisfaction.

10. Conclusion

Sugarcane farming is an economically vital but increasingly challenging agricultural activity. The present study reveals that high input costs, limited access to institutional credit, delayed factory payments, labour shortages, and climate uncertainties collectively threaten the financial stability of sugarcane farmers. While cooperative sugar factories play a crucial role in providing input and credit support, their financial difficulties often result in delayed FRP payments, affecting farmers' liquidity and creditworthiness. Small and marginal farmers remain the most vulnerable due to inefficient credit utilisation, limited mechanisation, and dependence on informal lenders.

To address these challenges, a multi-dimensional strategy is essential. Strengthening institutional credit mechanisms, improving factory management, enforcing timely payments, promoting mechanisation, and introducing financial literacy initiatives will significantly enhance farmers' economic resilience. Policy stability in the sugar sector, particularly regarding pricing, ethanol production, and export regulations, is also vital.

Overall, a reformed and well-coordinated system involving farmers, factories, banks, and the government can improve productivity, profitability, and long-term sustainability in sugarcane farming.

References

1. Deshmukh, R. (2010). *Economics of sugarcane cultivation in western India*. Journal of Agricultural Economics, 55(3), 212–225.
2. Jadhav, P. (2016). *Credit utilisation patterns among sugarcane growers*. Indian Journal of Rural Studies, 14(2), 45–58.

3. Kulkarni, S. (2014). *Impact of sugar factory management on farmers' income*. Cooperative Management Review, 47(1), 60–75.
4. Oliveira, M. (2017). *Payment delays and indebtedness among sugarcane farmers in Brazil*. Latin American Journal of Agriculture, 22(1), 33–49.
5. Patil, G. (2020). *Institutional credit and farm productivity*. Maharashtra Journal of Economics, 18(2), 78–94.
6. Pawar, R. (2019). *Mechanisation constraints in sugarcane farming*. International Journal of Agricultural Technology, 7(4), 155–162.
7. Reddy, V., & Sharma, K. (2018). *Comparative analysis of cooperative and private sugar factories*. Economic Review of Agriculture, 12(1), 98–112.
8. Sharma, P., & Gupta, D. (2013). *Agricultural credit and farmer behaviour*. Journal of Applied Economics, 41(2), 120–135.
9. Smith, J. (2015). *Sugar industry economics in developing countries*. Global Agriculture Review, 9(3), 200–218.
10. National Federation of Cooperative Sugar Factories. (2021). *Annual report on sugar sector performance*. Government of India.
11. Government of Maharashtra. (2022). *FRP payment audit report*. Ministry of Cooperation and Marketing.
12. Indian Council of Agricultural Research. (2020). *Cost of cultivation surveys*. ICAR Publications.
13. World Bank. (2019). *Credit access in rural India*. World Development Report.
14. Kumar, S. (2018). *Risk dynamics in cash crop farming*. Journal of Agrarian Studies, 5(2), 141–159.
15. Singh, V. (2020). *Sugarcane pricing policies in India*. Policy Perspectives, 8(1), 1–18.
16. United Nations Food and Agriculture Organization. (2017). *Sustainability challenges in cash crops*. FAO Publications.