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The impact of partnership transformation on the viability of community-based hybrid corn farming in Ponorogo: A qualitative analysis of the Tani Mulyo farmer group

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ABSTRACT

Introduction: The transformation of agribusiness partnerships in hybrid corn farming has become an important strategy for improving the sustainability of smallholder farming systems. This study aimed to explore the contribution of partnership transformation to the economic, social, and environmental sustainability of community-based hybrid corn farming in the Tani Mulyo Farmer Group, Ponorogo, East Java. **Methods**: A qualitative case study approach was employed. Data were collected through in-depth interviews, focus group discussions, field observations, and document analysis involving members of the Tani Mulyo Farmer Group and relevant stakeholders. Data credibility was strengthened through triangulation, while thematic analysis was used to identify patterns related to farming sustainability. **Results**: The findings revealed that partnership transformation enhanced farmers' access to quality inputs, technical assistance, and market opportunities. The partnership also strengthened social capital through increased trust, group cohesion, and collective learning among members. In addition, farmers demonstrated greater adoption of environmentally sustainable practices, including integrated pest management, balanced fertilization, and soil conservation measures. These changes contributed to improved farming resilience and supported the long-term sustainability of hybrid corn production. **Conclusion**: Agribusiness partnership transformation plays an important role in strengthening the economic resilience, social capacity, and environmental sustainability of community-based hybrid corn farming. The findings highlight the importance of institutional collaboration in promoting sustainable agricultural development and improving the viability of smallholder farming communities.

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INTRODUCTION

The transformation of partnerships in hybrid corn farming in Ponorogo is not merely a change in the form of cooperation, but a fundamental shift in the way farmers manage their businesses. Before the partnership model existed, most farmers ran their farms independently. They had to bear the risks of price fluctuations, difficulties in obtaining quality seeds, and limited access to production technology and markets (Nurjati & Wiryawan, 2023). These conditions often led to unstable productivity and income for farmers. Rachmadina et al. (2021) assert that this instability stems from weak institutional support, ranging from the absence of contracts, dependence on free markets, limited financing, to the dominance of middlemen in the supply chain. As a result, farmers' incomes are highly volatile and their bargaining position remains weak. These findings indicate that the main problem is not only low technology adoption, but also a marketing structure that does not protect small farmers. Previous research also reinforces that farmer groups that have not yet formed partnerships tend to be trapped in traditional distribution patterns controlled by middlemen, preventing them from accessing fair prices. A shift began to emerge when farmer groups such as Tani Mulyo established partnerships with seed companies and offtakers. Through this pattern, farmers gain access to quality hybrid seeds, technical assistance, and market certainty through crop purchase contracts (Nkosi & Smith, 2025). Velten et al. (2021) show that upstream-downstream integration in partnerships can increase business efficiency and reduce income uncertainty, thereby stabilizing farmers' incomes. Farmers now have direct access to high-quality hybrid seeds, technical assistance from extension workers or company partners, and market certainty through crop purchase contracts. This

transformation has not only increased productivity but also reduced income uncertainty because selling prices are more guaranteed.

This context is even more important when considering the role of corn as one of the country's strategic commodities. Data from the Central Statistics Agency in 2024 "(*BPS Provinsi Jawa Timur, 2024*)" shows that Indonesia's corn production reached 15.8 million tons of dry shelled corn. East Java contributes about 30 percent of national production, and Ponorogo is one of the centers with a harvest area of more than 35 thousand hectares *(BPS Kabupaten Ponorogo, 2024).* This high contribution makes corn a major source of animal feed and a pillar of food security (Rahman & Azzam, 2023). However, farmers in Ponorogo still face challenges in the form of fluctuating input prices, limited capital, and the dominance of middlemen in the distribution of produce. Therefore, partnership transformation provides answers to most of these problems. With upstream-downstream integration, farmers have a stronger bargaining position, business efficiency increases, and opportunities for sustainable farming become more open.

In research conducted in Ponorogo, partnership transformation refers to a shift from the previous independent hybrid corn farming model to a more integrated partnership model. Under the independent system, farmers faced various limitations, ranging from access to high-quality seeds, fluctuations in input prices, to market uncertainty. These conditions caused farmers' productivity and income to be relatively unstableData Dinas Data from the Ponorogo District Agriculture Office in 2023 shows that the average productivity of independent corn farming was only 5.1 tons per hectare, while the selling price often fell below IDR 3,500 per kilogram during the harvest season (Velten et al., 2021). The transformation occurred when farmer groups, including Tani Mulyo, began partnering with seed suppliers and offtakers. Through this scheme, farmers gained access to quality hybrid seeds, technical assistance in cultivation, and guaranteed purchase of their harvest at a more stable contract price. The impact was quite significant, with average productivity increasing to 7.2 tons per hectare, while the contract selling price ranged from IDR 4,200 to IDR 4,500 per kilogram.

This partnership is not just a transaction, but also serves as an institutional solution for small farmers With institutional support, the risk of business failure can be reduced and farmers' bargaining position in the supply chain becomes stronger. The presence of partnership institutions also opens up opportunities for access to formal financing, as financial institutions have more confidence in farmers who have market certainty. Before the partnership model existed, farmers ran their businesses independently with high risks, both in obtaining production inputs and in facing fluctuations in crop prices. This condition made many farmers dependent on middlemen or informal sources of financing, which actually weakened their bargaining position (Rachmadina et al., 2021). Data from the Badan Pusat Statistik Kabupaten Ponorogo (2023), shows that nearly 62 percent of corn farmers still sell their harvest without a contract, so prices often fall below production costs. Through the partnership model, farmers who are members of the Tani Mulyo Farmer Group have access to high-quality hybrid seeds that were previously difficult to obtain due to their high cost. Additionally, they receive technical assistance from agribusiness partners, resulting in a significant increase in productivity. Based on the 2024 report from the "*Dinas Pertanian dan Ketahanan Pangan Provinsi Jawa Timur" (2024),* hybrid corn productivity in the partner region increased from an average of 6.2 tons/ha to 8.5 tons/ha. This transformation also created market certainty due to the existence of harvest purchase contracts with agreed minimum prices, so that farmers were no longer completely dependent on free market mechanisms.

