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ADAPTIVE RICE FARMING FOR POST-FLOOD RECOVERY: CLIMATE-RESILIENT CULTIVATION PRACTICES FOR SMALLHOLDER FARMERS IN PULO IBOIH, NORTH ACEH, INDONESIA

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Abstract

Flooding and climate variability pose significant challenges to rice farmers in Gampong Pulo Iboih, North Aceh, particularly through disrupted irrigation, declining land conditions, limited access to production inputs, and low adoption of climate-adaptive cultivation technologies. This community empowerment program aimed to strengthen farmers' capacity to restore rice production through the application of adaptive cultivation technologies and participatory learning. The program was implemented through five stages: socialization and problem identification, technical training, demonstration plot development, mentoring and monitoring, and sustainability planning. Activities combined theoretical instruction with practical learning involving farmer groups, students, lecturers, and village authorities. The intervention included the application of superior rice seed, jajar legowo planting, improved land and water management, integrated pest management, and irrigation pumping, complemented by household-product processing training for women. The program resulted in increased farmer knowledge and skills in land management, superior seed utilization, jajar legowo cultivation, and irrigation management. It also produced a rice demonstration plot, a simple locally made planting tool, a functioning pumping-based irrigation system, and diversified household products. The participatory approach strengthened community ownership and created potential for sustainable adoption of the introduced innovations.

Keywords: adaptive cultivation; community empowerment; climate change; rice farming; technology adoption

INTRODUCTION

Climate change and the increasing occurrence of extreme rainfall events have created growing challenges for rice-based agricultural communities, particularly in areas exposed to recurrent flooding. Rice farming is highly dependent on relatively stable land and water conditions; consequently, recurrent flooding can disrupt crop production, damage agricultural land, increase the risk of crop failure, and affect household food security and farmer income. In North Aceh, including Gampong Pulo Iboih, recurrent flooding has become an important constraint to rice farming. The local condition is characterized not only by physical damage to agricultural land but also by declining soil quality, increased pest and disease pressure, limited access to production inputs, and inadequate application of climate-adaptive cultivation technologies.

The agricultural vulnerability of Gampong Pulo Iboih is particularly important because rice farming constitutes a major livelihood for local households. The partner farmer group, Kelompok Tani "*Tuah Meugoe and Sapue Pakat,*" consists of 137 farmers and has been involved in partnership activities since 2019. However, prior to the intervention, the group had not received technical training specifically addressing seed production and locally appropriate strategies for adapting rice cultivation to flood risks. Although the area has relatively extensive irrigated and rainfed rice fields with suitable agroecological potential, recurrent flooding has constrained the utilization of this potential.

The problem is therefore not simply the occurrence of flooding but the interaction between climatic hazards and farmers' adaptive capacity. Flooding in the study area is associated with high rainfall, overflowing rivers around agricultural fields, and suboptimal drainage. These conditions may alter soil structure and nutrient availability and increase the occurrence of organisms that negatively affect crop productivity. In such circumstances, agricultural recovery requires an approach that moves beyond the replacement of damaged inputs toward strengthening farmers' capacity to manage production under changing environmental conditions.

Previous studies have shown that adaptation of rice farming to flooding can be supported through technological and agronomic interventions. Makarim and Ikhwani (2011) identify technological innovation and appropriate cultivation strategies as important components for reducing the negative effects of flooding on rice farming. Similarly, Putri and Virianita (2021) demonstrate that farmers' adaptation to flood impacts is related not only to the physical characteristics of the hazard but also to farmers' characteristics and perceptions. These findings suggest that adaptation should be understood as a combination of appropriate agricultural technology and farmers' capacity to recognize, accept, and implement that technology. This perspective is particularly relevant in Gampong Pulo Iboih, where limited knowledge and skills regarding flood-adaptive cultivation constitute one of the identified constraints.

An integrated intervention is consequently required. Rather than introducing a single technological component, the program developed a package of adaptive rice cultivation that combined improved cultivation practices, superior seed utilization, organic fertilizer production, improved planting arrangements, water management, pest and disease management, demonstration plots, and farmer mentoring. The program also sought to strengthen the role of the farmer group as a learning and technology-adoption institution. This orientation is consistent with the existing condition that the farmer group had been established and was active, but its activities had not yet been systematically directed toward technology adoption and capacity strengthening.

