

Performance of Rice Cooperatives in the Vietnamese Mekong Delta: Initiatives for Sustainable and Organic-Oriented Agricultural Development

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Abstract

Rice cooperatives are vital to the agricultural landscape of Vietnam's Mekong Delta, yet their performance and contributions to sustainable agriculture are not well understood. This study provides a comprehensive analysis using data from 135 rice cooperatives, employing multiple regression and logit model. The findings reveal uneven membership distribution despite significant social influence, with most cooperatives having fewer than 100 members. Charter capital varies widely and does not strongly correlate with membership numbers. Despite challenges in rice processing, cooperatives offer diverse services to enhance productivity and market access, with a notable focus on high-quality rice production (41.5% of surveyed cooperatives produce premium rice,) and contract farming (43.7% engage in contract farming). Regression analysis highlights the influence of service provision, annual profit, and contract farming on cooperative performance, stressing the need for strategic management, financial stability, and market-oriented approaches to drive success in Mekong Delta's rice cooperatives.

Keywords: Contract farming; Performance; Rice cooperatives; Sustainable agriculture.

I. Introduction

The Vietnamese Mekong Delta (VMD) stands as a bastion of rice production, boasting a rich history that has transitioned from traditional methods dependent on natural conditions to a modernized approach integrating external interventions and technology. This evolution has positioned the VMD as Vietnam's leading rice producer, not only ensuring the nation's food security but also contributing significantly to global rice supplies (GSO, 2024). In 2023 alone, the region yielded over 25 million tons of paddy, with more than 8 million tons exported worldwide (Pingali & Xuan, 1992; GSO, 2024). Rice cultivation serves as a cornerstone of life in the delta, sustaining

millions of farmers and their families while bolstering Vietnam's export revenues.

Since the economic reforms of 1986, rice productivity in the VMD has experienced consistent growth, expanding from 2.8 tons per hectare in 1986 to 6.3 tons per hectare by 2023, albeit largely attributed to intensified agrochemical usage (Dung & Dung, 1999; Cabauatan et al., 2009; Tu & Yabe, 2016; Tu et al., 2019). However, this approach has raised concerns regarding environmental degradation and public health (Dung & Dung, 1999). Compounded by the region's predominately small-scale and fragmented agricultural landscape, these challenges hinder farmers' access to resources, information, and markets, thus impacting productivity and profitability

(Tu et al., 2021). In response, the development of agricultural cooperatives has emerged as a promising solution, offering farmers a platform to consolidate resources, share knowledge, and negotiate advantageous market terms (Thanh et al., 2018; Tri, 2020; Tu & Trang, 2020; Pham, 2022). Through collective action, farmers endeavor to enhance rice production, augment incomes, and fortify the long-term sustainability of the delta's agriculture.

The trajectory of agricultural cooperative development in Vietnam traces back to the early 20th century, with diverse cooperative models established to support farmers and spur economic progress. Despite setbacks during the Vietnam War, post-war efforts by the government revitalized the cooperative movement, culminating in a surge of agricultural cooperative formations by the 1980s. Subsequent decades witnessed government policies fostering cooperative growth, including access to credit and technical assistance, and the encouragement of large-scale cooperative ventures to bolster sector competitiveness (Pingali & Xuan, 1992; Dung, 2011; TRAN & IWAMOTO, 2014; Cox & Le, 2017). Presently, legislative reforms and supportive policies continue to nurture cooperative expansion, facilitating a conducive environment for their proliferation and efficacy.

Agricultural cooperatives in the VMD, particularly rice cooperatives, have proactively embraced initiatives for sustainable and organic agricultural development (Quang, 2020; Ngoc et al., 2021). Anchored in visions of enhancing farmer livelihoods and environmental stewardship, these cooperatives strive to produce and market organic or premium-quality rice while mitigating the ecological impacts of chemical-intensive farming. However, despite the promising trajectory, challenges persist, exacerbated by the demands of an increasingly competitive global market. The Vietnamese government's emphasis on cooperative development underscores the pivotal role envisioned for these entities in alleviating farmers' hardships and advancing the agricultural sector.

Yet, the current status of agricultural cooperatives in realizing their potential remains suboptimal, as highlighted by various studies (Thanh et al., 2016; Thanh et al., 2018; Tu & Trang, 2020). To address these limitations, legislative reforms such as the Law on Cooperatives 2012 and recently 2023, along with subsequent decrees and decisions, aim to bolster cooperative economic development, particularly in agricultural production. These regulatory interventions pave the way for innovative cooperative models tailored to meet members' needs and uplift household economies, rectifying past shortcomings.

Investigating the performance of rice cooperatives in the Mekong Delta holds paramount importance on multiple fronts. Given rice's central role as a staple food and economic mainstay in the region, the efficacy of rice cooperatives directly impacts the livelihoods of farmers, community well-being, and broader economic dynamics. Moreover, insights gleaned from assessing rice cooperative performance can inform strategies to enhance efficiency, productivity, market access, and sustainable agricultural practices, thereby charting a course towards a more resilient and prosperous agricultural future in the VMD.