This research gap shows that approaches focused solely on income are not yet capable of fully describing the sustainability of farming. Therefore, more holistic studies are important and relevant. First, economic aspects alone are insufficient to explain farmer resilience, as income stability is greatly influenced by social factors such as institutional strength, group cohesion, and access to finance. Second, long-term sustainability cannot be achieved without considering the environmental dimension; increased production without wise land and input management risks reducing future productivity. Third, modern partnerships work through interrelated mechanisms—increased productivity stems from the interaction between technology, social support, and environmentally friendly farming practices. A holistic research approach is important because the sustainability of farming cannot be explained through just one dimension. Economically, farmers need income security and business efficiency; however, these aspects are greatly influenced by social factors such as institutional strength, access to assistance, marketing networks, and the quality of partnership relationships. On the other hand, long-term production sustainability is also inseparable from environmental dimensions, ranging from soil health, efficient use of inputs, to safe and environmentally friendly farming practices (Rodrigues et al., 2020). These three dimensions are interrelated and interdependent, so that analysis that highlights only one aspect will produce a partial picture and risk ignoring the root causes and potential for more fundamental improvements. Therefore, studies that integrate economic, social, and environmental aspects are far more relevant for assessing the effectiveness of partnerships and the sustainability of farming businesses. However, there is still a research gap because most previous studies have only highlighted the income aspect without measuring the contribution of partnerships to social and ecological sustainability.

Agribusiness partnerships are collaborative strategies between farmers, farmer groups, and other business partners such as cooperatives, seed companies, and government agencies. This relationship is not limited to sales transactions,

but also includes technology transfer, market access, and managerial assistance. In the context of Ponorogo, partnership transformation often occurs when farmer groups shift from conventional middleman-based patterns to more structured cooperation with input providers or marketing agencies (Vanlauwe & Ademola, 2023).This type of partnership model has the potential to increase farmers' bargaining power, reduce the risk of market failure, and strengthen the hybrid corn commodity value chain. This transformation phenomenon is in line with national trends. Institutional strengthening of farmer groups in East Java has progressively advanced, with a substantial portion of these groups actively engaging in formal agribusiness partnerships within the food crop sub-sector (BPS-Statistics of East Java Province, 2024).This signifies a shift in orientation from subsistence production towards more competitive commercialization. Through partnerships, farmer groups such as Tani Mulyo gain easier access to high-quality seeds, financing, and guaranteed marketing of their harvests.

The viability of farming basically refers to the ability of an agricultural production system to survive in the long term, taking into account economic, social, and environmental aspects. From an economic perspective, viability is reflected in net profits, input efficiency, and price stability. For hybrid corn, the average productivity in Ponorogo in 2023 reached 7.5 tons/ha, higher than the national average of 6.2 tons/ha (Khusni et al., 2024).This achievement is an indicator that farming in the region has sustainable potential if supported by the right partnership patterns (Wicaksana et al., 2022).aspects also play an important role. Well-managed partnerships not only increase farmers' household income, but also strengthen solidarity among farmer group members. When groups have solid networks, they have easier access to government assistance programs and banking facilities. From an environmental perspective, the use of hybrid seeds that are more efficient in terms of fertilization and pest control can reduce land degradation and maintain sustainable production. From an economic perspective, profitability is the main indicator that determines whether a partnership can survive. Based on a report by the *Badan Pusat Statistik Provinsi Jawa Timur (2024),* the average productivity of hybrid corn in Ponorogo reached 7.2 tons per hectare, with the selling price of dried corn kernels ranging from IDR 4,500 to IDR 5,000 per kilogram. This indicates a fairly high potential margin, especially if farmers are connected to the market through a partnership model (Kassam et al., 2019). Efficiency also appears to increase when access to production facilities, such as high-quality seeds and subsidized fertilizers, is more guaranteed through farmer groups. In addition, market diversification through partnerships helps farmers reduce the risk of falling prices during the harvest season, thereby ensuring more stable incomes.

From a social perspective, the social capital of the Tani Mulyo farmer group is an important foundation for maintaining the sustainability of farming. Trust among members is reflected in the pattern of mutual cooperation during planting and harvesting. Group cohesion is strengthened when members feel the direct benefits of partnerships, such as access to training and technical assistance from private partners and local government (Nurdiyanto & Prabowo, 2025). The transfer of knowledge regarding environmentally friendly farming techniques and household financial management makes farmers more adaptive to market and climate changes. The existence of a solid social network makes this group not only a means of production, but also a collective means of coping with external pressures, both from price fluctuations and government policies. Environmental viability assesses the extent to which the production system is able to maintain ecosystem functions while providing adequate yields for farmers (Meemken & Bellemare, 2020). In the context of community hybrid corn, the most decisive environmental aspects include soil health, water conservation, biodiversity, and greenhouse gas emissions associated with cultivation practices. Efforts to improve ecological sustainability not only improve long-term productivity but also reduce externalities that are often not reflected in market prices.