The intervention was implemented within the Mahasiswa Berdampak/BIMA community empowerment framework, positioning students as facilitators and agents of change who connect academic knowledge and agricultural innovation with farmers' practical needs. The program was designed not merely to transfer technology but to involve farmers in the planning, implementation, and evaluation processes. Through this approach, the program sought to improve farmers' knowledge and skills, facilitate the adoption of locally appropriate adaptive technologies, support the recovery of rice production after flooding, and strengthen food and economic resilience at the village level.

Accordingly, the objective of this community empowerment activity was to strengthen the capacity of rice farmers in Gampong Pulo Iboih to recover and manage rice production under post-flood and climate-change conditions through an integrated, participatory, and locally adaptable cultivation package. The program specifically addressed limitations in adaptive rice cultivation skills, organic fertilizer production, and the practical application of climate-responsive farming technologies.

LITERATURE REVIEW

Flood Adaptation in Rice Farming

Flooding represents a significant production risk for rice farmers because its effects extend beyond temporary waterlogging. In flood-prone agricultural areas, repeated inundation can affect soil conditions, nutrient availability, crop growth, pest and disease incidence, and ultimately production and farm income. Makarim and Ikhwani (2011) argue that reducing flood impacts requires innovation in cultivation technology and strategies that are adapted to the specific conditions of rice-growing environments. Thus, post-flood recovery should not be interpreted solely as restoration of production but as an opportunity to improve the resilience of the farming system.

Putri and Virianita (2021) provide an additional perspective by showing that farmers' adaptation strategies are associated with their characteristics and perceptions of flood impacts. This finding is important because the availability of an appropriate technology does not automatically lead to its adoption. Farmers need to perceive the technology as relevant, feasible, and beneficial within their own production context. Consequently, technological interventions should be accompanied by communication, training, and mentoring that strengthen farmers' ability to understand and apply innovations.

The report's local assessment is consistent with this framework. Farmers in Gampong Pulo Iboih experience recurrent flooding, while their knowledge and skills concerning flood-adaptive varieties, fertilization, and integrated pest management remain limited. The literature and local evidence therefore converge on the importance of integrating technological adaptation with human-capacity development.

Integrated Rice Cultivation Technology

Adaptive rice cultivation is more appropriately understood as an integrated production system than as the application of a single innovation. The literature cited in the program report identifies flood-adapted varieties and integrated crop management as important strategies for reducing production risks in flood-prone rice areas. Sanjaya et al. (2025) similarly demonstrate the relevance of integrated crop management as an approach for disseminating rice cultivation technologies to farmers, while Radian et al. (2025) emphasize integrated nutrient management as part of technology application in rice farming.

Within the present program, this integrated principle was operationalized through a package involving superior seed, improved land preparation, seedling preparation, planting management, fertilization, water management, and pest and disease control. The package was delivered through a demonstration plot and direct farmer participation rather than through input distribution alone. This is important because farmers need opportunities to observe and practice technologies under conditions that resemble their own production environment.

The program specifically applied the IPB 3S rice variety as one of the cultivation approaches. The report describes IPB 3S as a high-yielding, early-maturing variety with adaptability to different environmental conditions and presents its application as part of the post-flood recovery strategy. The use of superior seed was accompanied by land preparation, seed treatment, nursery management, and farmer comparison of seedling performance, thereby transforming seed introduction into a learning process rather than a simple input intervention.

Farmer Learning and Technology Adoption

Agricultural innovation is unlikely to be sustained when farmers are positioned merely as passive recipients. Technology adoption is influenced by knowledge, perceptions, attitudes, communication, and the extent to which farmers can directly experience the innovation. Nurhayati et al. (2018) emphasize that dissemination of rice cultivation innovation requires communication strategies that take into account farmer characteristics, the innovation itself, and the local context.

This principle supports the use of demonstration plots and participatory learning in community empowerment. A demonstration plot allows farmers to observe the implementation of an innovation in an actual production environment and compare it with practices they already understand. In the Gampong Pulo Iboih program, farmers were involved in land preparation, seed preparation, planting, and other cultivation activities. The report explicitly describes the participatory approach as a core principle, with farmers involved from planning through evaluation.

