

ROLE OF AGRI-COOPERATIVES IN SUSTAINABLE RICE PROCESSING

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ABSTRACT

The role of cooperatives in sustainable rice processing is multifaceted and crucial for the agricultural sector's development. Cooperatives enable farmers to pool resources, share knowledge, and negotiate better prices, thereby improving their bargaining power and income. This review paper explores the role of agricultural processing cooperatives, specifically rice processing cooperatives in promoting local economic development and sustainable rice processing in India, analyzing their benefits, challenges, and potential strategies for improvement. As rice is a staple food for a large portion of the global population, and its processing efficiency significantly impacts food security, economic stability, and farmer incomes. Agricultural cooperatives play a crucial role in improving rice processing efficiency by integrating smallholder farmers, optimizing post-harvest handling, and facilitating access to modern milling technologies. They help in reducing post-harvest losses, improving the quality of processed rice, and ensuring better market access. Furthermore, cooperatives contribute to cost reduction through collective bargaining, providing technical training, and encouraging the adoption of mechanization. Cooperatives' effects on rice productivity vary greatly depending on the region, farm size, and degree of mechanization. This paper reviews the role of various cooperatives in enhancing rice processing efficiency by analyzing their impact on production, processing technologies, supply chain management, and marketing. Various studies highlight that cooperative models have successfully improved rice processing quality in countries like India, China, and the Philippines. However, cooperatives face challenges such as financial constraints, poor governance, and inadequate infrastructure. Addressing these issues through policy support, credit availability, and technological advancements can further strengthen the role of cooperatives in rice processing.

Keywords: Agri-processing cooperatives, Rice Processing Cooperatives, Rural development, farmer organizations, cooperative societies

INTRODUCTION

In recent decades, India has actively encouraged and facilitated the growth of small businesses, including agri-cooperative enterprises, as a key strategy to empower communities in addressing poverty, unemployment, and inequality. Cooperation and collective efforts were already widespread in various regions of India, especially among rural communities. Among the key areas of focus is the agricultural sector, where cooperatives have played a

significant role in driving local development. Additionally, Deng et al. (2021) stress the importance of agricultural cooperatives as a component of the contemporary agricultural production system. Numerous scientists, academics, and policymakers from various nations and locations throughout the world have found studies on agricultural cooperatives to be intriguing and worth taking into consideration. The effect estimation of cooperative membership has been the primary



subject of a large number of empirical investigations. The literature on the function and impact of cooperatives provides a wealth of evidence indicating the causal effects of cooperatives on the livelihoods and production outputs of their members are astonishingly diverse. The cooperative movement in India traces back to the late 19th century, originally initiated to liberate farmers from the exploitative practices of moneylenders (Kribhco, n.d.). Over time, agricultural cooperatives have evolved into robust institutions that not only facilitate financial access but also enable the dissemination of sustainable farming practices. These organizations empower small-scale farmers to overcome traditional production constraints, increase crop yields, and improve their livelihoods (Paraschou & Sergaki, 2024).

Rice is one of the most widely consumed cereals globally, with over 3.5 billion people depending on it as a staple food (FAO, 2022). Efficient rice processing is essential for maintaining quality, reducing post-harvest losses, and ensuring a steady supply to markets. However, smallholder farmers, who dominate rice production in many developing countries, often struggle with inefficient processing due to a lack of access to modern technology, financial constraints, and poor market linkages (Pingali et al., 2019). Agri-processing cooperatives provide a sustainable solution to these challenges by bringing farmers together to improve rice processing efficiency. They enable collective access to advanced milling equipment, storage facilities, and better marketing channels, thereby reducing post-harvest losses and improving rice quality (Kumar et al., 2021). Cooperatives also facilitate knowledge sharing, technological adoption, and economies of scale, making rice processing more cost-effective and sustainable (Ghosh & Dey, 2020).

Agri-processing cooperatives have emerged as a transformative solution to these challenges by fostering collective strength among farmers. These cooperatives provide

shared access to advanced rice milling technologies, enhanced storage facilities, and organized marketing networks. By working together, farmers can reduce individual costs, mitigate post-harvest losses, and improve the quality and competitiveness of their products in domestic and international markets (Kumar et al., 2021). Additionally, cooperatives offer a platform for the dissemination of knowledge, encourage the adoption of innovative practices, and enable farmers to benefit from economies of scale, making rice processing both economically viable and environmentally sustainable (Ghosh & Dey, 2020).