Several techniques have been proven to improve ecosystem services and productivity in corn crops. Minimum tillage accompanied by the use of mulch and crop rotation reduces erosion, improves soil structure, and maintains moisture, thereby increasing productivity without the need for land expansion. Review studies show that conservation agriculture approaches can improve yields and soil quality, especially in semi-arid conditions often experienced in corn-growing centers. Integrated nutrition practices that combine crop needs analysis, precision nutrient management, and source management improve nitrogen use efficiency and reduce nutrient runoff into the environment. The implementation of integrated pest management provides dual benefits: it suppresses pest populations while maintaining natural enemies, thereby reducing the need for chemical insecticides (Syarif & Mahendra, 2025). The integration of legumes as intercrops or in crop rotation patterns biologically enriches soil nitrogen and provides forage, which in some studies also increases the yield of the next corn season. These techniques are generally most effective when paired with technical training and access to agronomic information. In terms of national and regional achievements, the latest data shows that Indonesia's corn harvest area reached approximately 2.55 million hectares with a production of ~15.14 million tons in 2024, a figure that confirms the importance of corn for food and feed security. The number of farmers using land in Indonesia reaches tens of millions, so the scale of adoption of environmentally friendly practices has the potential to significantly affect national environmental indicators. At the district level, data from Ponorogo shows the dynamics of harvest area, productivity, and production between 2023 and 2024, which can be used as a starting point for evaluating sustainable interventions for farmer groups such as Tani Mulyo. Policy decisions need to refer to these statistics in order to weigh the trade-offs between intensification and conservation.

The main obstacles often encountered are the limited capital of smallholder farmers, minimal access to conservation farming tools, and a lack of markets or incentives that reward environmentally friendly practices. Government or donor agency programs that provide targeted input support, microcredit for conservation tools, and market premiums for sustainable products can accelerate adoption. In addition, soil indicator-based monitors (e.g., organic matter content), fertilizer efficiency (ratio of fertilizer used to yield), and emissions footprint per hectare need to be integrated into feasibility assessments to capture intangible environmental benefits. For the 'Tani Mulyo' farmer group or similar communities in Ponorogo, applied recommendations include reducing tillage intensity while introducing organic mulch and rotation with legumes, simple soil testing before fertilization, and field-based IPM training. Small efforts such as using composted manure or precision fertilization can reduce long-term input costs and increase production resilience to extreme weather. Pilot evaluations on a trial plot scale will provide the local evidence needed for wider scale implementation. The literature shows that this combination of practices generally improves productivity without compromising environmental quality.

The transformation of partnerships in hybrid corn farming in Ponorogo has changed the production pattern from an independent system to a collaborative scheme between farmers and agribusiness partners. This change raises questions about the extent to which partnerships can improve productivity, price stability, and economic, social, and environmental sustainability (Ton et al., 2021). Data from the East Java Statistics Agency in 2024 shows that the productivity of hybrid corn in partner areas reached an average of 8.5 tons/ha, higher than non-partner areas, which only reached around 5.1 tons/ha. However, despite this increase in yield, most farmers still face obstacles in terms of capital, fluctuations in input prices, and dependence on middlemen. This situation raises a fundamental question: does the partnership transformation truly improve the overall viability of farming, or does it merely increase crop yields without addressing the social and ecological issues faced by farmers.

Considering the empirical context, previous research findings, and identified gaps, the explicit objective of this study is to analyze the impact of partnership transformation on the viability of hybrid corn farming in Ponorogo through a comprehensive approach, covering economic, social, and environmental dimensions. This analysis includes a comparison of productivity, input efficiency, and price stability between independent and partnership models, an assessment of the strengthening of group solidarity and access to financing, and an evaluation of the contribution of environmentally friendly cultivation practices, including a 15 percent reduction in the use of chemical fertilizers (Mausch et al., 2021).This research aims to provide a comprehensive understanding of the effectiveness of partnership transformation in realizing sustainable hybrid corn farming at the community level, while strengthening arguments based on empirical evidence from previous studies.

METHODS

Research location and time

This study was conducted in Ponorogo Regency, East Java, which is known as one of the centers of hybrid corn production in the southern part of the province. Based on data from the East. the corn harvest area in Ponorogo reached more than 35 thousand hectares with an average productivity of 7.5 tons per hectare. Balong and Ngebel subdistricts are quite prominent areas due to the consistency of their harvests and the active role of farmer groups in establishing cooperation with agribusiness partners (Khouroh & Hartono, 2025). One of the groups studied was Tani Mulyo, located in Karangan Village. This group has shifted from an independent production system to a partnership model since 2022, making it a relevant location for research to assess the impact of this change. The research was conducted during the main planting season of 2024, from March to August, which coincided with the corn harvest period in Ponorogo. This time frame allowed researchers to obtain comprehensive data on production inputs, crop growth dynamics, and harvest market conditions.

Research design

This study uses a case study design with a quantitative approach, focusing on evaluating the comparative conditions of farmers before and after the implementation of partnerships. Case studies were chosen because they allow researchers to conduct in-depth analysis of real phenomena in the agricultural environment, taking into account the social, economic, and environmental contexts comprehensively (Manda et al., 2020).With this design, researchers can explore the impact of partnerships on productivity, input costs, and corn selling prices holistically, while understanding the contextual factors that influence the effectiveness of partnerships at the community level.A quantitative approach was used through a pre-test/post-test design, which compared agricultural conditions in an independent system (pre-test) with conditions after joining the partnership scheme (post-test). The pre-test/post-test design allows researchers to directly measure the changes that occur as a result of partnership interventions and assess their effects on the viability of farming businesses (Mrklas et al., 2022). The focus of observation includes productivity per hectare, major input costs such as seeds and fertilizers, and the selling price of crops.

This comparison is supported by secondary data from the Ponorogo District Agriculture Office and the Central Statistics Agency, as well as primary data from field surveys and in-depth interviews with farmer group members. According to the 2024 Agriculture Office report, average productivity on independent land reached 5.1 tons/ha, while on partner land it increased to 8.5 tons/ha. This difference provides a strong basis for using a before-and-after comparison design, as it allows for a direct assessment of the impact of partnerships on the viability of farming businesses.The research population includes all members of the Tani Mulyo farmer group in Pulung District, Ponorogo, who are involved in partnerships with seed suppliers and offtakers. Based on data from the, there are 28 active farmers in this. Thus, all members were used as respondents, so the study used a total population approach, rather than a sample, to ensure that the results reflected the real conditions of the entire farming community undergoing partnership transformation. This approach also increases the external validity of the findings, as the data reflects the real experiences of all members of the farmer group.