This approach is particularly relevant to *jajar legowo* technology. The program implemented a 3:1 *jajar legowo* planting arrangement and developed a simple wooden planting tool that farmers could potentially reproduce independently. The use of locally accessible materials illustrates an important principle of appropriate technology: adoption potential is strengthened when technology is technically understandable, economically feasible, and maintainable by users.

The literature therefore suggests that the success of technology transfer should not be evaluated only from whether the technology has been introduced. More meaningful indicators include whether farmers understand the technology, can perform it independently, perceive its relevance, and have the institutional capacity to continue using it. This distinction is important for evaluating community empowerment programs because physical outputs alone do not necessarily represent sustainable empowerment.

Farmer Groups and Institutional Capacity

Farmer institutions constitute an important bridge between individual technology adoption and collective agricultural development. Farmer groups can provide mechanisms for knowledge sharing, collective problem solving, access to agricultural inputs, communication with external institutions, and continuation of innovations after a project ends. However, institutional existence does not necessarily imply institutional effectiveness.

The condition of Kelompok Tani Tuah Meugoe illustrates this distinction. The group had already been established and was active, but its activities were reported to remain largely administrative and had not been systematically oriented toward innovation adoption and capacity development. This creates an institutional gap: farmers may receive technical knowledge individually, but without a functioning collective learning mechanism, the continuation and diffusion of the innovation may remain limited.

The empowerment approach therefore needs to connect technical intervention with institutional strengthening. In this program, students and lecturers served as facilitators linking farmer experience with technological knowledge, while demonstration plots provided a collective learning space. This arrangement potentially transforms the farmer group from an administrative unit into a platform for experiential learning and technology dissemination.

Participatory Empowerment as an Integrated Approach

The literature reviewed above indicates that three dimensions need to be connected to improve resilience in flood-prone rice farming: (1) technological adaptation, (2) farmer capacity, and (3) institutional sustainability. A technology-centered intervention without farmer capacity building may result in limited adoption. Conversely, training without appropriate technology may improve knowledge without resolving the underlying production constraints. Likewise, both technology and training may have limited long-term effects if there is no institutional mechanism to maintain and disseminate the innovation.

The Gampong Pulo Iboih program attempts to address this intersection through a participatory intervention involving socialization and problem identification, technical training, demonstration plots, mentoring and monitoring, and sustainability planning. This design corresponds with the identified constraints in farmer skills, adaptive cultivation, and organic fertilizer production.

The program's contribution therefore lies not simply in introducing an adaptive rice cultivation package, but in integrating agricultural technology with experiential learning and community empowerment in a post-flood setting. The use of demonstration plots, locally producible planting equipment, improved seed, and pumping-based irrigation represents an attempt to translate technological innovation into practices that farmers can observe and potentially continue independently. The report records the establishment of a rice demonstration plot, a simple *jajar legowo* planting tool, a functioning pumping irrigation system, and the use of superior seed as concrete outputs of the intervention.

METHOD

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The community empowerment program employed a participatory community-based approach through agricultural technology transfer, demonstration plots, practical training, and continuous mentoring. The activity was conducted in Gampong Pulo Iboih, Kuta Makmur District, North Aceh Regency, involving the *Kelompok Tani Tuah Meugoe and Sapue Pakat*, consisting of 137 farmers. The intervention addressed farmers' limited knowledge and skills in climate-adaptive rice cultivation, superior seed utilization, and organic fertilizer production.

The program was implemented in five stages: (1) socialization and participatory problem identification; (2) technical training and preparation of the demonstration plot; (3) application of an adaptive rice cultivation technology package; (4) mentoring and monitoring; and (5) sustainability planning. Training combined 30% theoretical instruction and 70% practical activities, including adaptive rice cultivation, demonstration plot management, and organic fertilizer production. The implementation applied a *learning by doing* approach, with farmers directly involved in field activities under the guidance of lecturers and students.

The technology package included superior rice seed, adaptive cultivation practices, organic fertilizer application, improved planting management, and water management. The demonstration plot was established at a strategic location that could be easily observed by the farmer group. The report identifies IPB 3S as the rice variety applied in the demonstration plot. Program evaluation used participatory observation, farmer discussions, field mentoring, and documentation. Evaluation focused on three dimensions: (1) farmers' knowledge of adaptive cultivation; (2) practical skills in implementing the technology package and producing/applying organic fertilizer; and (3) participation and potential continuation of the introduced innovations. Data were analyzed descriptively by comparing the initial conditions, implementation process, and outputs of the intervention. This approach was consistent with the community empowerment objective rather than experimental testing of a new agricultural technology.