2. Literature review

2.1 Overview of rice production in the Vietnamese Mekong Delta

The Mekong Delta is a major rice-producing region in Vietnam, accounting for a significant portion of the country's overall rice production. The region is characterized by its fertile soil, abundant water resources, and favorable climate, which make it an ideal location for rice cultivation (De, 2008). Rice is a staple food crop in the VMD, and its production is an important contributor to the region's economy, food security, and rural livelihoods. Despite these advantages, rice production in the VMD also faces many challenges, including climate change, declining soil fertility, increasing pressure from urbanization and industrialization, and changing market demand

(Le, 2016; Tran et al., 2021; Ho et al., 2022; Minh et al., 2023). To address these challenges and improve the productivity and competitiveness of the rice sector, the Vietnamese government has implemented a number of policies and programs aimed at supporting the development of agricultural cooperatives, which are considered as key to improving the performance of the rice industry in the VMD (Thanh et al., 2016; Tu & Trang, 2020; Pham, 2022).

The total rice production area in Vietnam has been declining steadily due to the agricultural restructuring program. The reduced rice land area has been replaced with aquaculture and horticulture production. Table 1 shows that the total rice production of the nation has reduced from 7,7 million hectares in 2017 to 7,23 million hectares in 2021 (GSO, 2024). This trend is the same for the VMD as the region contribute more than 53% of the total national rice production and 90% of rice for export.

Table 1: Total rice production area of the study sites and the Mekong Delta

Region/province	2017	2018	2019	2020	2021
Vietnam	7705.2	7570.9	7469.9	7278.9	7238.9
The Mekong Delta	4185.3	4107.5	4069.3	3963.7	3898.6
Dong Thap	538.3	520.4	521.6	514.2	504.4
An Giang	641.1	623.1	626.3	637.2	624.9
Kien Giang	735.3	728.4	722.1	725.8	715.7
Can Tho	240.1	237.3	225.1	223	222.4
Hau Giang	206.6	194.6	196.1	198.2	189
Soc Trang	348.2	351.8	356.3	353.7	327.9
Total	2709.6	2655.6	2647.5	2652.1	2584.3
Share of the MD	64.74	64.65	65.06	66.91	66.29

Source: GSO, 2024

2.2 Overview of agricultural and rice cooperatives

Agricultural cooperatives play an important role in the Vietnamese agricultural sector, particularly in the production of rice, the country's staple food (Thanh et al., 2016; Thanh et al., 2018; Tu & Trang, 2020; Pham, 2022). Rice cooperatives are organizations formed by farmers to pool their resources and jointly engage in activities such as seed production, cultivation, processing, and marketing. The main objectives of these cooperatives are to increase farmers' income, reduce production costs, improve product quality, and increase market access.

In Vietnam, the government has encouraged the development of agricultural cooperatives as

part of its strategy for rural development and poverty reduction (Thanh et al., 2016; Cox & Le, 2017). These cooperatives provide farmers with access to credit, improved seed varieties, and technical assistance, as well as facilitating their participation in the domestic and international markets (Tu & Trang, 2020).

The Vietnamese government has implemented several policies to support agricultural cooperatives in Vietnam. One of the key policies is the Cooperative Law of 2012 and recently 2023, which provides a legal framework for the establishment and operation of cooperatives in Vietnam. Under this law, agricultural cooperatives are recognized as a form of economic organization, and are entitled to certain privileges, such as tax exemptions, preferential loans, and land use rights. In

addition, various other decisions have been sanctioned to facilitate and encourage the advancement of agricultural cooperatives.

According to the report of Department of Economic Cooperation and Rural Development (2022), highlights the significant growth and progress of agricultural cooperatives in Vietnam. By the end of 2021, there were over 18,000 agricultural cooperatives in the country, accounting for nearly 70% of the total number of cooperatives. The past five years have seen impressive growth in the sector, with an average of 1,600-2,000 new cooperatives being formed each year. The average turnover of each cooperative has almost doubled, reflecting their increased competitiveness and success. The cooperatives have attracted a significant number of households and young people, as well as overseas Vietnamese intellectuals and pensioners who have received specialized training. Implementing policies to support human resource development for cooperatives has attracted over 833 workers to the sector. The results of these efforts demonstrate the importance and potential of agricultural cooperatives in Vietnam.

As Figure 1 shows, in the 20 years of the period 2002-2021, the number of agricultural cooperatives nationwide increased by 2.27 times, the average annual increase was about 4.19%/year. The results of Figure 1 also show that the number of agricultural cooperatives increased rapidly after 2016, in just five years, the number of agricultural cooperatives increased from 10,726 to 18,327.

