

SUBSIDIZED FERTILIZER MANAGEMENT IN THE FRAMEWORK OF DEVELOPING TUMPATAN NIBUNG VILLAGE, DELI SERDANG REGENCY, NORTH SUMATRA PROVINCE TO BECOME AN AGROECOEDU TOURISM VILLAGE

Ali Jamil¹, Nurhayati^{2*}

¹ POLBANGTAN BOGOR

² Universitas Islam Sumatera Utara, Medan, Indonesia

Email korespondensi: alijamil1611@gmail.com

Received: 26/06/2026 | Revised: 10/07/2026 | Accepted: 28/07/2026 | Published: 10/08/2026

Abstract

Effective, transparent, and accountable management of subsidized fertilizers is crucial for sustaining agricultural productivity and fostering sustainable rural development. This community service program aimed to enhance the capacity of farmers and farmer group institutions in subsidized fertilizer governance to optimize fertilization efficiency and support the transformation of Tumpatan Nibung Village, Batang Kuis District, Deli Serdang Regency into an AgroEcoEduTourism Village. Conducted on May 16, 2026, the activity involved 30 participants including farmer group members, Gapoktan officers, village government officials, BUMDes managers, and field agricultural extension workers. The implementation utilized a Participatory Rural Appraisal (PRA) approach comprising five structured stages: preparation, counseling and education, training and balanced fertilization field demonstrations, mentoring for the Definitive Group Needs Plan (RDKK) formulation, and monitoring and evaluation. The results indicated a significant increase in farmers' knowledge regarding subsidized fertilizer policies, e-RDKK data updating procedures, and the application of the six right principles (right type, dosage, timing, method, place, and target). Training and mentoring strengthened administrative order within farmer groups and enhanced inter-stakeholder coordination. Furthermore, the balanced fertilization demonstration plot served as an educational hub and a prototype for sustainable agricultural practices. This initiative effectively lays a strong institutional foundation for developing a productive, environmentally sound, and self-sustaining AgroEcoEduTourism Village.

Keywords: *AgroEcoEduTourism, Balanced Fertilization Demonstration Plot, Farmer Groups, RDKK, Subsidized Fertilizer.*

INTRODUCTION

Agricultural sector development is a key strategy for achieving food security, improving farmer welfare, and sustainable rural development. One government policy instrument to support these goals is the provision of subsidized fertilizer for farmers who meet the requirements in accordance with applicable regulations. This policy is designed to ensure fertilizer is available at affordable prices, thereby maintaining and improving agricultural productivity (Minister of Agriculture Regulation Number 15 of 2025). The success of the subsidized fertilizer program is determined not only by the size of the fertilizer allocation, but also by effective, transparent, accountable, and targeted distribution governance. Various studies have shown that weaknesses in farmer data validation, e-RDKK preparation, distribution oversight, and coordination between stakeholders remain the main causes of suboptimal subsidized fertilizer distribution in Indonesia. The Definitive Group Needs Plan (RDKK) is the primary instrument for planning subsidized fertilizer needs, based on farmer data, land area, commodities, and fertilizer recommendations. Accurate RDKK preparation serves as the basis for determining subsidized fertilizer allocations, ensuring active participation by farmer groups in the preparation process is crucial for targeting recipients, ensuring effective distribution, and ensuring efficient fertilizer use (Ministry of Agriculture of the Republic of Indonesia, 2025). Conversely, low farmer involvement in preparing and updating the RDKK can result in a mismatch between actual field needs and the fertilizer allocation received, potentially hampering

SUBSIDIZED FERTILIZER MANAGEMENT IN THE FRAMEWORK OF DEVELOPING TUMPATAN NIBUNG VILLAGE, DELI SERDANG REGENCY, NORTH SUMATRA PROVINCE TO BECOME AN AGROECOEDU TOURISM VILLAGE

Ali Jamil et al

farming productivity (Sari et al., 2024). The government continues to transform subsidized fertilizer governance through digitalization of the distribution system, utilizing electronic farmer data, improving the e-RDKK (Regional Financial Reporting System), and implementing a farmer identity-based fertilizer redemption mechanism. This transformation aims to increase transparency, accountability, efficiency, and accuracy in subsidized fertilizer distribution, thereby minimizing administrative errors and distribution irregularities (Ministry of Agriculture of the Republic of Indonesia, 2025). However, the implementation of the digital system at the farmer level still faces various obstacles, including low digital literacy, limited access to information technology, and the need for ongoing support from agricultural extension workers and local governments to ensure optimal system utilization (Purnomo et al., 2024).