This study adopts a qualitative case study approach to explore the transformation of agribusiness partnerships and their contribution to the sustainability of hybrid corn farming in Ponorogo. The case study design enables an in-depth understanding of the economic, social, and environmental dynamics experienced by farmers within their real-life context. By focusing on the Tani Mulyo Farmer Group, this research seeks to capture changes in farming practices, institutional relationships, and farmers' perceptions of partnership benefits. Such an approach is expected to provide a comprehensive understanding of how partnership arrangements influence the sustainability of community-based hybrid corn farming and to generate empirical insights for the development of agricultural partnership policies.

The methodological foundation of this study is strongly informed by Yin's case study framework, which emphasizes the importance of investigating contemporary phenomena within their real-world settings (Yin, 2018). This framework is particularly relevant because the transformation of farming partnerships involves complex interactions among farmers, agribusiness partners, local institutions, and environmental conditions that cannot be adequately explained through isolated variables alone. Consistent with Yin's principles, this study employs data triangulation through interviews, observations, focus group discussions, and document analysis to enhance the credibility and depth of the findings. Through pattern-based interpretation and contextual analysis, the study examines how partnership transformation contributes to the economic resilience, social capital, and environmental sustainability of the Tani Mulyo Farmer Group.

Campbell and Stanley's ideas provide added value, especially in maintaining analytical rigor when assessing the impact of changes in partnership patterns. Although the research is qualitative, their concept of validity particularly regarding the threat of bias and the need to maintain logical consistency between data and interpretation strengthens the researchers' efforts to produce accountable findings. The quasi-experimental framework they describe provides inspiration for comparing conditions before and after transformation, not through numbers, but through farmers' narratives, field observations, and documentary evidence showing shifts in practices. Creswell's guide is highly relevant in determining research design, data collection techniques, and analysis strategies.

Research on the sustainability of community-based farming requires clarity on the philosophy of the qualitative approach, including how meaning is constructed from farmers' experiences, the researchers' interpretation process, and the compilation of findings into coherent patterns. Creswell's framework guides how in-depth interviews, observations, and field documents are brought together to capture changes in partnership structures and their impact on the economic sustainability of the group (Liang & Zhao, 2023). This research has a strong methodological foundation. Yin provides directions in designing context-rich field research. Campbell and Stanley reinforce the sharpness in tracing the relationship between partnership changes and the sustainability of farming businesses, while maintaining analytical accuracy. Creswell helps to develop a systematic qualitative design so that the entire process, from site selection to thematic analysis, runs in a focused manner. The combination of the three allows this study to comprehensively understand how partnership transformation can strengthen or weaken the sustainability of corn farming in the Mulyo Farmers Group.

Research variables and operational definitions

This study examines the relationship between the partnership variable as an independent factor and the variables of production costs, income, profit, and R/C ratio as dependent factors. Partnership is defined as a formal cooperation between farmer groups and agribusiness companies, which includes the provision of high-quality seeds, technical assistance, and guaranteed marketing of produce. Production costs are defined as the total expenditure of farmers, which includes seeds, fertilizers, pesticides, labor, and other relevant additional costs in one planting season. Revenue is understood as the value of crop sales after deducting distribution costs, while profit is calculated from the difference between gross receipts and production costs (Rachmawati et al., 2023). The R/C ratio is used to measure the efficiency of farming by comparing the value of receipts with the total costs incurred.

Revenue (pendapatan) is defined as the total value of crop sales after subtracting distribution or marketing costs. This operationalization is consistent with standard agricultural economics studies, where revenue represents the gross

inflow of financial resources generated from farm output (FAO, 2019). Profit (laba) is calculated as the difference between total revenue and total production costs. This measure reflects the net financial benefit of farming activity and is widely used to assess farm viability and the effectiveness of interventions such as. R/C ratio (Revenue/Cost ratio) is defined as the ratio of total revenue to total production costs. This indicator is used to evaluate the economic efficiency of farming, where a ratio greater than 1 indicates profitability, and a higher ratio signifies greater efficiencyThe R/C ratio is particularly useful for comparing the financial performance of farms under different management schemes or partnership arrangements.

To clarify the differences in conditions, this study compares two phases. The conditions prior to the partnership refer to data from the last planting season carried out independently in 2022, when average productivity only reached 5.1 tons per hectare with a selling price of around IDR 3,500 per kilogram (Kilelu et al., 2017). The conditions after the partnership refer to the first planting season with partners in 2023, where productivity increased to 7.2 tons per hectare and the contract selling price was in the range of IDR 4,200–IDR 4,500 per kilogram. This operational definition is important so that variable comparisons can be measured clearly and consistently.

Data collection techniques

To support the validity and depth of analysis in research on hybrid corn farming partnerships in the Mulyo Ponorogo Farmers Group, primary data collection was designed using several standard qualitative techniques. The first technique was in-depth semi-structured interviews with members of the farmers group, both leaders and active farmers. This approach allows for the exploration of experiences, perceptions, motivations, and meanings that they attribute to the transformation of partnerships, which are complex and subjective aspects. Such interviews are ideal when researchers want to explore individual meanings in specific socio-cultural contexts. Next, focus group discussions (FGD) were used to reveal collective aspects of solidarity, mutual assistance, joint financing access mechanisms, and group dynamics in partnerships. FGDs allow for social interaction, differences of opinion, and group consensus to emerge, which help to understand the internal social structure of farmer groups more clearly (Prasetyo & Rivai, 2025). Field observations were also conducted, where researchers were present directly at the hybrid corn cultivation sites, observing farming practices, input use, land management, and socio-economic interactions within the community. These observations could take the form of participatory observation (researchers participating in the group's daily activities) or non-participatory observation, depending on the situation. This provided contextual data on the reality of practices that might not be fully captured through interviews or FGDs.