However, the quality of operation of the economic and cooperative areas is still considered to be limited. The size of members and the size of capital and revenue of cooperatives are still small. Infrastructure, especially infrastructure for production and business such as warehouses, factories, preliminary processing, processing and preservation facilities are sketchy (Thanh et al., 2016; Hong, 2017; Thanh et al., 2018; Tu & Trang, 2020; Pham, 2022). Especially the management capacity, production and business management of cooperatives. Access to capital is difficult because the cooperative's common

assets are small and there is no collateral; management of production and business activities is not transparent.

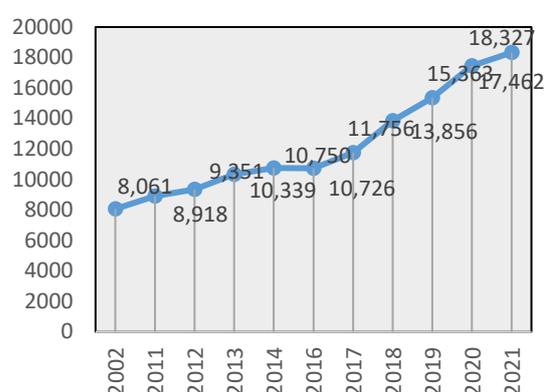


Figure 1: Changes in the number of agricultural cooperatives nationwide in the period 2002-2021

Source: Department of Economic Cooperation and Rural Development, 2022

According to Resolution 20-NQ/TW dated June 16, 2022 of the Central Executive Committee, the overall goal in supporting cooperative development is to improve the quality and performance of cooperatives. In which, special attention is paid to improving the quality of activities, supporting members through raising awareness of the whole people about the information economy and cooperatives ; at the same time, strengthen the capacity of the economic and cooperative organizations in order to further promote the role of association, cooperation and support for members and the regional community ; strengthen the competitiveness of the household economy, especially the household economy in the market mechanism . Specific targets set by 2030 are as follows:

- The whole country has about 140,000 farmer group, with 02 million members; 45,000 cooperatives with 8 million members; 340 cooperative unions with 1,700 member cooperatives.

- Ensure that over 60% of the information economy organizations achieve good and good grades, of which at least 50% participate in value chain linkages. There are more than 5,000 cooperatives applying high

technology to the production and consumption of agricultural products; develop agricultural commodity value chains associated with production linkages, provision of processing services and consumption of agricultural products; promote participation in supply chains to bring agricultural products directly to foreign countries.

Overall, rice cooperatives provide numerous benefits to farmers, communities, and the economy in Vietnam. By promoting sustainable agriculture practices, providing market access, and improving efficiency, rice cooperatives are helping to support the long-term viability of the rice industry in the country.

3. Methodology

3.1 Data collection

In order to ensure the representative of the sample, the current study considered and employed stratified sampling method with 03 types of cooperatives including good, medium and weak. The current selection and classification of cooperatives is based on five criteria (i) The cooperative's rice-growing area divided by the total number of cooperative members, (ii) The cooperative's services provided (the number of services that the cooperative provided to members and customers); (iii) Membership size of the cooperative (including associate members); (iv) Total revenue of the cooperative divided by the total number of hectares of all members and (v) Total revenue of the cooperative divided by the total number of members – including associate members.

According to Table 1, the study sites (An Giang, Dong Thap, Kien Giang, Can Tho, Soc Trang and Hau Giang) share about 66% of total rice production area in the VMD, of which in terms of rice land area, Kien Giang is the largest rice producer, followed by An Giang and Dong Thap.

The study conducted face-to-face interviews with 135 rice cooperatives in the six provinces. The distribution of rice cooperatives by province is presented in Fig. 2 below

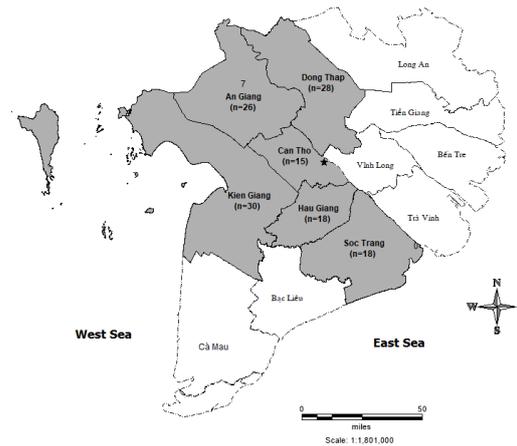


Figure 2: The map of the Mekong Delta and the study sites

3.2 Data analysis

In order to gain a deeper understanding of the factors impacting the performance and contract farming of rice cooperatives in the VMD region, this study utilized two regression methods: multiple regression and logit regression. The data analysis was carried out using Stata 12® software. The study employed two distinct regression models. Firstly, a logit regression model was employed to analyze the factors that influence the contract farming practices of rice cooperatives. In this model, a dummy variable (0 representing no contract farming with buyers and 1 representing contract farming) was used as the independent variable. Secondly, a multiple regression model was used to investigate the factors affecting the performance (as measured by profit) of rice cooperatives.

