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Improving Rice Farmers' Livelihoods through Participatory Crop Support and Seed Distribution in Collaboration with UPTD in Cihanyawar Village

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Abstract. This community service initiative was designed to improve rice farmers' livelihoods through a participatory support program involving seed distribution and collaborative agricultural assistance with the Regional Technical Implementation Unit (UPTD) in Cihanyawar Village. The program integrated the strengths of academic institutions and local agricultural agencies to deliver targeted support aimed at increasing productivity and income. Using a participatory action research approach, the six-month program engaged 50 farmers through four key phases: preparation, implementation, monitoring, and evaluation. Three superior rice varieties IR64, Ciherang, and Inpari-32, were distributed, accompanied by intensive training in modern cultivation techniques, integrated pest management, and sustainable farming practices. The initiative led to a 61.9% increase in rice yield, from 4.2 to 6.8 tons per hectare, with Inpari-32 performing the highest at 7.2 tons per hectare. Economically, farmers' gross income rose by 55.3%, from IDR 8.5 million to IDR 13.2 million per hectare per season, with a benefit-cost ratio of 6.27. Knowledge transfer was also effective, as farmers' mastery of modern practices improved from 23% to 87%. Notably, 78% of participating farmers expressed commitment to continue the improved practices. The success of this collaborative model underscores the potential of participatory and institutional synergy in promoting sustainable improvements in farmers' livelihoods. This model can serve as a practical reference for future agricultural development programs in similar rural contexts.

Keywords: Participatory Farming Support; University-UPTD Collaboration; Seed Distribution; Sustainable Agriculture; Rural Livelihoods

1. Introduction

Indonesia as an agrarian country has a very high dependence on the agricultural sector, particularly in meeting national food security needs (Yakop et al., 2020). Rice as the staple food of Indonesian society has become a strategic commodity that determines the country's economic stability and food security (Abdurrahman, Hamdani, 2022). According to data from the Central Statistics Agency (BPS) in 2023, approximately 70% of Indonesia's population depends on the agricultural sector as their primary source of

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livelihood, with rice field areas reaching 8.1 million hectares spread across the archipelago (Aryawati & Sutami, 2020). However, national rice productivity still faces various complex challenges that require serious and sustainable intervention.

Cihanyawar Village, as one of the agricultural areas in Indonesia, faces typical problems experienced by most agricultural regions in the country. Farmers in this village still rely on local rice varieties that have low productivity, are vulnerable to pest and disease attacks, and are not adaptive to increasingly extreme climate change (Jaya, 2022). This condition is exacerbated by farmers' limited access to superior seeds, modern agricultural technology, and adequate technical assistance. Consequently, rice productivity in Cihanyawar Village remains below optimal potential, ultimately impacting the low welfare levels of farmers and their families (Kusmiati et al., 2023).

Agricultural productivity problems cannot be separated from the socio-economic aspects of farming communities (Wongkar et al., 2023). Most farmers in Cihanyawar Village are smallholder farmers with limited land ownership, minimal business capital, and conventional market access (Ah et al., 2025). This condition creates a poverty cycle that is difficult to break, where low productivity causes low income, which in turn limits farmers' ability to invest in improving their farming productivity (Aryawati & Sutami, 2020). This phenomenon requires comprehensive and sustainable intervention through community service approaches involving various related stakeholders.

The importance of using superior seeds in increasing rice productivity has been proven through various research and field implementations (Halim, 2020). Superior seeds have superior characteristics compared to local varieties, including higher productivity, resistance to pests and diseases, good adaptability to environmental conditions, and better grain quality (Jufri, 2025). However, the adoption of superior seeds by farmers is often hindered by various factors, including limited access, lack of knowledge about proper cultivation techniques, and minimal technical assistance from related institutions.

The Regional Technical Implementation Unit (UPTD) as an extension of regional government in agriculture has a strategic role in agricultural development at the grassroot level (Okmawaty Anwar et al., 2020). UPTD has the task and function of providing technical services to farmers, conducting guidance and assistance, and facilitating farmers' access to agricultural technology and production inputs (Susanto et al., 2022). However, the effectiveness of UPTD's role in assisting farmers still faces various obstacles, including limited human resources, limited budget, and suboptimal coordination with various related parties (Anwar et al., 2024).