The use of adaptive cultivation technology and participatory farmer learning was supported by previous studies emphasizing technological adaptation to flooding and effective dissemination of rice cultivation innovations (Makarim & Ikhwani, 2011; Nurhayati et al., 2018).

Figure 1. Introduction of superior seedlings and water pumping activities at partner farmer sites.

RESULTS AND DISCUSSION

Implementation of Adaptive Rice Cultivation Technology

The implementation of the Mahasiswa Berdampak program in Gampong Pulo Iboih demonstrated that post-flood rice farming recovery requires an integrated intervention combining agricultural technology, farmer participation, and continuous technical assistance. Initial identification with farmer partners indicated several constraints, including declining soil fertility, increased pest and disease pressure, limited production inputs, and low application of climate-adaptive cultivation technologies. These conditions confirm that the problem faced by farmers was multidimensional and could not be addressed through the provision of seed or fertilizer alone.

The intervention subsequently introduced an integrated rice cultivation package through a demonstration plot (*demplot*). The package included land preparation, seed preparation and nursery management, regulated planting using the *jajar legowo* system, balanced fertilization, water management, integrated pest and disease management, and post-harvest handling. Farmers were directly involved in these activities through a *learning by doing* approach. This participatory model is consistent with the importance of farmer involvement in the dissemination and adoption of agricultural innovations (Nurhayati et al., 2018).

The use of IPB 3S was described in the implementation of the demonstration plot as one of the principal technological interventions. The report indicates that the variety was selected because of its high yield potential, relatively early maturity, and adaptability to varying environmental conditions. The intervention therefore did not treat superior seed as an isolated input, but combined it with improved cultivation practices. This is important because Makarim and Ikhwani (2011) emphasize that reducing the impact of flooding on rice farming requires an integrated technological and agronomic strategy.

Farmer Learning and Technology Adoption

One of the important outcomes of the program was the strengthening of farmer knowledge and practical skills. Farmers participated directly in land preparation, seed treatment, nursery management, planting, fertilization, water management, pest and disease observation, and harvesting. This process transformed the demonstration plot into a practical learning environment rather than simply a production area.

The application of *jajar legowo* provided a concrete example of this learning process. Farmers were introduced to a more regular planting arrangement and were directly guided in its application at the demonstration plot. The program also developed a simple planting tool made from locally available wood, enabling farmers to reproduce the technology without relying heavily on external equipment.

This finding is relevant to the literature on agricultural innovation dissemination. Nurhayati et al. (2018) argue that dissemination strategies need to consider farmers' characteristics, the innovation being introduced, and the local communication environment. In the present program, direct demonstration and practical participation reduced the distance between technical knowledge and farmers' actual practices. The observed improvement in farmers' confidence and willingness to apply the introduced practices therefore appears to have been supported by experiential learning rather than information transfer alone.

The result is also consistent with Setia Budi et al. (2016), who emphasized the role of agricultural extension in the adoption of IPB 3S-related innovations among rice seed farmers in North Aceh. The present intervention extends this principle by placing students alongside farmers as facilitators of practical technology adoption.

Figure 2 Preparation of the demonstration plot and the *jajar legowo* planting implement.

Irrigation Innovation and Post-Flood Recovery

A particularly important technological output was the implementation of pumping-based irrigation. Post-flood conditions created difficulties in water management, including areas where the soil became dry and hard and where existing irrigation could not optimally supply agricultural land. The pumping intervention enabled water to reach farmers' fields and the demonstration plot.

The result illustrates that post-flood agricultural recovery involves a paradoxical water-management problem: flooding may cause severe damage, but after the flood subsides, agricultural land may experience inadequate water availability because irrigation infrastructure and soil conditions have been disrupted. Consequently, water management needs to be flexible and responsive to changing field conditions.

The intervention also introduced controlled or intermittent irrigation as part of the cultivation package. Farmers were encouraged to manage water levels more systematically rather than treating irrigation simply as continuous water supply. This approach strengthens the adaptive character of the technology package because it addresses both excess-water risks and subsequent water shortages.