4. Results and discussions

4.1 Performance of rice cooperatives

4.1.1 About the number of member

The number of rice cooperative member is an important indicator which show the capacity/social network or the influences of a certain cooperative. As opposed to other agricultural cooperatives, the rice cooperatives have more members (official members) because the agricultural production in the Mekong Delta is dominated with rice

production (Thanh et al., 2016; Thanh et al., 2018; Tu & Trang, 2020). The study shows that the average number of cooperative member is 135. Within the selected cooperatives, the smallest number of rice cooperative member is 7 and the largest rice cooperative have 1299 members.

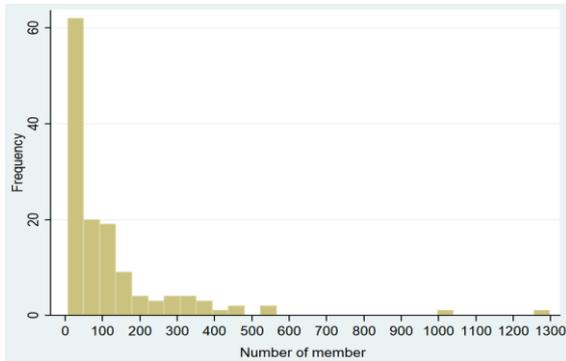


Figure 3: Distribution of cooperative members or size of rice cooperative

Source: Survey of rice cooperatives in 2022, n=135

Figure 3 also shows that the majority of rice cooperatives (about 62%) have less than 100 members.

4.1.2 About the registered charter capital

As the small number of member, the charter capital of the rice cooperative is also limited. On the average, the registered capital of the selected rice cooperative is about 771 million VND (equivalent to 30,800 USD), in which the cooperative with small charter capital have 21 million VND (equivalent to 850 USD) and the greatest charter capital is 10 billion VND (400,000 USD). Although we believe that the charter capital and the number of rice cooperative are significantly correlated, in reality some rice cooperatives are considered as outliers, their registered capital is quite big while their number of member is quite small.

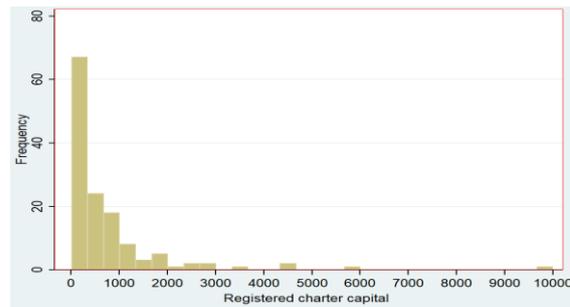


Figure 4: The distribution of registered charter capital of the rice cooperatives

Source: survey in 2022, n=135

Figure 5 below shows the relationship between the registered charter capital and the number of member.

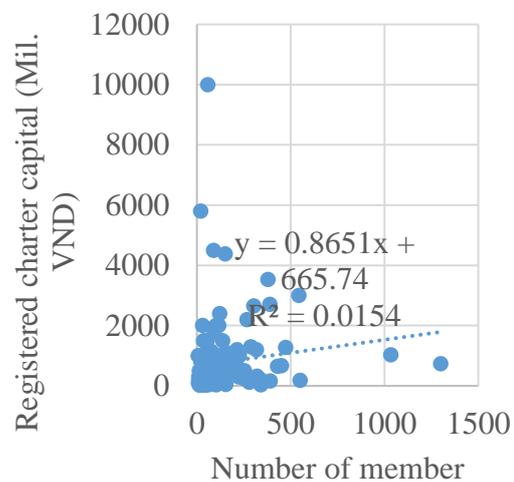


Figure 5: The relationship between the registered charter capital and the number of member

Source: Scoping survey in 2022, n=135

The figure shows that there is no significant relationship between the registered charter capital and the number of member with the R2 of only 1.5%. From Figure 5, we can see that there are 4 cooperatives having small number of members but their registered charter capital is quite large.

4.1.3 The services provided by the rice cooperatives

Within 135 surveyed rice cooperatives, Figure 6 shows that the rice cooperatives offer a total of 24 different services, which are classified into three main types: financial service, input

service, and output service. Financial services include internal credit service, selling of insurance, and rice trading service. Input services include agrochemical supply service, clean water supply service, seeding service, seed supply service, land preparation service, drone pesticide spraying service, and fertilizer supply service. Output services include rice drying service, rice processing service, safe rice production, harvesting service, storage service, and market linkage service. The diverse range of services provided by rice cooperatives not only helps farmers to increase their yields but also provides them with financial support and market access.