Collaboration between universities and UPTD in assisting farmers is a very strategic and potential approach model to be developed (Wongkar et al., 2023). Universities have advantages in terms of quality human resources, access to the latest technology and innovation, and research and development capabilities (Sofia et al., 2022). Meanwhile, UPTD has advantages in terms of local condition knowledge, networks with farmers, and practical field experience (Purnamayani & Hermawan, 2020). The synergy between these two institutions can create a comprehensive and sustainable assistance model that combines technological, economic, and social aspects in an integrated program unit (Maulidiya et al., 2024).

The concept of increasing agricultural productivity cannot be separated from the aspect of farmers' welfare comprehensively (Jaya, 2022). High productivity must be followed by efficient marketing systems, adequate access to post-harvest technology, and sustainable economic empowerment (Dwinarko et al., 2023). This requires a holistic

approach that not only focuses on technical cultivation aspects but also considers economic, social, and environmental aspects (Damianus Ebang Koten et al., 2020). Effective assistance must be able to increase farmers' capacity in managing their farming business professionally, accessing profitable markets, and developing business diversification to increase the economic resilience of farming families (Khadijah & Nasution, 2024).

Community service as one of the pillars of the University's Tri Dharma has an important role in transferring knowledge and technology to society (Derry Nugraha, 2023). In the agricultural context, community service can be a bridge between research results at universities and the real needs of farmers in the field (Kusmiati et al., 2023). Through structured and sustainable service programs, universities can contribute directly to improving community welfare, especially farmers, while obtaining valuable feedback for further research and education development (Friska et al., 2023).

The success of programs to increase farmers' productivity and welfare requires participatory and sustainable approaches (Rote et al., 2025). Farmers must be positioned as active subjects in every stage of the program, from problem identification, planning, implementation, to evaluation (Sofia et al., 2022). This is important to ensure that the implemented programs are in accordance with farmers' real needs and can be adopted sustainably after the program ends (Suliartini et al., 2021). Furthermore, program sustainability also requires long-term commitment from various related parties, including local government, educational institutions, and the farming community itself.

Cihanyawar Village was selected as the location for this community service program based on various strategic considerations. This village represents the general condition of agriculture in Indonesia with various classic problems faced by farmers, but still has great potential to be developed. Additionally, the commitment of the community and village government to actively participate in agricultural development programs is an important factor in selecting this location (Susanto et al., 2022). Support from the local UPTD is also an important consideration in ensuring the sustainability of the program to be implemented.

The program "Improving Farmers' Productivity and Welfare Through Rice Plant Assistance and Collaboration with UPTD: Provision of Superior Seeds in Cihanyawar Village" is designed as a comprehensive intervention model that combines technological, assistance, and institutional aspects. This program is expected to become a pilot project that can be replicated in other areas with similar conditions. Through this program, it is hoped that an effective partnership model can be created between universities, UPTD, and farming communities in efforts to improve farmers' productivity and welfare sustainably.

2. Methods

This community service program employed a participatory action research approach with collaborative methodology involving multiple stakeholders. The program was implemented through four main phases: preparation, implementation, monitoring, and evaluation, conducted over six months from January to June 2024 in Cihanyawar Village (Amelia et al., 2023).

The preparation phase involved comprehensive baseline surveys and stakeholder mapping. Initial field assessments were conducted to identify current rice cultivation practices, productivity levels, and socio-economic conditions of farmers. Coordination meetings were organized with UPTD officials, village leaders, and farmer group

representatives to establish program objectives and implementation strategies (Lestari et al., 2020). A needs assessment was performed to determine appropriate superior seed varieties suitable for local agro-climatic conditions.

The implementation phase consisted of three integrated activities. First, the distribution of superior rice seeds was conducted through a collaborative mechanism between the university team and UPTD (Rahayuningsih et al., 2023). Selected high-yielding varieties including IR64, Ciherang, and Inpari-32 were provided to 50 participating farmers based on their land capacity and preferences. Second, comprehensive technical assistance was delivered through field demonstrations, training sessions, and regular farm visits (Sofia et al., 2022). Topics covered included proper seed treatment, optimal planting techniques, integrated pest management, and sustainable farming practices. Third, capacity building programs were conducted for both farmers and UPTD staff to ensure knowledge transfer and program sustainability.

The monitoring phase involved continuous field observations and data collection throughout the growing season. Weekly visits were conducted to assess crop performance, document farming practices, and address emerging challenges. Yield measurements were recorded at harvest time, comparing results between farmers using superior seeds and those maintaining traditional varieties. Economic analysis was performed to evaluate cost-benefit ratios and income improvements.