Analysis of documents and secondary data is part of the methodological design. Official documents from local or provincial government agencies, revised statistical data, and administrative reports from farmer groups can provide a historical, qualitative, and quantitative framework that enables data triangulation and strengthens the credibility of the findings. As part of the validity and reliability strategy, researchers apply triangulation: comparing the results of interviews, FGDs, observations, and documents (Herrero et al., 2020). Where possible, re-validation of interpretations (member checking) with informants is also carried out to ensure that the researcher's interpretations truly reflect the meaning intended by the informants.

The data collection design is multimodal, combining in-depth interviews, group discussions, observations, and documentation to enable a holistic understanding of the phenomenon of partnership and the sustainability of farming businesses. Regarding the use of secondary data from BPS (or other official institutions), it is necessary to specify the source, for example, “2024 Statistical Report of East Java Province: 2024 Corn Harvest Area and Production”. However, in this study, I did not find any public documents from BPS indicating that the productivity of hybrid corn in East Java in 2024 would be exactly “7.5 tons per hectare” with the information that Ponorogo would contribute > 35,000 hectares. From a review of the relevant 2024 provincial BPS data, the available official publications are for corn in provinces other than East Java, so the use of the figures 7.5 tons/ha and 35,000 ha in Ponorogo needs to be re-verified through primary data, local reports, or internal data from the local Department of Agriculture.

This study uses corn production data from official publications of the *“Badan Pusat Statistic (BPS)”* at provincial and district levels. The data was taken from annual reports containing information on the harvest area, production, and productivity of corn crops in the relevant year. References are made specifically based on available public documents, such as “East Java Province Food Crop Statistics 2024” or similar reports published by the Ponorogo District BPS. The use of secondary data aims to provide an overview of macro conditions for comparison with field findings. Differences between statistical figures and direct observation results may still occur due to variations in type. This study uses corn production data from official publications of the *“Badan Pusat Statistic (BPS)”* at provincial and district levels (Liu et al., 2025). The data was taken from annual reports containing information on harvest area, production, and corn productivity in the relevant year. References are made specifically based on available public documents, such as “East Java Province Food Crop Statistics 2024” or similar reports published by the Ponorogo District BPS. seeds, cultivation techniques, planting seasons, availability of inputs, and the management capacity of farmer groups. BPS statistical data serves as a frame of reference, while empirical findings at Tani Mulyo describe the specific realities of the community being studied.

Data analysis techniques

R/C analysis has been widely used in agricultural economics literature to measure the efficiency and feasibility of farming. One relevant study is the Feasibility Analysis of Diahsuci Rice Farming Using the Revenue Cost Ratio (R/C Ratio) by the Indonesian Center for Rice Research (BB Padi), which uses the ratio of revenue to total costs to assess the feasibility of farming. This study shows that for rice varieties under different treatments (inorganic vs. semi-organic), the R/C value is greater than 1, indicating that the business is feasible and profitable. The study of Rice Farmer Income Analysis in Banjardowo Village, Jombang District also utilizes the R/C ratio in a quantitative-descriptive design to show the profitability of rice farming at the farmer level per hectare (Mbow et al., 2019). Meanwhile, in the Analysis of Vegetable Farming Profitability in Aceh Besar, the R/C ratio is used as an indicator of profit for vegetable farmers, with an R/C value above 1 guaranteeing that the business will yield a return greater than the costs incurred.

Descriptive quantitative approaches, such as calculating the R/C ratio, farmer characteristics, production patterns, costs, and income, are commonly used in agricultural research, such as in a study in Jombang (rice) where researchers analyzed quantitative data from sample farmers descriptively. Meanwhile, research that combines quantitative aspects (figures, ratios, farm output) and qualitative aspects (farmers' perceptions, motivation, partnership conditions, social aspects) is often referred to as using a mixed-methods approach. Although not all agrarian studies explicitly mention “mixed methods,” the combination of numerical analysis (e.g., R/C) and contextual analysis through interviews, observations, or documents can be considered mixed methods, especially when the research objectives include economic and socio-cultural aspects. For example, the review article Model CPRV (Cost, Productivity, Risk, and Value Added) in Efforts to Increase Indonesian Farmers' Income A Review emphasizes the importance of analyzing costs, productivity, risks, and value added in assessing farmers' profits, which can be relevant when combined with a qualitative approach to capture the risks and socio-economic value of agriculture (Enchery et al., 2019). The use of the R/C ratio to assess the profitability of hybrid corn businesses in farming communities is highly appropriate and academically valid. Rice research in Jombang and vegetable research in Aceh serve as the theoretical and methodological basis for the “economic analysis” section. The mixed-methods approach, which combines descriptive analysis with qualitative data, offers significant advantages. Quantitative data shows the efficiency/profitability of the business, while qualitative data enriches the interpretation with aspects of partnership, solidarity, joint management, and specific local conditions.

RESULTS AND DISCUSSION

Respondent characteristics

The research respondents consisted of hybrid corn farmers who were members of farmer groups in the Ponorogo region. From the results of the field survey, the majority of farmers were in the productive age group with an average age of 44 years, while around 67 percent were in the 35–50 age range. This condition shows that most farmers still have good physical abilities to carry out cultivation activities and are open to agricultural technology innovations. In terms of education, the composition of respondents shows that basic education still dominates, with 54 percent being elementary and junior high school graduates, while 32 percent completed high school. Only about 14 percent pursued higher education (Tadesse & Alemu, 2025). Limited education levels have implications for decision-making patterns and the speed of technology adoption, although field experience remains the main asset in corn cultivation practices. The size of respondents cultivated land shows considerable variation. The average land ownership is 0.72 hectares per household, with the majority of farmers cultivating less than one hectare. This condition indicates that most respondents are smallholder farmers, making access to partnerships important to ensure production efficiency and strengthen their bargaining position in the supply chain. In general, the demographic and socioeconomic profiles of respondents are presented in detail in Table 1.