Among them, the irrigation pumping service is the most common services provided by rice cooperatives in the Mekong Delta, accounting for 53.00% of total surveyed rice cooperatives. This entails that the rice cooperatives take responsibility for pumping water into and out of the paddy fields for their members within a designated area, for which the members pay a pumping fee to the cooperative. The fee charged to cooperative members is typically lower than for non-member farmers. Market linkage service or contract farming with buyers

as an intermediary is the second predominant service provided by the rice cooperatives, accounting for 43.00% of the total number of surveyed cooperatives. Harvesting service provided by rice cooperatives as an intermediary account for 42.00%. Rice cooperatives' provision of agrochemical supply service as an intermediary constitutes 38.00% of their overall service portfolio. This service entails the cooperative serving as a mediator between its members and agrochemical suppliers, facilitating their access to these inputs at a reduced price.

However, rice processing service remains a challenge for the rice cooperatives in the Mekong Delta, due to limited capital and farmer participation in the cooperatives. As a result, only a small proportion of rice cooperatives have the capability to process rice and offer white rice products for sale on the market. Given the long history of rice production in the region and the limited value-addition received by rice farmers in the value chain, rice processing is considered as a crucial strategy for the development of rice cooperatives in the Mekong Delta.

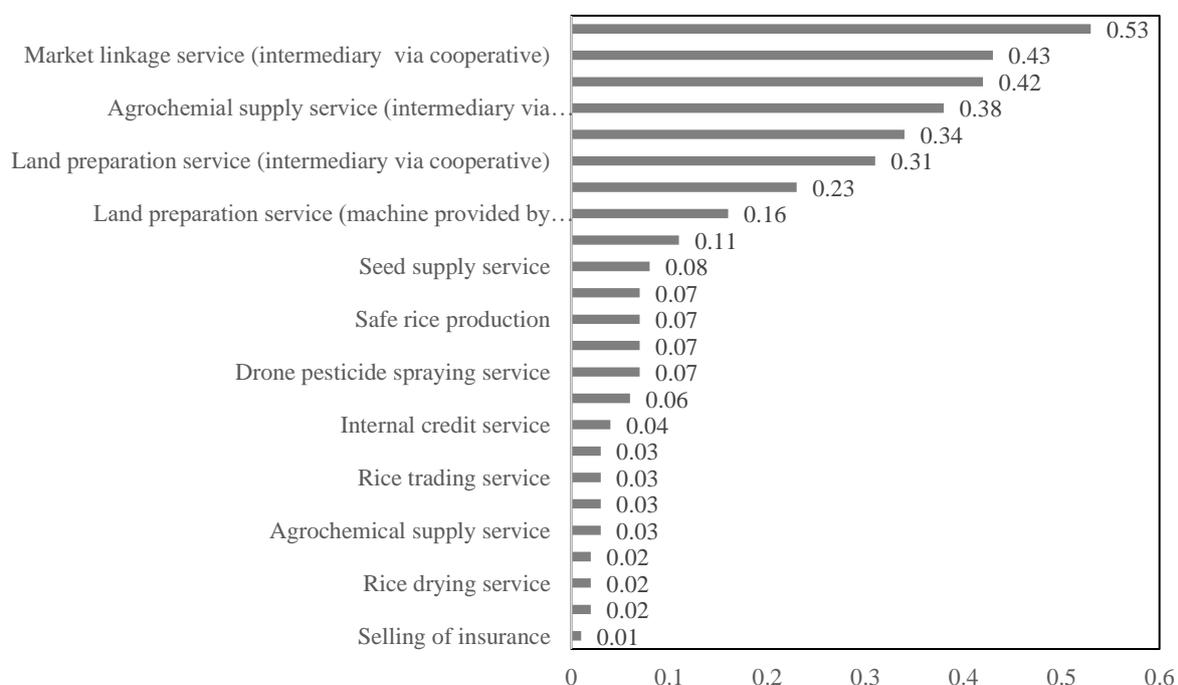


Figure 6: The services provided by the rice cooperatives

Source: survey in 2022, n=135

Based on the data provided in Fig. 6, it can be seen that the average number of services provided by rice cooperatives is 2.57 services per cooperative. However, the range of services offered varies widely, with the highest number of services provided by a cooperative being 12, while the lowest is only 0. The rice cooperatives without any services were established for the purpose of sharing new technologies and knowledge among cooperative members. The variation of number of services may be influenced by factors such as the size of the cooperative, their location, and the needs of their members.

4.1.4 Production of high quality rice

In the context of deeper integration into the world markets, it is imperative to restructure the rice sector in both the Mekong Delta and Vietnam as a whole, towards cleaner and eco-friendly production practices. The scoping study aimed to investigate the current adoption of high-quality rice production standards, such as VietGAP, GlobalGAP, SRP, and organic rice. The results, presented in Figure 7, reveal that 41.5% of the 135 interviewed rice cooperatives (56 cooperatives) are engaged in producing rice that meets high-quality certification standards.