Tumpatan Nibung Village, Batang Kuis District, Deli Serdang Regency, is an agrarian village where the majority of residents depend on rice farming for their livelihood. In recent years, the village government and the community have developed the **AgroEcoEduTourism Village concept**, a village development model that integrates productive agricultural activities, environmental conservation, education, and community-based tourism. This concept aims to increase the added value of the agricultural sector through community empowerment, environmental conservation, and the development of agricultural education areas that can support sustainable community income growth (FAO, 2022; Mulyani & Dariah, 2021). The use of fertilizers in the right type, dosage, time, method, location, and target area is an implementation of the principle of balanced fertilization, which plays a crucial role in increasing the efficiency of nutrient use, improving crop productivity, and reducing the risk of soil and water pollution due to excessive fertilizer use (Sutrisno et al., 2023). In addition to increasing the efficiency of production input use, the application of these principles also supports sustainable agricultural practices, which are a key pillar of village development based on education and environmental conservation (FAO, 2022).

Based on initial observations and discussions with the Tumpatan Nibung Village Government, farmer groups, and agricultural extension workers, several issues remain that need to be addressed. These include farmers' limited understanding of subsidized fertilizer policies and governance, suboptimal preparation and updating of the RDKK (Regional Development Planning) (RDKK), poor administration of fertilizer distribution records at the farmer group level, and the lack of integration of subsidized fertilizer management with the development of the AgroEcoEduTourism Village. These conditions demonstrate the need for community empowerment efforts through human resource capacity building and strengthening farmer group institutions to ensure effective, transparent, and accountable subsidized fertilizer governance (Rachman et al., 2023).

Based on these conditions, the Community Service Team implemented the **"Subsidized Fertilizer Management Program in the Context of Developing Tumpatan Nibung Village into an AgroEcoEduTourism Village."** This program was implemented through extension activities, training, field demonstrations, participatory discussions, and mentoring to farmer groups as an effort to increase community capacity in managing subsidized fertilizer. It is hoped that this activity will be able to strengthen agricultural institutional governance, increase the efficiency of fertilizer use, and support the realization of a productive, sustainable, and competitive agricultural system as a foundation for the development of the AgroEcoEduTourism Village.

2. Implementation Method

Community Service Activities were carried out in **Tumpatan Nibung Village, Batang Kuis District, Deli Serdang Regency, North Sumatra Province on May 16, 2026**. The targets of the activities were members of farmer groups, administrators of Farmer Group Associations (Gapoktan), Village Governments, Village-Owned Enterprises (BUMDes), field agricultural extension workers, and communities involved in the development of the AgroEcoEduTourism Village. A total of **30 participants** participated in the entire series of activities. The implementation method uses a **Participatory Rural Appraisal (PRA) approach**, which places the community as the primary subject at every stage of the activity. This approach was chosen so that participants not only receive material but also actively participate in identifying problems, formulating solutions, and developing follow-up plans tailored to village conditions. The implementation of the activity consists of the following five stages.

2.1 Preparation

The preparation phase began with coordination with the Tumpatan Nibung Village Government, agricultural extension workers, farmer group leaders, and village-owned enterprise (BUMDes) administrators to develop an activity

SUBSIDIZED FERTILIZER MANAGEMENT IN THE FRAMEWORK OF DEVELOPING TUMPATAN NIBUNG VILLAGE, DELI SERDANG REGENCY, NORTH SUMATRA PROVINCE TO BECOME AN AGROECOEDU TOURISM VILLAGE

Ali Jamil et al

schedule and determine community needs. Next, a field survey was conducted to identify the state of subsidized fertilizer management, the mechanism for developing the Definitive Group Needs Plan (RDKK), fertilizer distribution patterns, and farmer fertilization practices. The identification results were used as the basis for developing extension and training materials.

2.2 Counseling and Education

The outreach activities were conducted interactively through lectures, discussions, and a question-and-answer session. The material presented covered government policies on subsidized fertilizer, fertilizer recipient requirements, the preparation and updating of the RDKK (Regional Farming Plan) (RDKK), fertilizer redemption mechanisms through the applicable system, the principles of balanced fertilization, and the importance of efficient and environmentally friendly fertilizer use. Participants were also provided with an understanding of the role of fertilizer governance in supporting the development of AgroEkoEduTourism Villages.