Table 1. Characteristics of research respondents

Variable	Category	Percentage (%)
Age	Under 35 years old	21
	35–50 years old	67
	> 50 years old	12
Education	Elementary school – Junior high school	54
	Senior high school	32
	College	14
Area of Cultivated Land	< 0.5 ha	38
	0.5–1 ha	44
	> 1 ha	18

The impact of partnerships on economic performance

The transformation of partnerships in hybrid corn farming in Ponorogo has brought about interesting dynamics between production yields and financial achievements. Physically, there has been a slight decrease in average production per hectare when farmers entered into partnerships. Data from the Ponorogo District Agriculture Office in 2024 shows that before the partnership, the average productivity of hybrid corn reached 7.8 tons/ha, while after the partnership, this figure decreased slightly to 7.5 tons/ha. Despite this small decline in physical output, the financial picture shows much more profitable results for farmers. The partnership scheme provides price certainty through more stable sales contracts compared to the free market mechanism (Tesfamicheal Wossen & Thomas Berger, 2022). Based on the analysis results, farmers' net income increased from IDR 22.3 million/ha to IDR 27.8 million/ha. Business profits also increased significantly because contract prices were higher than market prices at the time of the harvest. A comparison of income, profit, and business feasibility indicators is shown in Table 2.

Table 2. Comparative analysis of income, profit, and R/C ratio (Rp/ha)

Indicator	Independent	Partnership
Revenue (Rp)	22,300,000	27,800,000
Profit (Rp)	8,900,000	13,200,000
R/C Ratio	1.87	2.25

A significant increase was seen in the R/C ratio, which rose from 1.87 in the independent model to 2.25 after the partnership. This value indicates that every rupiah of production cost generates higher and financially viable revenue. Thus, even though average productivity has decreased slightly, cost efficiency and contract price stability have strengthened the position of farmers. This change is visualized in Figure 1. This increase in the ratio proves that the partnership model not only improves farmers' incomes, but also enhances the sustainability of community-based hybrid corn farming in Ponorogo.

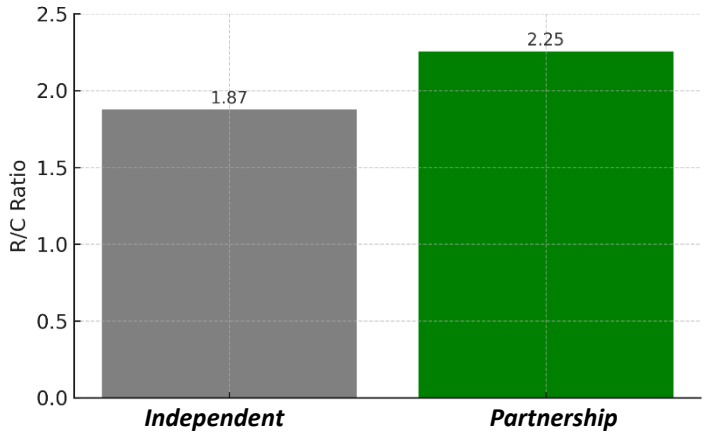

Figure 1. Comparison chart of R/C ratio before and after partnership

The analysis results demonstrate a significant increase in the R/C (Revenue/Cost) ratio, which rose from 1.87 under the independent business model to 2.25 after the partnership model was implemented. This value indicates that every rupiah of production cost expended generates higher revenue, confirming that the partnership system is financially feasible. The improvement in the R/C ratio highlights that the partnership model not only drives cost efficiency but also provides essential contract price stability, thereby strengthening farmers' bargaining position in the market and with supporting financial institutions. Although average physical productivity declined slightly from 7.8 tons/ha to 7.5 tons/ha, the optimized input efficiency and contract price certainty substantially improved overall business profitability, ultimately strengthening the long-term sustainability of community-based hybrid corn farming in Ponorogo.

The R/C ratio is a commonly used indicator in agricultural economics to assess the feasibility of farming businesses, as it provides a simple yet powerful overview of the economic efficiency of agricultural businesses. An R/C value greater than 1 indicates that the income earned exceeds production costs, meaning that the business can be categorized as profitable. In addition, modern agricultural economics literature emphasizes that R/C measurement must be combined with other cost and income analyses to understand the dynamics of profitability and business sustainability more comprehensively. Increasing the R/C ratio through partnerships emphasizes the importance of collective management and coordination with marketing agencies or input providers (Mango & Chikowo, 2023).Previous studies have also shown that partnerships that provide access to capital, price guarantees, and technical services can increase the cost efficiency and income of smallholder farmers, making the R/C ratio a relevant evaluation tool for assessing the economic

impact of such interventions (Rice Research Center, The increase in the R/C ratio among the Mulyo Farmer Group shows that the partnership model not only increases individual profits but also strengthens the economic and social sustainability of community-based hybrid corn farming.

Changes in cost structure key to efficiency

The data in the table 3 shows that the total production cost per hectare in the partnership model fell by almost 15 percent compared to the independent system. The most notable efficiency gains were in pesticides, thanks to the implementation of integrated pest management strategies, while the reduction in labor costs demonstrated the tangible impact of the shift to more mechanized production methods. Overall, these cost efficiencies explain why profitability increased significantly for farmers participating in the partnership (Vanlauwe et al., 2015). The findings of this study show that the partnership model reduced total production costs by 14.7%, with the greatest efficiency gains observed in pesticide use (30.9%), followed by seed, fertilizer, and labor costs. These improvements contributed directly to higher profitability and an increase in the R/C ratio among partner farmers. This finding is consistent with Vanlauwe and Ademola (2023), who emphasize that efficient resource management and sustainable intensification practices can improve the economic performance of smallholder farming systems. Similarly, Kassie and Shiferaw (2022) argue that the adoption of improved agricultural technologies and management practices enhances farm productivity and efficiency by optimizing the use of available resources. In the present study, the observed cost reduction reflects not only improvements in input-use efficiency but also the role of institutional partnerships in facilitating access to quality inputs, technical assistance, and coordinated farm management. These findings suggest that partnerships can serve as an effective mechanism for improving farm efficiency while strengthening the long-term sustainability of hybrid corn farming.