The sustainability potential of the pumping technology is relatively favorable because the report characterizes it as a simple and locally manageable technology. Nevertheless, its long-term effectiveness remains dependent on maintenance, availability of water sources, and collective management of the irrigation infrastructure. Thus, technological success should not be interpreted as permanent infrastructure performance; rather, institutional arrangements for maintenance are equally important.

Community Participation and the Role of Students

The results demonstrate strong participation from farmers, village authorities, students, and lecturers. Farmers were involved from socialization and problem identification through technical implementation and evaluation. Village officials facilitated communication, scheduling, farmer mobilization, and administrative coordination, while students functioned as facilitators and technical assistants.

This collaborative structure represents one of the program's important strengths. The intervention did not position the university as an external provider of solutions but created interaction between academic knowledge and local farming experience. Such an approach is particularly important in community empowerment because the sustainability of an innovation depends partly on local ownership.

The report also identifies high community participation and mutual cooperation (*gotong royong*) as important supporting factors. These social resources helped facilitate activities requiring collective labor, particularly irrigation pumping, demonstration plot preparation, and construction of the *jajar legowo* planting tool.

Supporting and Limiting Factors

The implementation was supported by strong community participation, cooperation from village authorities, active student involvement, and access to some agricultural inputs. These factors facilitated technology implementation and strengthened communication between the program team and beneficiaries.

At the same time, several constraints affected implementation. Post-flood soil conditions remained difficult, particularly where the soil became dry and hard. Irrigation infrastructure was initially suboptimal, access to some facilities was difficult, and fertilizer availability was limited. These constraints demonstrate that technological interventions in disaster-affected agricultural areas cannot be separated from the physical and institutional context in which they are implemented.

The findings support the argument of Putri and Virianita (2021) that farmers' adaptation to flooding is influenced by more than the availability of agricultural technology. Farmers' ability to adapt is connected with perceptions, experience, and contextual factors. Therefore, interventions should remain flexible and responsive to local conditions rather than applying a uniform technological package.

Sustainability of the Intervention

The program demonstrated several characteristics that support potential sustainability. The *jajar legowo* planting tool was made from locally available wood, pumping-based irrigation addressed an immediate local constraint, and the demonstration plot provided a continuing reference for farmers. The report also indicates that farmers and village authorities were actively involved, which provides an institutional foundation for continuation. From a technology-adoption perspective, these characteristics are important because technologies that are simple, accessible, and compatible with local resources tend to be easier to reproduce at the community level. The use of a demonstration plot also provides a physical reference through which farmers can continue learning and potentially disseminate practices to other farmers.

However, sustainability remains conditional. The report identifies continuing dependence on production inputs, irrigation availability, managerial capacity, and external assistance as potential constraints. Therefore, the long-term sustainability of the program should be understood as potential sustainability, not as a demonstrated long-term impact. Continued monitoring would be required to determine whether farmers maintain the practices after the intervention and whether the technology expands beyond the demonstration plot.

Taken together, the results indicate that the principal contribution of the Mahasiswa Berdampak program was the integration of adaptive agricultural technology with participatory farmer learning and local institutional collaboration. The program generated tangible agricultural outputs—demonstration plots, *jajar legowo* planting equipment, pumping-based irrigation, and the use of superior seed—as well as intangible outcomes in the form of increased farmer knowledge, skills, participation, and confidence.

The findings reinforce the argument that resilience in flood-prone rice farming should not be approached solely through technological inputs. Technology needs to be accompanied by farmer capacity, practical learning, institutional support, and mechanisms for continued maintenance. This integrated perspective is consistent with the literature on flood adaptation (Makarim & Ikhwani, 2011), farmer adaptation behavior (Putri & Virianita, 2021), and agricultural innovation dissemination (Nurhayati et al., 2018).

CONCLUSION

The Mahasiswa Berdampak community empowerment program in Gampong Pulo Iboih, North Aceh, demonstrated that participatory agricultural interventions can support the recovery and strengthening of rice farming capacity in flood-affected areas. The integration of adaptive rice cultivation, superior seed utilization, *jajar legowo* planting, organic fertilizer application, water management, demonstration plots, and continuous mentoring provided farmers with practical opportunities to improve their knowledge and cultivation skills. The program also generated tangible outputs, including a rice demonstration plot, a locally produced *jajar legowo* planting tool, and pumping-based irrigation. Farmer, student, lecturer, and village-government participation strengthened the potential for continuation of the introduced innovations.