2.3 Training and Demonstration

The training was conducted through hands-on practice to improve participants' skills in calculating fertilizer requirements based on land area and site-specific fertilizer recommendations. Participants were also trained in preparing RDKK (Regional Development Planning) administration, recording fertilizer distribution, and applying the six rights principle (correct type, correct dose, correct time, correct method, correct place, and correct target) in fertilizer use. As part of the activity, a field demonstration was held on agricultural land, showcasing balanced fertilization practices, the use of organic fertilizers as a complement to inorganic fertilizers, and efficient fertilizer application techniques. This demonstration aimed to provide hands-on learning experiences to help participants better understand the material presented.

2.4 Mentoring

Following the outreach and training, the community service team provided assistance to farmer groups and village governments. The assistance focused on improving RDKK administration, recording subsidized fertilizer distribution, formulating fertilizer requirements based on land area and commodity, and strengthening coordination between farmer groups, agricultural extension workers, and village governments. The assistance also focused on integrating fertilizer management practices with the development of agricultural demonstration areas as part of the AgroEkoEduTourism concept.

2.5 Monitoring and Evaluation

Monitoring and evaluation were conducted to determine the effectiveness of activity implementation and the level of achievement of program objectives. Evaluation was conducted through observations during the activity, discussions with participants, and questionnaires before and after the activity (pre-test) to measure improvements in participant knowledge. Additionally, participants' abilities in compiling RDKK (Regional Development Plan), understanding subsidized fertilizer distribution mechanisms, applying balanced fertilization principles, and maintaining farmer group administrative records were assessed. The success of the program is measured based on several indicators, namely: (1) increasing participant knowledge regarding subsidized fertilizer management; (2) increasing the ability of farmer groups in preparing RDKK; (3) increasing understanding regarding balanced fertilization and efficient fertilizer use; (4) establishing a more orderly and transparent fertilizer distribution administration; and (5) increasing community commitment in supporting the development of Tumpatan Nibung Village as an AgroEkoEduTourism Village. The implementation method is expected to change community behavior regarding subsidized fertilizer management while strengthening village agricultural institutional governance. Through a participatory approach, communities not only gain new knowledge but also develop the skills to implement effective, efficient, and sustainable fertilizer management practices as part of village development based on agriculture, the environment, education, and tourism.

3. Results and Discussion

3.1 Implementation of Community Service Activities

The Community Service program was conducted in Tumpatan Nibung Village, Batang Kuis District, Deli Serdang Regency, involving farmers, farmer group administrators, agricultural extension workers, village officials, and Village-Owned Enterprises (BUMDes). The program began with coordination with the village government to identify issues faced by farmers related to subsidized fertilizer management, followed by outreach, training, field demonstrations, group discussions, and assistance in developing the Definitive Group Needs Plan (RDKK).

The entire series of activities took place in a participatory manner, so that participants not only received material but also actively participated in identifying problems and developing applicable solutions tailored to village conditions. A participatory approach is an effective strategy for increasing community capacity because it encourages direct participant involvement in the learning and decision-making process.

3.2 Improving Farmers' Knowledge of Subsidized Fertilizer Management

Prior to the activity, most participants did not fully understand the subsidized fertilizer distribution mechanism, the preparation of the RDKK (Regional Development Plan), or changes in government policy regarding fertilizer distribution. Through outreach and interactive discussions, participants gained an understanding of the requirements for subsidized fertilizer recipients, the RDKK preparation procedure, the fertilizer redemption mechanism, and the six rights principle (right type, right dose, right time, right method, right place, and right target). This increased knowledge is crucial for supporting more effective fertilizer management. According to research on the implementation of the Farmer Card Program, farmers' understanding of the administrative mechanisms and preparation of the RDKK (Farmers' Card) has impacted the smooth distribution of subsidized fertilizer, although fertilizer allocations remain limited compared to actual farmer needs. The results of the activity showed that participants began to understand the importance of regularly updating farmer data as a basis for determining fertilizer allocations. This awareness is expected to reduce administrative errors, which have been a major cause of inaccurate fertilizer distribution targets.