Table 3. Comparative analysis of hybrid corn production cost structure in Ponorogo (IDR/ha)

Cost Components	Independent System	Partnership System	Change (%)
Seeds	5,200,000	4,300,000	-17.3
Fertilizer	8,500,000	7,480,000	-12.0
Pesticides	2,100,000	1,450,000	-30.9
Labor	9,800,000	8,600,000	-12.2
Total	25,600,000	21,830,000	-14.7

Source: "Dinas Pertanian Ponorogo", 2024 (processed by the author)

The impact of partnerships on social and environmental dimensions

Agribusiness partnerships play an important role in strengthening the social foundations among farmers. Relationships between members of farmer groups become closer through the creation of mutual trust and commitment to common goals. The presence of agribusiness partners not only serves as a provider of inputs and market access, but also as a catalyst in strengthening social networks. Activities such as regular discussions, joint training, and the implementation of clear contract patterns encourage the formation of stronger solidarity and collective capacity within the community. Quantitative findings support this narrative, while also emphasizing the importance of the farmers' perspective in understanding the social impact of partnerships. Field survey data analyzed using a five-point Likert scale showed a significant increase in social capital indicators. Paired t-test results showed that after joining the partnership, the average score for trust among members increased from 3.21 to 4.35 with a significance value of 0.004. The level of group cohesion rose from 3.05 to 4.18, while the adoption of new knowledge increased from 3.12 to 4.41. These findings are reinforced by the testimonies of members of the Mulyo Farmer Group, who stated that previously they often worked alone and faced difficulties in obtaining fertilizers or seeds through middlemen (Tasie & Reardon, 2023). After joining the partnership, they were able to work together, learn from extension workers and companies, and feel more confident because they had friends and support (Table 4). The largest improvement was observed in the adoption of new knowledge, which increased by 1.29 points (41.3%). This finding suggests that agribusiness partnerships function not only as marketing arrangements but also as effective platforms for knowledge transfer and collective learning. Regular interactions with extension agents, company representatives, and fellow farmers facilitated the dissemination of improved cultivation practices and encouraged farmers to adopt innovations more rapidly. Similarly, the significant increase in trust and group cohesion indicates that repeated collaboration and shared economic interests strengthened social relationships within the farmer group, thereby enhancing collective action and reducing individual production risks.

This concept is in line with Vanlauwe's findings, which emphasize that efficient resource management, collaboration in agronomic practices, and collective community involvement increase input efficiency while strengthening the profitability and sustainability of small-scale agricultural systems. Other literature confirms that well-designed partnerships can encourage the adoption of environmentally friendly practices, facilitate collective learning, and strengthen social capital, which forms the basis for long-term adaptation to economic and ecological change. These findings are consistent with Vanlauwe and Ademola (2023), who emphasize that efficient resource management,

collaboration in agronomic practices, and collective community involvement strengthen both farm profitability and sustainability. The increase in trust, group cohesion, and knowledge adoption observed among members of the Tani Mulyo Farmer Group indicates that the partnership serves as an effective platform for collective learning and innovation diffusion. Through regular interaction with extension agents, agribusiness partners, and fellow farmers, members gained greater access to technical knowledge and environmentally sound cultivation practices. Similar findings were reported by Sutrisno et al. (2023), who demonstrated that farmer groups play an important role in improving farmers' productivity and welfare through knowledge sharing, cooperation, and collective action. Therefore, the partnership model contributes not only to economic performance but also to the strengthening of social capital and the long-term sustainability of community-based hybrid corn farming. Therefore, the impact of partnerships is not only seen from an economic perspective but also strengthens the social and environmental capacity of farming communities. Therefore, a research approach that integrates quantitative data, such as social capital indicators, with qualitative data through interviews, testimonials, and field observations is highly relevant for capturing the complex social and ecological dynamics in the context of community-based agriculture.

Nurdiyanto and Prabowo (2025) emphasize that partnerships between smallholder farmers and value chain actors create stronger trust, networks, and solidarity. Through structured mentoring, reliable access to production inputs, and secure market integration, relationships between farmer group members become significantly more cohesive and open to collaboration, thereby supporting collective business sustainability. These findings align with the results of an international study on value chain partnerships by Ton et al. (2021), which demonstrates that structured partnerships not only increase productivity and income but also effectively balance ecosystem services and environmental sustainability. Consequently, these integrated partnerships serve as a vital institutional mechanism to strengthen the social, economic, and ecological resilience of farming communities simultaneously.

Table 4. Comparative analysis of social capital indicators among hybrid corn farmers in Ponorogo

Social capital indicators	Average before partnership	Average after partnership	Difference	-value (Sig. 2-tailed)
Trust between members	3.21	4.35	+1.14	0.004
Group cohesion	3.05	4.18	+1.13	0.006
Adoption of new knowledge	3.12	4.41	+1.29	0.002

Source: Data from the ponorogo hybrid corn farmer survey, 2024.

Domestic research also provides empirical evidence to support this shows that social capital, in the form of trust, networks, and collective norms among farmers, contributes significantly to the success of integrated farming practices and rice harvesting. This reinforces the argument that the increase in social capital after joining a partnership, as seen in the Tani Mulyo group in Ponorogo, is not only a local phenomenon but is consistent with trends observed in the national context. Agribusiness partnerships not only increase profitability through efficiency and market access but also strengthen the social capacity of farming communities. Higher social capital enables the adoption of sustainable agronomic practices, the exchange of information and technology, and solidarity in facing production and market risks. This approach confirms that the success of community-based agriculture requires the integration of economic benefits and social development, which collectively support the resilience and sustainability of the agricultural system.