This review paper examines the role of cooperatives in enhancing rice processing efficiency by analyzing their impact on technology adoption, cost reduction, quality improvement, and market access. It also explores the challenges cooperatives face and potential strategies to overcome them. In India, cooperation has its origin in the last quarter of the 19th Century in attempts to provide relief to the farmers from the clutches of money lenders (Kribhco. n.d.). Agricultural cooperatives promote sustainable agricultural practices, enabling small-scale farmers to adapt to modern challenges and improve their resource accessibility (Paraschou & Sergaki, 2024). While agricultural cooperatives show promise in improving livelihoods, challenges such as ineffective service delivery and resource constraints persist, indicating a need for ongoing support and development to maximize their impact. This review paper is majorly based on a review of the relevant literature available on the subject. The paper is divided into various sections, including this introductory Section, traces the conceptual framework, origin, and evolution of co-operatives; the status and scenario of agri-processing cooperatives; and the profile of cooperatives in India that examines their role in promoting local economic development performance and the factors affecting it. Finally, the last section identifies and briefly discusses some contemporary issues confronting co-operatives and outlines policy frameworks and strategies for their resolution.



EVOLUTION OF AGRI-PROCESSING COOPERATIVES IN INDIA

Agricultural cooperatives began to appear in the late 19th and early 20th centuries as a solution to the difficulties encountered by farmers, especially concerning access to financing, resources, and marketing options. Based on the ideals of collaborative effort, these cooperatives sought to enhance farmers' empowerment and boost their economic conditions. "The cooperative movement in India dates back to the early 20th century, with the introduction of the Cooperative Societies Act, 1904 (Deshpande, 2017)". Rice processing cooperatives gained momentum post-Green Revolution as the government sought to modernize the agricultural sector (Reddy et al., 2021). With the establishment of the National Cooperative Development Corporation (NCDC) and various state-level

cooperative federations, rice processing cooperatives have become an integral part of the agricultural economy (Sharma, 2019). Act of 1912 on Cooperative Societies, as the number of cooperatives grew far more than expected, the Cooperative Societies Act of 1912 became essential, allowing cooperatives to be established under the Act to offer their members non-credit services. Federations of cooperatives were also established by the Act. Urban cooperative banks changed their name to Central Cooperative Banks with primary cooperatives and individuals as members in the credit sector after this law was passed. Similar to this, cooperatives were established for non-credit operations like marketing societies, buy and sales unions, and, in the non-agricultural sector, cooperatives of handloom weavers and other craftspeople (Tiwari, 2017).



Figure 1: History of Agricultural Cooperatives in India



CONCEPTUAL FRAMEWORK

In India, collective farming is emphasized in the conceptual framework of agricultural cooperatives, where members pool resources and collaborate to increase productivity and efficiency. A cooperative society is an organization of a group of people with collective responsibilities and thoughts for the development of the needy, especially the underprivileged. A cooperative is an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise. In developing nations, agricultural cooperatives are anticipated to boost crop yield and production efficiency. These cooperatives were established to overcome these production and marketing constraints through collective action (Chagwiza et al., 2016). Cooperative societies work on the ethical principles of openness, honesty, social responsibility, and concern for others. and values self-help, self-responsibility, democracy, equality, equity, and solidarity. Cooperative ideals formulated by the global cooperative movement, includes open and voluntary membership; democratic member control; economic involvement by members; autonomy and independence; information, education, and training; cooperative cooperation; and community concern.



Figure 2: An integrated conceptual framework for the study of agricultural cooperatives

STATUS OF AGRICULTURAL COOPERATIVES IN INDIA

In both developed and developing nations, cooperatives are vital to the agricultural industry. They are thought to be the primary organizational and institutional tool that farmers use to empower markets and lower transaction costs (Tortia et al. 2013). In the agricultural sector, there are 619 State Cooperative Agriculture and Rural Development Banks (SCARDB) and Primary Cooperative Agriculture and Rural Development Banks (PCARDBs), as well as 1,00,428 Primary Agricultural Credit Societies (PACS), Large Area Multi-Purpose Societies (LAMPS), and Farmers Services Societies (FSS). To help realize the goal of "Sahakar se Samridhi," promote the cooperative-based economic development model, and strengthen the cooperative movement in the nation while expanding its reach to the grassroots, the ministry has begun the creation of the New National Cooperation Policy. In this context, stakeholder consultations were previously conducted, and the public as well as Central Ministries/Departments, States/UTs, National Cooperative Federations, and Institutions were asked for their ideas on how to draft the new policy. Under the direction of Shri Suresh Prabhakar Prabhu, a national level committee was established on September 2, 2022. Its members include cooperative sector experts, representatives from cooperative societies at the national, state, district, and primary levels, Secretaries (Cooperation) and RCSs from States and UTs, and officers from Central Ministries and Departments. The committee's goal is to analyze the gathered input, policy suggestions, and recommendations in order to draft a new policy.