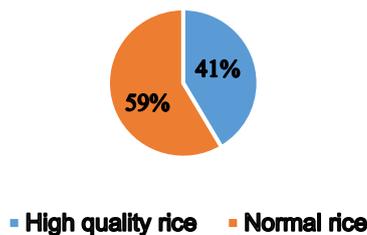


Figure 7: Current adoption of high quality rice certifications

Source: survey in 2022, n=135

4.1.5 Contract farming with buyers

Contract farming in rice cooperatives refers to an agreement between farmers and rice companies or cooperatives, where the farmers grow rice according to the specifications set by the companies or cooperatives in exchange for a guaranteed market for their crop and other

benefits like technical support, access to inputs and financing. This system allows for a more efficient and reliable supply chain for the companies and a stable income for the farmers.

The previous studies suggest that contract farming is a crucial aspect for the development of rice cooperatives, especially in terms of addressing the issue of market outlet (Setboonsarng et al., 2006; Pham et al., 2021). Dong Thap and An Giang appear to be the leading provinces in terms of the number of rice cooperatives engaged in contract farming, while Soc Trang has the lowest number of such cooperatives. Overall, it appears that 59 rice cooperatives out of a total of 134 are involved in contract farming, which accounts for 43.7% of all rice cooperatives. This highlights the importance of contract farming in ensuring the success and sustainability of rice cooperatives.

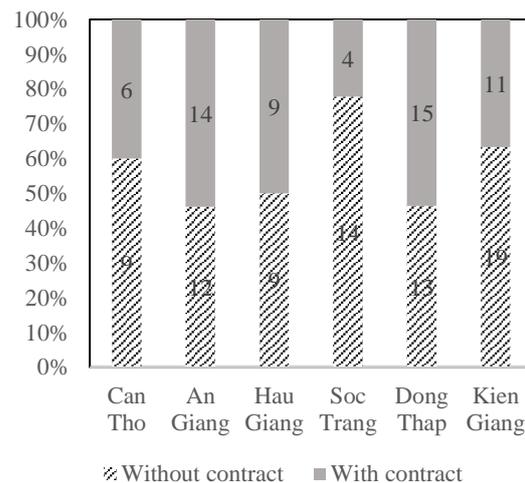


Figure 8: Current situation of contract farming in the rice cooperatives

Source: survey in 2022, n=135

4.1.6 Financial performance of the rice cooperatives

Regarding to the financial performance of rice cooperatives, the scoping results show that the total revenue of the rice cooperatives has been increasing over time from 2019 to 2021, an annual increase of 27.78%. This finding suggests that the rice cooperatives in the scoping sites have been improving their performance. The profit has also increased as compared with 2019. However, the profit in

2021 is a bit lower as compared with 2020. The possible explanation is that the increase of total cost has far exceed the increase of revenue due to Covid-19 (the transportation and transaction cost has been increased).

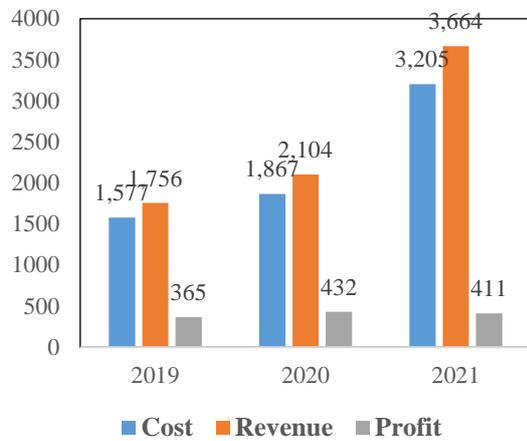


Figure 9: Financial performance of the rice cooperatives

4.2 Factors affecting the performance of the rice cooperatives

In order to investigate the performance of rice cooperatives, this current study considers three main indicators: (1) the number of services provided by rice cooperatives, (2) the annual profit of the rice cooperatives in 2021 and (3) the contract farming between rice cooperatives and buyers. As we mentioned, the multiple regression model was employed to investigate the factors affecting the number of services and financial performance of the rice cooperatives and the logistic regression was used to investigate the determinants of contract farming among rice cooperatives.

The dependent and independent variables used in the regression model are summarized in Table 2 below:

Table 2: Descriptive statistics of dependent and independent variables

No	Variables	Notation	Description	Mean	Standard deviation
1	Profit	Y_1	Mil. VND	192.78	429.22
2	Service	Y_2	No. of services	2.57	2.47
3	Contract farming	Y_3	Dummy variable, 1 = Yes, 0 = No	0.68	0.46
4	Revenue	X_1	Mil. VND	3,582.70	7,950.26
5	Charter	X_2	Mil. VND	771.09	1,220.78
6	Member	X_3	Persons	121.76	175.31
7	Age	X_4	Year	42.96	6.60
8	Associate member	X_5	Persons	125.14	225.70
9	Associate area	X_6	Ha	272.80	481.11
10	High quality rice	X_7	Dummy variable, 1=Yes, 0=No	0.52	0.50