3.3 Strengthening Farmer Group Governance

Farmer group administration training focused on compiling member data, recording land area, compiling fertilizer requirements by commodity, and recording fertilizer distribution to group members. After participating in the training, farmer group administrators were able to organize their administration more systematically, facilitating data verification and the preparation of the RDKK. Strengthening farmer group institutions is a crucial factor in the success of subsidized fertilizer governance. A study of subsidized fertilizer governance in Indonesia found that e-RDKK data validation, administrative transparency, and strengthening farmer institutions are strategic steps to increase the effectiveness of fertilizer distribution and reduce the potential for irregularities. Furthermore, coordination between farmer groups, agricultural extension workers, and village governments has improved following the mentoring. This synergy provides crucial social capital in supporting community-based agricultural development.

3.4 Balanced Fertilization Demonstration

The field demonstration was one of the most popular activities for participants, providing practical experience in proper fertilization techniques. Farmers learned how to determine fertilizer dosages based on plant needs, the proper application timing, and fertilizer placement techniques to increase nutrient absorption efficiency. In addition to inorganic fertilizers, the community service team introduced the use of organic fertilizers as part of a sustainable soil fertility management strategy. The combination of organic and inorganic fertilizers is expected to improve the physical, chemical, and biological properties of the soil while increasing the efficiency of fertilizer use. This finding is in line with the recommendations of various studies which state that increasing the efficiency of fertilizer use through balanced fertilization and the use of organic fertilizers is an important solution to overcome the limitations of subsidized fertilizers while supporting sustainable agriculture.

3.5 Digitalization and Transparency of Fertilizer Management

One topic that captured the participants' attention was the digitalization of fertilizer management through an electronic administration system. Participants were introduced to the importance of utilizing digital data in compiling

SUBSIDIZED FERTILIZER MANAGEMENT IN THE FRAMEWORK OF DEVELOPING TUMPATAN NIBUNG VILLAGE, DELI SERDANG REGENCY, NORTH SUMATRA PROVINCE TO BECOME AN AGROECOEDU TOURISM VILLAGE

Ali Jamil et al

RDKK (Farm-Based Farming Plans), recording fertilizer distribution, and documenting farmer group administration. Advances in information technology offer opportunities to improve the efficiency of subsidized fertilizer management. The use of web-based applications can accelerate data verification, simplify transaction recording, and reduce administrative errors common in manual systems. However, the discussions revealed that some farmers still require assistance in using digital systems. Therefore, the role of agricultural extension workers and village governments remains essential to ensure the gradual progress of the digital transformation process.

3.6 Contribution to the Development of AgroEkoEduTourism Villages

This community service program not only benefits subsidized fertilizer management but also supports the development of Tumpatan Nibung Village as an AgroEkoEduTourism Village. A balanced fertilization demonstration plot is being developed as a learning tool for farmers, university students, and the community visiting the village. The AgroEkoEduTourism concept positions agricultural activities as a means of education and economic empowerment for the community. Proper fertilizer management contributes to increased crop productivity, maintains environmental quality, and demonstrates exemplary cultivation practices for visitors. This activity also strengthens collaboration between universities, village governments, farmer groups, agricultural extension workers, and communities in building productive, transparent, and sustainable agricultural systems. This collaborative approach is a key factor in the successful implementation of public policies at the local level.

3.7 Evaluation of Program Success

Based on observations, discussions, and final evaluations, the community service program had a positive impact on improving community capacity. Participants demonstrated an increased understanding of subsidized fertilizer management, the preparation of RDKK (Regional Farming Plan) plans, balanced fertilization, and the importance of orderly and transparent farmer group administration. The success of the activity was measured not only by the participants' increased knowledge but also by the growing shared commitment to improving fertilizer management at the village level. Village governments, farmer groups, and agricultural extension workers agreed to regularly update farmer data, improve fertilizer distribution records, and develop the use of organic fertilizer as part of a sustainable agricultural system. Overall, the community service activities have made a real contribution in increasing the institutional capacity of farmers and supporting the transformation of Tumpatan Nibung Village into an AgroEkoEduTourism Village that integrates agricultural productivity, environmental conservation, education, and community empowerment.

4. Conclusion

The Community Service Program on **Subsidized Fertilizer Governance in the Framework of Developing Tumpatan Nibung Village into an AgroEkoEduTourism Village** has been implemented well through extension activities, training, field demonstrations, participatory discussions, and mentoring to farmer groups and the village government. This activity successfully increased public knowledge and understanding of subsidized fertilizer policies, the mechanism for developing the Definitive Group Needs Plan (RDKK), the principles of balanced fertilization, and the importance of transparent and accountable fertilizer distribution administration. Furthermore, the mentoring activities strengthened the institutional capacity of farmer groups in determining fertilizer needs based on real-world conditions, which is expected to improve the accuracy of subsidized fertilizer distribution.