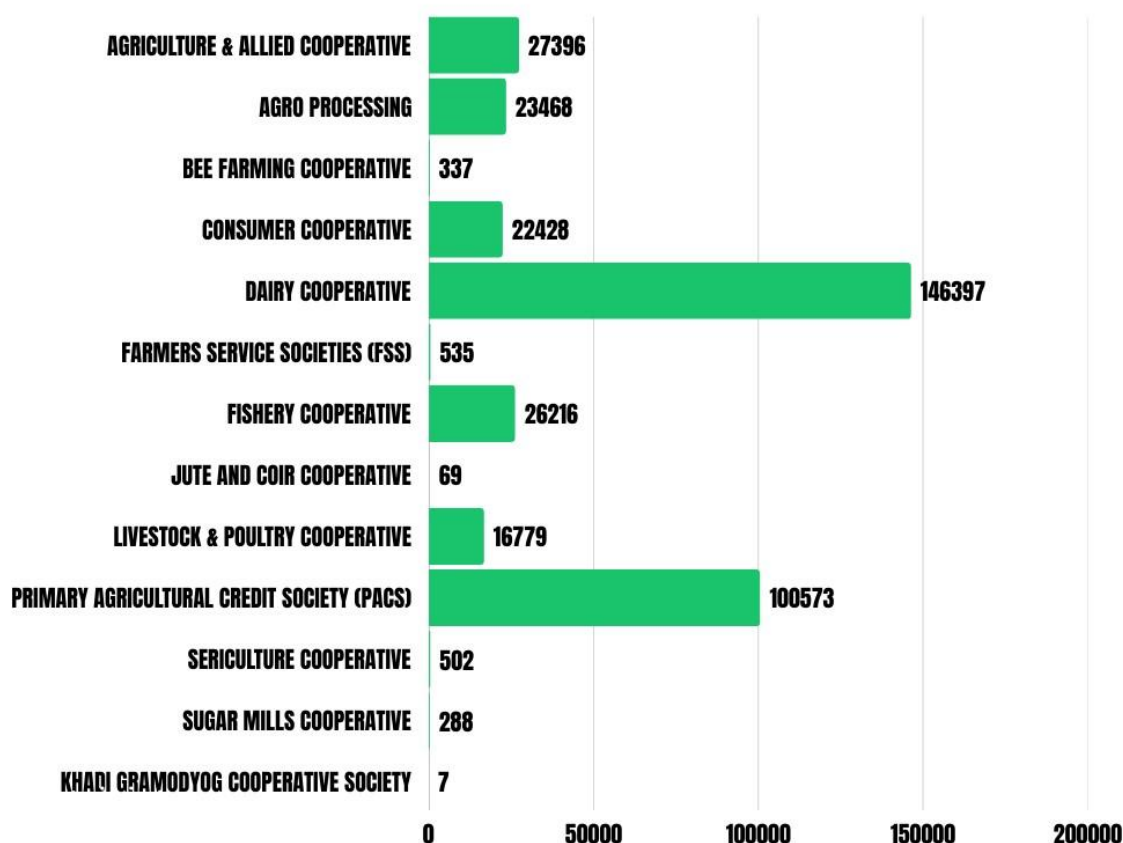


Figure 3: Number of Functional Agricultural Cooperatives in India
Source: National Cooperative Database (NCD), As on 16/03/2025 12:24 AM

STRUCTURE AND FUNCTIONING OF RICE PROCESSING COOPERATIVES

Rice processing cooperatives operate through a well-defined organizational structure comprising farmer members, governing committees, and professional management teams (Kumar & Sinha, 2018). It is also highlighted that cooperatives might improve food security and lower post-harvest losses (Kaplinsky & Morris, 2001; IBEF, 2024).