The evaluation phase utilized both quantitative and qualitative assessment methods. Pre and post-program surveys measured changes in productivity, income levels, and farmers' knowledge. Focus group discussions were conducted to gather feedback on program effectiveness and sustainability prospects. Collaboration effectiveness between university and UPTD was assessed through stakeholder interviews and joint evaluation sessions, ensuring continuous improvement and knowledge sharing for future replication.

3. Results and Discussion

3.1. Productivity Enhancement Results

The implementation of superior rice seed distribution and technical assistance in Cihanyawar Village demonstrated significant improvements in agricultural productivity. Baseline data collected before program implementation showed that farmers using traditional local varieties achieved an average yield of 4.2 tons per hectare. Following the introduction of superior seeds (IR64, Ciherang, and Inpari-32) coupled with proper cultivation techniques, participating farmers achieved an average yield of 6.8 tons per hectare, representing a 61.9% increase in productivity.

Among the three superior varieties tested, Inpari-32 showed the highest performance with an average yield of 7.2 tons per hectare, followed by Ciherang at 6.7 tons per hectare, and IR64 at 6.5 tons per hectare. The superior performance of Inpari-32 can be attributed to its high tillering capacity, good grain filling, and excellent adaptability to local soil conditions. These results align with previous research conducted by the Indonesian Center for Rice Research, which reported similar yield improvements when superior varieties are properly managed.

The yield increase was not uniform across all participating farmers, with variations ranging from 45% to 78% improvement. Factors contributing to this variation included land quality, water availability, farmer experience, and adherence to recommended cultivation practices. Farmers who consistently followed the technical guidance provided

during field demonstrations and training sessions achieved higher yield improvements compared to those who partially adopted the recommendations.

Figure 1 All Activity and Collaboration Farmers and UPTD

Figure 1 illustrates the comprehensive process of collaborative engagement between farmers and the Regional Technical Implementation Unit (UPTD) throughout the implementation of the participatory agricultural support program in Cihanyawar Village. The diagram (or photo, if it is a visual documentation) captures key stages of the program beginning from initial socialization meetings, seed distribution, hands-on training sessions, to on-field mentoring and evaluation workshops.

3.2. Economic Impact Analysis

The economic analysis revealed substantial improvements in farmers' income and welfare. Before program implementation, participating farmers earned an average of IDR 8.5 million per hectare per growing season. After adopting superior seeds and improved cultivation practices, the average income increased to IDR 13.2 million per hectare per growing season, representing a 55.3% increase in gross income.

Cost-benefit analysis showed that despite slightly higher input costs for superior seeds and recommended fertilizers, the net profit increased significantly. The additional input cost averaged IDR 750,000 per hectare, while the increased revenue from higher yields reached IDR 4.7 million per hectare. This resulted in a benefit-cost ratio of 6.27, indicating highly profitable investment returns for farmers.

The economic impact extended beyond individual farmers to the broader community. Increased agricultural productivity stimulated local economic activities, including transportation services, grain trading, and agricultural input supplies. Several farmers reported being able to invest in farm improvements, children's education, and household welfare enhancement as a direct result of increased income from rice farming.

3.3. Knowledge Transfer and Capacity Building Outcomes

The technical assistance and training programs resulted in significant improvements in farmers' knowledge and skills. Pre-program assessments revealed that only 23% of farmers had adequate knowledge about optimal planting density, integrated pest management, and proper fertilizer application. Post-program evaluations showed that 87% of participating farmers demonstrated good understanding and practical application of these techniques.

Farmer field schools conducted throughout the program proved particularly effective in knowledge transfer. These hands-on learning sessions allowed farmers to observe and practice improved cultivation techniques directly. Topics covered included seed treatment procedures, transplanting methods, water management, pest and disease identification,

and post-harvest handling. The participatory learning approach fostered peer-to-peer knowledge sharing and created a supportive learning environment.

The capacity building component for UPTD staff was equally successful. Technical training sessions enhanced their ability to provide effective agricultural extension services. UPTD personnel reported increased confidence in advising farmers on modern rice cultivation techniques and improved coordination with university researchers for ongoing technical support.

3.4. Collaboration Effectiveness Between University and UPTD

The partnership between the university and UPTD proved highly effective in program implementation. The collaboration combined university expertise in research and technology with UPTD's local knowledge and farmer networks. This synergy resulted in more comprehensive and sustainable agricultural extension services.