Demonstrations on balanced fertilization and the use of organic fertilizers provide farmers with practical experience in more efficient and environmentally friendly fertilization techniques. This approach supports efforts to increase agricultural productivity while maintaining the sustainability of land resources. The community service program also contributes to the development of Tumpatan Nibung Village as an **AgroEkoEduTourism Village** by strengthening agricultural governance, increasing human resource capacity, and developing a demonstration area as an educational platform for farmers, students, and the community. Synergy between universities, village government, agricultural extension workers, farmer groups, and the community is a key factor in the success of this program and a crucial asset in realizing sustainable agricultural development.

SUBSIDIZED FERTILIZER MANAGEMENT IN THE FRAMEWORK OF DEVELOPING TUMPATAN NIBUNG VILLAGE, DELI SERDANG REGENCY, NORTH SUMATRA PROVINCE TO BECOME AN AGROECOEDU TOURISM VILLAGE

Ali Jamil et al

5. Suggestions

The program's sustainability needs to be supported through regular mentoring of farmer groups in preparing and updating their RDKK (Regional Development Plans), strengthening the administration of subsidized fertilizer distribution, and increasing farmers' capacity to apply site-specific fertilizers. Village governments, along with agricultural extension workers, are expected to continue providing guidance and supervision to ensure fertilizer distribution is on target, on time, in the right quantity, type, quality, and at the right price, in accordance with applicable regulations. The development of village compost houses, the use of organic fertilizer, the digitization of farmer group administration, and the construction of sustainable agricultural demonstration plots are also necessary follow-up programs to support the development of AgroEkoEduTourism Villages. Continuous collaboration between universities, local governments, village governments, farmer groups, village-owned enterprises (BUMDes), and the private sector is expected to strengthen food security while improving the welfare of village communities.

REFERENCES

- Food and Agriculture Organization. (2022). The State of Food and Agriculture 2022: Leveraging Automation in Agriculture for Transforming Agrifood Systems. FAO. <https://doi.org/10.4060/cb9479en>
- Food and Agriculture Organization. (2024). FAOSTAT Statistical Database. FAO. <https://www.fao.org/faostat>
- Kementerian Pertanian Republik Indonesia. (2025). Peraturan Menteri Pertanian Republik Indonesia Nomor 15 Tahun 2025 tentang Peraturan Pelaksanaan Peraturan Presiden Nomor 6 Tahun 2025 tentang Tata Kelola Pupuk Bersubsidi. Jakarta: Kementerian Pertanian.
- Mulyani, A., & Dariah, A. (2021). Pengelolaan lahan berkelanjutan dalam mendukung pembangunan pertanian Indonesia. *Jurnal Sumberdaya Lahan*, 15(1), 1–12.
- Purnomo, D., Rahmawati, S., & Hidayat, T. (2024). Digitalisasi tata kelola pupuk bersubsidi melalui sistem elektronik untuk meningkatkan efektivitas distribusi pupuk. *Jurnal Sosial Agribisnis*, 18(2), 145–158.
- Rachman, B., Saptana, & Muslim, C. (2023). Tata kelola distribusi pupuk bersubsidi dalam mendukung ketahanan pangan nasional. *Jurnal Manajemen dan Kebijakan Publik*, 8(1), 31–44.
- Sari, N., Widodo, S., & Prasetyo, A. (2024). Penguatan kelembagaan kelompok tani dalam penyusunan Rencana Definitif Kebutuhan Kelompok (RDKK). *Jurnal Penyuluhan*, 20(1), 25–38.
- Sutrisno, E., Nugroho, A., & Lestari, D. (2023). Penerapan pemupukan berimbang untuk meningkatkan efisiensi penggunaan pupuk pada budidaya padi. *Jurnal Agronomi Indonesia*, 51(2), 120–129.
- Undang-Undang Republik Indonesia Nomor 19 Tahun 2013 tentang Perlindungan dan Pemberdayaan Petani.
- World Bank. (2023). Transforming Food Systems for Climate Resilience. World Bank. <https://www.worldbank.org>
- Zhang, X., Davidson, E. A., Mauzerall, D. L., Searchinger, T. D., Dumas, P., & Shen, Y. (2021). Managing nitrogen for sustainable development. *Nature*, 528(7580), 51–59.