Their key functions include:

1. **Procurement of Paddy:** Cooperative societies, particularly Primary Agricultural Cooperative Societies (PACS), play a crucial role in paddy procurement by acting as procurement centers, ensuring farmers, especially small and marginal ones, can easily sell their produce, and by potentially establishing rice mills for custom

milling. Cooperatives collect paddy from member farmers, ensuring fair pricing and reducing exploitation by middlemen (Mehta et al., 2020).

2. **Milling and Processing:** One of the significant contributions of cooperatives is their ability to provide access to modern rice-milling technologies. Many small farmers lack the financial capacity to invest in high-quality milling machines, leading to lower efficiency and higher breakage rates during processing (Bello et al., 2020). Cooperatives address this issue by pooling resources and establishing shared processing units, enabling farmers to use advanced milling technology at a lower cost (Hossain et al., 2019). Modern rice mills under cooperative ownership enhance



efficiency, minimize wastage, and improve product quality (Ghosh, 2021).

3. **Storage and Distribution:** In order to overcome the nation's shortage of food grain storage capacity, the Government of India recently approved the "World's Largest Grain Storage Plan in Cooperative Sector", which has been rolled out as a Pilot Project in different States/UTs of the country (PIB, 2024). Cooperatives manage warehouses and cold storage facilities to maintain grain quality (Sharma, 2020).
4. **Marketing and Sales:** India is the 2nd largest rice producer after China with the estimated Rice produced during

2018-19 at 115.60 million tonnes. India is also the largest exporter of Basmati Rice and 2nd largest exporter of non-Basmati Rice. The export potential and increasing domestic requirement presents ample scope for venturing in the Rice trade. The Rice could play a key role in starting the export business of the cooperatives and could place them in a competitive advantage with the private enterprises. They facilitate collective marketing and branding, ensuring better returns for farmers (Verma & Reddy, 2022).

5. **Financial Support:** Access to cooperative banks and government subsidies aids in business sustainability (Narayan, 2021).

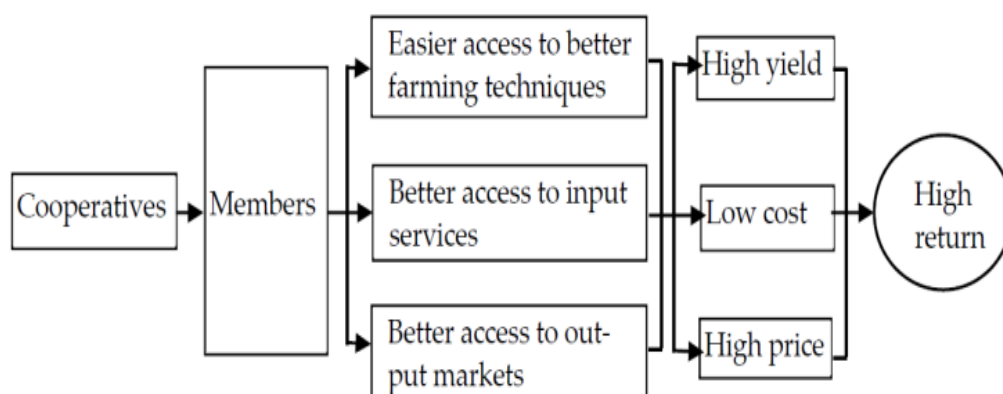


Figure 4: Cooperatives' pathways for improving farm performance.

IMPACT OF AGRO-PROCESSING COOPERATIVES ON LOCAL ECONOMIC DEVELOPMENT

Rice processing cooperatives have demonstrated remarkable success:

- **Chhattisgarh State Rice Cooperative Federation:** The Chhattisgarh State Rice Cooperative Federation, known as CG MARKFED, is a nodal agency for paddy procurement and fertilizer distribution in Chhattisgarh, acting as a semi-government company

promoting the state's agro potential. Markfed serves as the primary organization for the procurement of paddy and the distribution of fertilizers in Chhattisgarh. Since November 1, 2000, Markfed has consistently made strides toward achieving its goals, enabling the Federation to receive numerous national level awards in its field. A model for efficient paddy procurement and milling (Patil, 2021).

- **Tamil Nadu Rice Millers Cooperative Society:** The Tamil



Nadu Rice Millers Cooperative Society (TNCSC) is a government-run corporation in Tamil Nadu, India, that manages the procurement, processing, and distribution of rice through modern rice mills and direct purchase centers. Helps farmers access modern processing technology and better markets (Sharma, 2022).