Table 2 shows that the average revenue of rice cooperatives in the Mekong Delta was 3582.7 million VND, with a standard deviation of 7950.26. This indicates a wide variation in revenue across cooperatives, which can be attributed to factors such as differences in production capacity, market access, and

management practices. Regarding to the contract farming, rice cooperatives in the Mekong Delta have been encouraged to make contract farming as a means of improving the efficiency and stability of their operations. The current study found that 68% of the total rice cooperatives in the region had contract farming

agreements with buyers. Charter capital is an important indicator of the financial strength and stability of rice cooperatives in the Mekong Delta. The current found that the average charter capital of rice cooperatives in the region was 771.09 million VND, with a standard deviation of 1220.78. This result suggests that there is considerable variation in the financial resources available to rice cooperatives, which can have implications for their ability to invest in equipment, technology, and infrastructure.

This could have implications for the governance and management of rice cooperatives in the Mekong Delta, as the inclusion of associate members would require changes to the Cooperative Law and potentially affect the decision-making structure of the cooperatives. The current study found that the average number of associate members in rice cooperatives in the Mekong Delta was 125.4, with a standard deviation of 225.7. Due to inadequate total rice land area of the cooperatives' members, the rice cooperatives have entered into contracts with external

farmers (so-called as associate members) for the cultivation of rice and mandated their adherence to a specific set of production practices referred to as the production technical package to meet the demand of buyers. The current study found that the total rice land of associate members under the contracts with the rice cooperatives is 272.8 ha on the average. The current study also found that 52% of total surveyed rice cooperatives have been producing high quality rice varieties and following the high quality standards such as VietGAP, organic, SRP, ... On the average, the rice cooperative members aged approximately 43, which is quietly advanced in age.

Now, we turn to estimate the factors affecting the performance of rice cooperatives. Before conducting the estimations, it is essential to assess the presence of multicollinearity and heteroskedasticity. Results from the Breusch-Pagan test and correlation matrix confirm that the regression outputs for all three models are valid and efficiently estimated.

Table 3: Regression estimates for the rice cooperatives

No.	Variables	Profit (OLS)		Service (Tobit)		Contract farming (Logit)	
		Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
1	Profit (Y_1)						
2	Service (Y_2)	0.0216	0.0695			0.3570**	0.1379
3	Contract farming (Y_3)	0.9070	0.3871	0.7027	0.4784		
4	Revenue (X_1)	0.0001**	0.0000	0.0000	0.000	0.0001***	0.0001
5	Charter (X_2)	0.0002**	0.0001	0.0001	0.0002	0.0029	0.0011
6	Member (X_3)	0.0009	0.0009	0.0004	0.0012	0.0028	0.0022
7	Age (X_4)	-0.0092	0.0239	0.0312	0.0296	0.0346	0.0399
8	Associate member (X_5)	0.0019**	0.0008	-0.0002	0.0010	-0.0030	0.0034
9	Associate area (X_6)	-0.0001	0.0004	0.0016***	0.0005	0.0106***	0.0036
10	High quality rice (X_7)	0.6983*	0.3495	0.2250	0.4350	0.1294	0.5660
	Constant	2.3519	1.0752	0.0107	1.3396	-4.2203	1.9262
	Observation		135		135		135
	F test		7.83				
	LR χ^2				27.14		76.54

The research findings reveal a positive correlation between revenue, charter, and high-quality rice production and the performance of rice cooperatives. Additionally, regression analysis highlights that the number of associate areas positively influences the number of services provided by rice cooperatives. Furthermore, the results of logit regression indicate that contract farming is positively

associated with the number of services, revenue, and associate areas of the cooperatives. These findings underscore the importance of financial stability, diversified services, and expanded agricultural areas in enhancing the effectiveness and sustainability of rice cooperatives in the Mekong Delta.

4.3 SWOT analysis of the rice cooperatives

with director boards of rice cooperatives, the SWOT analysis of the rice cooperatives can be summarized in Table 4 below:

4.3.1 SWOT analysis

Based on the collected data and group discussions with local staff members as well as