Regular coordination meetings between university team members and UPTD staff ensured smooth program implementation and prompt resolution of field challenges. Joint field visits enhanced mutual understanding of local conditions and farmer needs, leading to more targeted interventions. The collaborative approach also facilitated knowledge exchange, with university researchers gaining valuable insights into practical farming constraints while UPTD staff accessed latest agricultural research findings.

The institutional partnership model developed through this program has potential for replication in other agricultural areas. Key success factors identified include clear role definitions, regular communication channels, shared objectives, and mutual respect for each partner's expertise and contributions.

3.5. Challenges and Limitations

Despite overall success, the program encountered several challenges that provide important lessons for future implementations. Weather variability during the growing season affected some participating farms, highlighting the importance of climate-adaptive farming practices. Irregular rainfall patterns in certain areas led to water stress, particularly affecting farms without adequate irrigation infrastructure.

Initial resistance from some farmers to adopt new varieties and cultivation practices required additional persuasion and demonstration efforts. Traditional farming practices deeply rooted in local culture needed sensitive approaches to encourage gradual adoption of improved techniques. Language barriers and varying educational backgrounds among farmers necessitated diverse communication strategies and simplified technical materials.

Limited availability of superior seeds in local markets posed sustainability challenges. While the program provided initial seed distribution, ensuring continuous access to quality seeds requires strengthening local seed supply chains and establishing farmer-to-farmer seed exchange networks.

3.6. Sustainability and Long-term Impacts

The program's sustainability prospects appear promising based on farmer adoption rates and institutional commitments. Approximately 78% of participating farmers expressed intention to continue using superior seeds and improved cultivation practices in subsequent growing seasons. The establishment of farmer groups dedicated to superior seed multiplication and sharing creates a foundation for program sustainability beyond external support.

UPTD commitment to continue technical assistance and monitor farmer progress ensures institutional sustainability. The enhanced capacity of UPTD staff to provide quality extension services will benefit not only program participants but also other farmers in the region. Integration of program activities into regular UPTD work plans demonstrates institutional ownership and long-term commitment.

The collaborative model established between university and UPTD has been formalized through a memorandum of understanding, ensuring continued partnership for future agricultural development initiatives. This institutional framework provides a platform for ongoing research collaboration, technology transfer, and capacity building activities.

3.7. Broader Implications and Recommendations

The success of this community service program in Cihanyawar Village demonstrates the potential for similar interventions in other agricultural communities facing comparable challenges. The integrated approach combining superior seed distribution, technical assistance, and institutional collaboration offers a replicable model for agricultural development programs.

Key recommendations for scaling up include establishing regional seed production centers, strengthening farmer organization capacity, developing standardized training modules, and creating sustainable financing mechanisms for agricultural inputs. Government support for farmer group development and agricultural extension services enhancement would further accelerate adoption of improved farming practices.

The program's success underscores the importance of participatory approaches in agricultural development. Involving farmers as active participants rather than passive recipients ensures better program acceptance, higher adoption rates, and greater sustainability. Future programs should continue emphasizing farmer empowerment and local ownership of development initiatives.

4. Conclusions

The program recorded substantial improvements in both agricultural productivity and farmer income. Rice yields rose by 61.9%, from 4.2 to 6.8 tons per hectare, with Inpari-32 delivering the highest output at 7.2 tons. Farmers' gross income increased by 55.3%, from IDR 8.5 million to IDR 13.2 million per hectare per growing season. The benefit-cost ratio of 6.27 confirmed the program's economic viability and attractiveness. These quantitative gains directly contributed to improved household welfare and stimulated the local rural economy.

This success was driven by a participatory and collaborative model involving the university and the UPTD. The combination of academic insight and local practical experience enabled effective knowledge transfer and field-based mentorship. Farmers' understanding of modern agricultural practices improved significantly from 23% to 87%, and 78% of participants showed commitment to continue these improved practices independently. The program also enhanced UPTD's capacity in extension work and built a framework for long-term institutional cooperation, further supporting sustainability.

Despite its strengths, the program faced several challenges including inconsistent weather conditions, initial skepticism from farmers, and limited local seed supply infrastructure. To ensure wider replication and long-term success, future initiatives should invest in regional seed production, strengthen farmer group management, and

design accessible financing models. Overall, this program offers a scalable model for agricultural development that aligns participatory learning, technology innovation, and institutional partnership to improve the livelihoods of smallholder farmers.

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