

**Subak Paddy Cluster System on Agricultural Sustainability
in Bengkel Village, Kediri District, Tabanan Regency, Bali**

***Sistem Klaster Padi Subak terhadap Keberlanjutan Pertanian
di Desa Bengkel, Kecamatan Kediri, Kabupaten Tabanan, Bali***

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ABSTRACT

The Subak paddy cluster plays an important role in maintaining sustainable agricultural practices in Bali, especially in Bengkel Village, Kediri District, Tabanan Regency. The Subak system, as a world cultural heritage, not only manages water resources wisely but also reflects local wisdom that supports sustainability. The purpose of this research is to find out the subak paddy cluster system for the sustainability of n farming. This research was conducted in September 2023 in Bengkel Village, Kediri District, Tabanan Regency, Bali, using primary data collected through questionnaires and interviews with eight key informants who are active in the cluster. The method used was purposive sampling, analyzed using descriptive qualitative to understand the phenomenon in Bengkel Village. The results showed that the Subak paddy system cluster can increase paddy productivity to 7 tons per hectare from 5 tons per hectare through more efficient resource management and the application of modern technology. Socially, the existence of the cluster helps strengthen coordination among farmers, encourages closer cooperation, and improves community welfare through available institutional support. Economically, clusters have a positive impact by improving farmers' access to markets, creating more efficient distribution, and strengthening their ability to negotiate ppaddys. The implementation of environmentally friendly practices, such as the use of organic fertilizers, also supports the sustainability of the agricultural ecosystem. The development of innovation, both through product packaging and modern agricultural technology, is an important factor in improving competitiveness. By combining traditional and modern practices, agricultural clusters are able to create a more resilient and sustainable agricultural system.

Keywords: impact, innovation, agricultural sustainability, productivity, Subak

ABSTRACT

Klaster padi Subak berperan penting dalam mempertahankan praktik pertanian berkelanjutan di Bali, terutama di Desa Bengkel, Kecamatan Kediri, Kabupaten Tabanan. Sistem Subak, sebagai warisan budaya dunia, tidak hanya mengelola

sumber daya air dengan bijak tetapi juga mencerminkan kearifan lokal yang mendukung keberlanjutan. Tujuan dari Penelitian ini yaitu untuk mengetahui sistem klaster padi subak untuk keberlanjutan pertanian. Penelitian ini dilakukan pada bulan September 2023 di Desa Bengkel, Kecamatan Kediri, Kabupaten Tabanan, Bali, dengan menggunakan data primer yang dikumpulkan melalui kuesioner dan wawancara dengan delapan key informans yang aktif dalam klaster. Metode yang digunakan adalah purposive sampling, dianalisis menggunakan deskriptif kualitatif untuk memahami fenomena yang ada di Desa Bengkel. Hasil penelitian menunjukkan bahwa klaster sistem padi Subak dapat meningkatkan produktivitas padi hingga 7 ton per hektar dari 5 ton per hektar melalui pengelolaan sumber daya yang lebih efisien dan penerapan teknologi modern. Dari sisi sosial, keberadaan klaster membantu memperkuat koordinasi antarpetani, mendorong kerja sama yang lebih erat, serta meningkatkan kesejahteraan komunitas melalui dukungan kelembagaan yang tersedia. Secara ekonomi, klaster memberikan dampak positif dengan meningkatkan akses petani ke pasar, menciptakan distribusi yang lebih efisien, dan memperkuat kemampuan negosiasi harga. Penerapan praktik ramah lingkungan, seperti penggunaan pupuk organik, turut mendukung keberlanjutan ekosistem pertanian. Pengembangan inovasi, baik melalui pengemasan produk maupun teknologi pertanian modern, menjadi faktor penting dalam meningkatkan daya saing. Dengan menggabungkan praktik tradisional dan modern, klaster pertanian mampu menciptakan sistem pertanian yang lebih tangguh dan berkelanjutan.

Kata Kunci : *dampak, inovasi, keberlanjutan pertanian, produktivitas, Subak*

INTRODUCTION

Bali is one of the provinces that still practices traditional agriculture that not only serves as a source of food, but also a symbol of local wisdom and sustainability. One system that still survives and is well known is the subak system, which is a unique irrigation method developed by the Balinese people. This system not only manages water and land technically, but also reflects the cultural and spiritual values of the Balinese people, such as mutual cooperation and respect for nature. The Subak system is recognized as a World Cultural Heritage by UNESCO, making it an important model to preserve and develop in the context of sustainable agriculture (Wasis 2023). The Subak system is still implemented very well in the province of Bali, one of the villages that implement it is Bengkel Village, Kediri District, Tabanan Regency. This village is famous as a fertile area that is very suitable for paddy cultivation and has become one of the centers of paddy production in Bali (Fajar et al. 2015). Subak not only relies on efficient water

management for agricultural needs, but also instills a sense of shared responsibility among its members, it contains collective and sustainability principles that encourage farmers to work together in maintaining the existing agricultural ecosystem (Wirata 2020). The Subak system also shows harmony between humans and nature, by paying attention to the cycle and sustainability of life around the paddy fields (Fajar et al. 2015).