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REFERENCES

Budi, S., Nirzalin, N., & Wardah, E. (2025). Social Dynamics Model of Farmers' Acceptance and Behaviour in the Implementation of Owl House Innovation (Rubuha) to Control Sustainable Rat Pests. *Yuzuncu Yıl University Journal of Agricultural Sciences*, *35*(4), 603-613. https://doi.org/10.29133/yyutbd.1668281

Fatahilah, R. A., Fadilah, C. N., Nurhamdini, N., Sahara, W. O., Sari, W., & Kasogi, M. A. (2025). Pemberdayaan petani Desa Moncongloe guna meningkatkan produktivitas lahan sawah tergenang banjir dengan inovasi padi apung. *Panrita Abdi: Jurnal Pengabdian Masyarakat, 9*(3), 626–635.

Hajrial, A. (2015). *Teknologi produksi optimum (IPB-Prima) padi varietas IPB 3S: Rekomendasi teknologi budidaya*. Bogor, Indonesia: Departemen Agronomi dan Hortikultura, Institut Pertanian Bogor.

Makarim, A. K., & Ikhwani, I. (2011). Inovasi dan strategi untuk mengurangi pengaruh banjir pada usahatani padi. *Jurnal Ilmu Tanah dan Lingkungan, 13*(1), 35–41. https://doi.org/10.29244/jitl.13.1.35-41

Nurhayati, N., Saleh, A., Hubeis, A. V. S., & Ginting, B. (2018). Strategi komunikasi dalam diseminasi inovasi teknologi budidaya padi berbasis pemetaan pengguna di Kabupaten Sidrap Sulawesi Selatan. *Jurnal Penyuluhan, 14*(2). https://doi.org/10.25015/penyuluhan.v14i2.16779

Nurhayati, N., Saleh, A., Hubeis, A. V. S., & Ginting, B. (2018). Strategi komunikasi dalam diseminasi inovasi teknologi budidaya padi. *Jurnal Penyuluhan, 14*(2).

Putri, Y., & Virianita, R. (2021). Hubungan antara karakteristik dan persepsi petani dengan strategi adaptasi petani padi sawah terhadap dampak bencana banjir. *Jurnal Sains Komunikasi dan Pengembangan Masyarakat, 5*(4), 563–576. https://doi.org/10.29244/jskpm.v5i4.783

Radian, R., Sasli, I., Abdurrahman, T., Rianto, F., Syahputra, E., & Ramadhan, T. H., et al. (2025). Penerapan teknologi budidaya tanaman padi melalui pengelolaan hara terpadu di Desa Kuala Dua Kabupaten Kubu Raya. *Jurnal Pengabdian Masyarakat Riset Pendidikan, 4*(1), 1168–1172.

Sanjaya, P., Hendarto, K., Damai, A. A., Aviati, S., Erwanto, E., Rahmalia, D., et al. (2025). Diseminasi teknologi budidaya padi sawah dengan metode pengelolaan tanaman terpadu (PTT). *Jurnal Pengabdian Fakultas Pertanian Universitas Lampung, 1*(1).

Setia Budi, & Eva Wardah. (2022). Constraints And Role Of Agricultural Extension Partnerships In Application Rice Field Rice Cultivation Innovations To Realize Food Security. *International Journal of Economic, Business, Accounting, Agriculture Management and Sharia Administration (IJEBAS)*, *2*(6), 1258–1270. https://doi.org/10.54443/ijebas.v2i6.587

Setia Budi, Eva Wardah, & Nopri Yanto. (2025). Identification Of Constraints And The Role Of Extension Workers In Innovation In Welth Rice Cultivation In The Response To Climate Change In North Aceh District. *International Journal of Economic, Business, Accounting, Agriculture Management and Sharia Administration (IJEBAS)*, *5*(4), 1981–1986. https://doi.org/10.54443/ijebas.v5i4.3934

Setia Budi, Hamid, A. H., Fajri, & Agussabti. (2016). Peran penyuluh pertanian dalam proses adopsi inovasi budidaya benih padi varietas IPB 3S pada petani penangkar benih padi di Kabupaten Aceh Utara. *Prosiding Seminar Nasional BKS PTN Wilayah Barat Bidang Ilmu Pertanian*. Lhokseumawe, Indonesia.