Table 4: SWOT analysis of the rice cooperatives

Strengths	Weaknesses
<ul style="list-style-type: none"> - Many rice cooperatives have been producing rice towards good agricultural practice standards (VietGap, GlobalGAP) and organic certifications - Rice farmers have many experiences in rice production - The agricultural farming practices adapting to climate change (rice – fish in An Giang and Hau Giang and rice-shrimp in Kien Giang and Soc Trang) has been implemented. - Some cooperatives started using high technology in production management and traceability. - The determination and capacity of the Board of Directors - The Board of Directors are positive/enthusiastic with the adoption of innovation - Production and processing infrastructure have been gradually improving (warehouses, drying, harvesting, etc.) - Steady improvement of member's trust and commitment 	<ul style="list-style-type: none"> - Management capacity of the board of directors is limited and uneven; only one or two members are proactive and take all responsibilities in the cooperatives. - The number of services provided by the rice cooperative is still limited - Lack of equipment/facilities for storage and processing - The mobilization of capital from the rice cooperative member is quite difficult. - In terms of number of member or cooperative scale, the rice cooperatives are mostly small - The roles and responsibilities of each member of the Board of directors, and the Supervisory Board are not clearly defined - Most of the members of the director board are old, and the tasks is not evenly assigned among the members of the Board of Directors - Charter capital is still small and lack of collateral - Awareness of the rice cooperative members is still limited, they put more focus on immediate benefits - Product quality is not stable - Lack of marketing and sales staff members
Opportunities	Threats
<ul style="list-style-type: none"> - Many national policies to support equipment/facilities for cooperatives to provide services and increase value - Increasing market demand for safe rice products - 15 free trade agreements have been signed to remove/reduce rice export tariff - Many international organizations such as DGRV, Agriterra, ... have been considering about the rice cooperatives - New technology in production, processing, 	<ul style="list-style-type: none"> - Unusual weather (unusual rain, hot weather, outbreak of pests, diseases) - The market for safe rice products is becoming more and more competitive - Input material prices increase - High cost of organic rice production - The rice land area of the cooperatives is scattered, leading to some difficulties for quality management and economies of scales. - Market information is limited and asymmetric.

...	- Most of rice cooperatives function as brokers, providing land preparation, harvesting, fertilizing and spraying services, as well as supplying fertilizers and seeds to their members
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4.3.2 Strategies for the development of the rice cooperatives

a) Strengths-based development strategy (SO)

- Expand the size of members and rice areas or establish rice cooperative unions producing towards good agricultural practice or organic production; forming concentrated or large -field areas.

- Diversify the market channels for the rice cooperatives. In addition, establishing the three side linkage model (rice cooperative, input supplier and rice buyer). Within this model, the rice buyers will make contract with the input supplier under the negotiation and agreement of the rice cooperatives. The input suppliers have to ensure that their agro-chemical inputs are appropriate with the standards set by the buyers. The cooperative will sell the harvest to the rice buyers and pay the agro-chemical cost when the buyers strictly follows the contracts.

b) Risk Transformation Strategy (ST)

- Changing the farming system from 3 rice to 2 rice + fish or rice + shrimp farming in the favorable areas.

- Apply new technologies (drones, high technology, etc.) to increase adaptation to weather irregularities, control production, processing, distribution and traceability of products.

- Rice production insurance is encouraged under the context of climate change and market instability.

- Improving the negotiation capacity and risk management (production risk, market risk and financial risks) for the rice cooperatives is necessary.

c) Strategies to take advantage of opportunities (WO)

- Strengthening the organization, improving the management capacity (including rejuvenation of the director board, cooperative management capacity, ...); at the same time, clearly define the roles and responsibilities of each member of the director board to increase the efficiency of activities.

- Raise awareness and capacity of cooperative members to respond well to production processes according to good agricultural practices or organic certification or to eliminate risks of pesticide residues or other risks affecting rice quality.

- Using capital leverage of partners is one of the solutions to increase working capital. to expand the cooperative 's rice production and business.

d) Challenge elimination strategy (WT)

- Areas of raw materials are not concentrated, production is scattered with outside farmers, causing the risk of pesticide residue contamination; Therefore, building concentrated production areas, attracting farmers is essential.

- Increasing the application of new technologies (machines, equipment, digital technology , etc.) to management, production, processing.

5. Conclusions

In summary, the study offers a thorough examination of rice cooperatives in the Mekong Delta, covering their structure, services, production methods, financial status, and operational influences. With an average membership of 135, these cooperatives wield significant social influence, yet distribution is uneven, with most having fewer than 100 members. Charter capital varies widely, averaging 771 million VND, and doesn't correlate significantly with membership numbers, indicating other factors affect

cooperative size. Rice cooperatives provide diverse services, aiming to boost productivity, offer financial aid, and ease market access for farmers, though challenges persist in rice processing due to limited capital and farmer involvement. Emphasizing the importance of high-quality rice production and contract farming, around 41.5% of surveyed cooperatives produce premium rice, while 43.7% engage in contract farming, vital for market access and stability. Regression analysis highlights the influence of service provision, annual profit, and contract farming on cooperative performance, underscoring the need for strategic management, financial stability, and market-oriented approaches in driving success in the Mekong Delta's rice cooperatives.

However, it's important to acknowledge several limitations within the study. Firstly, the research primarily focuses on rice cooperatives in the VMD, potentially limiting the generalizability of findings to other agricultural contexts. Furthermore, the analysis is cross-sectional in nature, providing snapshots of cooperative characteristics and performance at a specific point in time, thus limiting the ability to infer causality or predict long-term trends. Despite these limitations, the study provides valuable insights into the dynamics of rice cooperatives in the Mekong Delta and lays a foundation for future research and policy interventions aimed at addressing challenges and fostering their sustainable development.

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