- **Bharatiya Beej Sahakari Samiti Limited (BBSSL):** Agricultural cooperatives can create the right system for the conservation of Indian traditional natural seeds. BBSSL set up with the approval of Union Government and registered under Multi-State Cooperative Societies Act 2002 on the 25 January, 2023 is hereby conferred the status of National Cooperative Society (hereinafter referred as the society). BBSS is jointly promoted by IFFCO, KRIBHCO, NAFED, NDDB and NCDC as promoter members and among them, KRIBHCO is the Chief Promoter of this society. It perform a range of tasks as a national organization, such as producing, processing, storing, marketing, branding, and distributing

CHALLENGES AND CONSTRAINTS

Despite their benefits, rice processing cooperatives face several challenges:

1. **Insufficient marketing expertise:** The majority of cooperatives and groups typically lack marketing expertise. They are run by one of the group members who has no experience with marketing or running a business in general. For groups or cooperatives to operate, marketing strategy will be necessary. Among the creative tactics used include branding, fair pricing, and retail. They ought to push for the government to help them by offering services and funding as startup capital (Pujara, 2016).

2. **Financial Constraints:** Limited access to capital and high operational costs hinder expansion (Sharma & Gupta, 2020). Many cooperatives in India lack sufficient capital, relying heavily on government funding or debt, which can lead to financial instability and unsustainable operations.
3. **Poor Capital Formation:** Members often struggle to contribute capital, and cooperatives may not effectively mobilize resources or attract investment.
4. **Technological Gaps:** Outdated milling techniques result in lower efficiency and quality issues (Patel et al., 2019).
5. **Market Competition:** Private millers and multinational corporations pose significant challenges (Reddy, 2020).
6. **Infrastructure Deficiencies:** Inadequate storage and logistics facilities impact efficiency (Ghosh, 2019).
7. **Regulatory Barriers:** Complex cooperative laws and bureaucratic hurdles slow down growth (Kumar & Sinha, 2018).

Government Policies Supporting Rice Processing Cooperatives

The Indian government has implemented several policies to promote rice processing cooperatives, including:

- **World's Largest Decentralized Grain Storage Plan in the cooperative sector:** The government has given the green light to a plan aimed at establishing warehouses, custom hiring facilities, primary processing units, and other agricultural infrastructure for grain storage at the PACS level, utilizing a merger of different Government of India



schemes, such as AIF, AMI, SMAM, PMFME, and others. This initiative is set to diminish food grain wastage and transport expenses, allow farmers to obtain better crop prices, and address various agricultural needs directly at the PACS level. As part of the Pilot Project, warehouses have been built in 11 PACS across 11 states, and this Pilot is now being expanded to include an additional 500 PACS (PIB Delhi).

- **National Food Security Mission (NFSM):** Cooperatives are essential to the National Food Security Mission (NFSM) because they make resources more accessible, encourage sustainable farming methods, and improve farmers' livelihoods, all of which lead to increased food security and revenue.
- **Pradhan Mantri Formalisation of Micro Food Processing Enterprises (PMFME) Scheme:** Provides financial assistance and technical support to cooperatives (Verma et al., 2019).
- **Rashtriya Krishi Vikas Yojana (RKVY):** Encourages modernization of rice mills under cooperative ownership (Sharma, 2021).

- **Agro Processing Cluster Scheme:** Facilitates the establishment of processing hubs through cooperative participation (Narayan, 2019).
- **New National Multi-State Cooperative Export Society for promoting exports:** The Government has launched a new apex multi-state cooperative export society under the MSCS Act of 2002, called the National Cooperative Export Limited (NCEL), aimed at boosting exports from the cooperative sector. Currently, approximately 7,700 PACS and cooperative societies have joined NCEL as members. NCEL has exported a total of 815,007 metric tonnes of various commodities. This includes 801,790 metric tonnes of rice (PIB Delhi).

NAFED (National Agricultural Cooperative Marketing Federation of India Ltd.)

In FY 2023-24, NAFED undertook the procurement of Paddy from West Bengal and Assam. NAFED was entrusted with the role of state agency, representing the State Governments in these states. NAFED successfully procured a total of 79,346.75 MT of Paddy, with a total value of Rs. 17,321.39 lakh benefitting around 20,823 Farmers in the two states.