On March 4, 2024, BSIP East Java held an event entitled "Promoting the Implementation of Rice and Corn Standards in Ponorogo" through a focus group discussion (FGD) attended by rice and corn farmers and extension workers in Ponorogo Regency. This FGD is part of efforts to assist in the implementation of standards and Good Agricultural Practices (GAP) for rice and corn commodities. In the 2024 program, *Badan Standardisasi Instrumen Pertanian* (BSIP) East Java held a Technical Guidance on "Environmentally Friendly Corn Cultivation" in Pasuruan, which was attended by hundreds of farmers (Candraningrum, 2022). This activity shows that the institution provides training on sustainable agronomy techniques: integrated pest control, reduction of pesticide/chemical fertilizer use, water and soil management, and other environmentally friendly practices for corn farmers. From the annual report of BSIP/ BPTP East Java (2023, with realization in 2024), it is documented that the program "Product Standardization, Institutional Facilitation & Development, Dissemination of Standards, Facilities, and Support Services" was implemented, showing that this institution structurally supports the application of formal agricultural standards at the farmer/group level. See program outputs and dissemination facilities for agricultural products and facilities.

Agribusiness partnerships in Ponorogo also contribute to strengthening social capital and adopting sustainable agricultural practices, thanks to technical assistance from the East Java Agricultural Technology Assessment Institute (BPTP), through the BSIP program. This institution actively holds group discussion forums, technical guidance, and training for corn and rice farmers, so that their cultivation practices become more efficient and environmentally friendly. These activities encourage the reduction of chemical fertilizer use, the application of local organic fertilizers, integrated pest management, crop rotation to improve soil fertility, and water and soil conservation during the dry season (Rahmadani et al., 2025). This assistance not only improves technical skills, but also strengthens relationships between members of the farmer group. Through regular interaction, collaboration, and shared learning, trust, solidarity, and

group cohesion have increased significantly. Survey findings in the Mulyo Farmer Group show that the trust score among members rose from 3.21 to 4.35, group cohesion from 3.05 to 4.18, and adoption of new knowledge from 3.12 to 4.41 after farmers became involved in the partnership. These changes are in line with BSIP's goal of strengthening the collective capacity and social networks of farming communities.

Table 5. Comparison of sustainable agricultural practice adoption in hybrid corn farming in Ponorogo (2024)

Sustainable Agricultural Practices	Partner Farmers (%)	Non-Partner Farmers (%)
Balanced fertilization according to recommendations	72.5	38.4
Use of organic fertilizers	64.7	29.1
Integrated pest management (IPM)	58.2	27.6
Crop rotation with legumes	43.9	18.7
Use of organic mulch	36.4	15.2
Water conservation (ditches, reservoirs, simple irrigation)	41.8	22.5

Source: Field data from the Mulyo Farmer Group, East Java Agricultural Research and Development Institute, and Ponorogo Agricultural Office, 2024.

Table 5 demonstrates that partner farmers consistently exhibit higher adoption rates of sustainable agricultural practices than non-partner farmers. The largest differences were observed in balanced fertilization (+34.1 percentage points) and the use of organic fertilizers (+35.6 percentage points), suggesting that partnership programs effectively improve farmers' access to technical guidance and input management knowledge. Adoption of integrated pest management was also substantially higher among partner farmers (58.2%) compared with non-partner farmers (27.6%), indicating increased awareness of environmentally friendly pest control strategies. Although practices such as crop rotation, organic mulching, and water conservation showed relatively lower adoption rates, partner farmers still outperformed non-partner farmers by a considerable margin. These findings suggest that agribusiness partnerships function not only as market-based arrangements but also as important mechanisms for promoting sustainable agricultural innovation and environmental stewardship among smallholder farmers.

The findings from this study indicate that agribusiness partnership transformation contributes significantly to environmental sustainability in hybrid corn farming in Ponorogo. In addition to increasing productivity and income, these partnerships encourage the adoption of sustainable agricultural practices, including more efficient use of inputs, integrated pest management, soil and water conservation, and the application of Good Agricultural Practices principles (GAP) (Khouroh et al., 2025). These results are in line with findings from international studies that highlight the role of partnerships in strengthening the capacity of farming communities. For example, research on coffee farmers shows that partnership models enable increased production and social capital development through trust, social networks, and collaboration among smallholder farmers. Other studies emphasize that contract farming partnerships or collaborations with agribusiness institutions can encourage the adoption of environmentally friendly technologies, improve input management, and strengthen communities' ability to adapt to economic and ecological pressures (Nurdin & Wahyuni, 2024). With the support of partnership institutions, farmers in Ponorogo were able to reduce their use of nitrogen fertilizers by up to 15 percent without reducing productivity, while the adoption of environmentally friendly practices such as crop rotation, the use of organic fertilizers, and organic mulch increased. This shows that partnerships not only increase financial profits, but also strengthen the social and ecological capital of farming communities. Partnerships serve as catalysts that strengthen social networks, encourage solidarity, and create collective learning environments where farmers can share experiences, obtain technical training, and make more optimal use of market access.

CONCLUSION

This study demonstrates that the transformation of agribusiness partnerships has contributed to the sustainability of community-based hybrid corn farming in Ponorogo from economic, social, and environmental perspectives. Economically, the partnership improved farm viability through better access to production inputs, technical assistance, and market opportunities, resulting in greater efficiency and profitability. Socially, the partnership strengthened social capital by fostering trust, group cohesion, and collective learning among farmer group members. Environmentally, the partnership encouraged the adoption of more sustainable farming practices, including balanced fertilization, integrated pest management, and soil conservation measures.

These findings indicate that agribusiness partnerships function not only as market-oriented arrangements but also as institutional mechanisms that support the resilience and sustainability of smallholder farming systems. However, this study was limited to a single farmer group and a specific observation period. Future research should involve a wider range of farmer groups and longer-term observations to better understand the long-term impacts of partnership-based farming models. Strengthening collaboration among farmers, government agencies, financial institutions, and agribusiness actors is therefore essential to promote sustainable agricultural development and improve the competitiveness of hybrid corn farming.

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