State-wise procurement details are summarized below

S. No.	Year	State	Progressive Procurement as on 31/03/2024	
			Quantity (In MT)	Procurement (MSP) Value (In Rs Lakh)
1.	KMS 2023-24	West Bengal	65672.89	14336.39
2.	KMS 2023-24	Assam	13673.86	2985.00
	Total		79,346.75	17,321.39

Table 1: State-wise procurement details of rice

Source: NAFED, ANNUAL REPORT 2023-24, CHAPTER 11.2 Food Grain



INTERNATIONAL TRADE

Having the goal of expanding commercial activities and creating a presence in global markets. In order to generate additional funds for the Federation, NAFED imports and exports a variety of agricultural goods and commodities to and from other countries.

During the FY 2023-24, NAFED has undertaken following business activities:

- 1000 MT of non-Basmati parboiled rice (with a 5 % breakage) exported to Port Louis, Mauritius under government-to-government initiatives on CFR basis.
- NNAFED and State Trading Corporation (STC), Mauritius, have signed an MOU dated 05.09.2023 for the export of long grain parboiled rice to the Republic of Mauritius.
- Using the MV MSC ELSA 3, NAFED has successfully transported 1000 MT of non-basmati parboiled rice. For this operation, NAFED made about ₹22, 70, 900 in profit.
- Supply of 2080MT Non - Basmati White Rice to Food Corporation of Bhutan Limited on b/o National Co-operative Exports Limited (NCEL).

RETAIL BUSINESS



NAFED, the National Agricultural Cooperative Marketing Federation of India Ltd., has started working on consumer marketing and retail business initiatives to expand its business and provide customers with reasonably priced everyday necessities including groceries, tea, oil, spices, etc. These goods are sold through a chain of stores called NAFED Bazaar and are promoted under the "NAFED" name. These stores are managed by NAFED, which also oversees franchise agreements and company-owned locations. With the opening of new locations across India in recent years, the retail presence has grown.

Bharat Rice was officially introduced at Kartavya Path, New Delhi, ensuring quality and accessibility for all on February 06, 2024. The Hon'ble Union Minister, Ministry of Consumer Affairs Food and Public Distribution (CA, F&PD), Shri Piyush Goyal, distributed Bharat rice to beneficiaries, exemplifying a strong commitment to uplift communities nationwide.

INFORMATION TECHNOLOGY

Additionally, NAFED made progress in 2023 in developing a strong IT foundation to facilitate the deployment of Numerous government projects, such as PSS and PSF, are designed to minimize manual intervention and provide end-to-end digital solutions. To achieve this goal, NAFED has started working on the e-Samridhi site and has started the process of implementing an Enterprise Resource Planning (ERP) system to automate the organizational setup.

Development of the e- Samridhi Portal:

The IT Division has successfully facilitated the development of the e-Samridhi portal, providing a comprehensive solution for the self-registration of farmers, including procurement and payments. This end-to-end multilingual solution encompasses seamless integrations with key stakeholders, such as state warehouses, state land records, banks, SMS, WhatsApp and Aadhaar for account verification.



CONCLUSION

Agricultural cooperatives serve as a vital mechanism for strengthening farmer-market linkages in India, ensuring that small and marginal farmers have better access to markets, fair prices, and improved economic opportunities. By enabling collective bargaining, agri processing cooperatives help farmers reduce their dependence on intermediaries, allowing them to secure higher returns for their produce. They streamline supply chains, minimize post-harvest losses, and enhance the overall efficiency of the agricultural marketing system. Rice processing cooperatives have played a vital role in enhancing efficiency, reducing losses, and increasing farmer incomes in India. While challenges such as financial constraints and governance issues persist, targeted policy interventions and infrastructural support can further strengthen the role of cooperatives in the rice processing sector. Strengthening cooperative-based rice processing models will not only improve farmer incomes but also contribute to food security and economic sustainability. Beyond market access, cooperatives provide essential support in terms of financial resources, technological advancements, and capacity-building initiatives. They facilitate access to credit, allowing farmers to invest in better inputs, irrigation systems, and modern farming techniques. Moreover, cooperatives often collaborate with government agencies, research institutions, and private enterprises to bring innovative agricultural solutions and extension services to their members, thereby improving productivity and sustainability. However, for agricultural cooperatives to reach their full potential, it is crucial to address challenges such as inadequate infrastructure, limited financial resources, and governance issues. Strengthening policy frameworks, providing institutional support, and enhancing cooperative management practices are essential steps toward making them more effective and sustainable. Digital technology and ecommerce platforms can further revolutionize cooperative-led

marketing, offering farmers direct access to consumers and larger markets.

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