The novelty of this study is that it discusses the modern integrated subak rice cluster system that focuses on increasing the efficiency and productivity of farmers, rice milling units, input entrepreneurs and rice traders in Bengkel Village, while other studies discuss the general nature of the subak rice system without discussing modern clusterization. Previous studies, which discussed subak agriculture in the formation of this cluster can have a significant impact on farmers. One of the studies conducted by ukanteri et al. (2021), mentioned that subak plays a close role with irrigated agriculture construction, conflict resolution, maintenance, pest control, planting scheduling, and rituals. Another study from Windia, (2018), emphasizes that the subak system has the strength to survive globalization, climate change, and modernization pressures, by maintaining harmony and togetherness according to the foundation of Tri Hita Karana. Darmayasa, (2014) also points out that clustering in Tabanan district has a positive impact on farmers' welfare, due to better access to markets and supporting facilities. In addition, the use of organic fertilizers and more environmentally friendly pest control methods help maintain soil quality and the health of the surrounding environment (Astuti and Widyastuti 2017). Adi, Harisudin, and Ferichani, (2015) also emphasized the importance of analyzing cluster success factors, such as institutions, government support, community involvement, and the application of sustainable agricultural practices. Thus, this research not only focuses on increasing crop yields, but also on how the cluster system can assist farmers in improving their quality of life and maintaining balance (Efendi 2016).

The difference between this research and others is that this research discusses the cluster system of the subak system in terms of regular and well-integrated irrigation, to focus on increasing the efficiency and productivity of

farmers, *paddy milling units*, input entrepreneurs, and paddy traders in Bengkel Village, while other articles are general in discussing the subak paddy system without discussing modern clusterization. This research is also relevant in supporting the achievement of the *Sustainable Development Goals (SDGs)*, especially the goals to alleviate poverty, support food security, and preserve the environment (Natalia and Maulidya 2023). This research aims to determine the subak paddy cluster system for agricultural sustainability in Bengkel Village.

RESEARCH METHODS

The research was conducted in Bengkel Village, Kediri District, Tabanan Regency. The location was chosen because Bengkel Village is an area with a fairly good agricultural sector income each year so that it can be used for agricultural references in Indonesia. In addition, the location is one of the assistance of Muhammadiyah University of Malang in the Subak Paddy Cluster Program. This program focuses on developing agriculture based on the Subak system, a traditional Balinese water management system that plays an important role in the success of agriculture in the region. The research was conducted in September 2023. The data used is primary data by conducting observations, interviews, questionnaires and documentation studies (Ismail et al. 2023). The sampling technique uses *purposive* sampling, which is a deliberate sampling and is selected based on criteria that match the researcher's objectives and are expected to meet (Surayasa et al. 2024). In this study, eight key informants were selected based on predetermined criteria, including their involvement in Subak paddy farming cluster activities and their understanding of the impact of the Subak paddy farming cluster. The eight key informants included farmer group administrators, farmers, input entrepreneurs, *paddy milling units*, *paddy* traders, village heads, agency heads, and the general public. The research used descriptive qualitative analysis to describe the conditions or phenomena that occurred in the field. Quantitative descriptive analysis is a method that describes systematically and deeply a phenomenon based on non-numerical data through the stages of reduction, presentation, and conclusion drawing (Salim Lubis et al. 2021).

RESULTS AND DISCUSSION

Subak Paddy Cluster

The Subak system is challenged by globalization, land conversion, and climate change, which pose new challenges to the sustainability of the Subak system. Along with changing market needs and modernization pressures, Subak in Bengkel Village now faces threats related to sustainability, both in terms of productivity, resource management, and farmer welfare (Windia 2018). Farmers overcome these challenges, and an initiative emerged to form a Subak paddy cluster with a more organized and modern development system supported by agricultural technology as well as wider market access and training as part of an effort to strengthen agricultural competitiveness in Bengkel Village. The formation of this cluster aims to unify agricultural activities, improve resource management, and support the sustainability of the Subak system in the face of various external challenges (Lestari et al. 2023). Clusters not only focus on increasing yields and production efficiency, but also support environmentally friendly practices and encourage collaboration among farmers (Murdiyanto 2020). The establishment of paddy clusters brings changes in productivity and efficiency of agricultural management, but also provides significant social impacts (Wati and Chazali 2015).

Table 1. Comparison of Conditions Before and After the Establishment of the Subak Paddy Cluster in Bengkel Village

Aspects	Before Cluster Formation	After Cluster Formation
Productivity	The average yield is only 5 tons per hectare. The 300 ha of land has not been optimally utilized.	Increased production and sales; joint purchase of inputs and improved product quality through training and innovation.
Capital and Markets	Limited capital means that businesses do not grow. Access to markets is very limited, and selling ppaddys are low because there is no marketing network.	Access to financing is more open, input ppaddys are cheaper collectively, and market access is obtained through group coordination.
Social Work System	Farmers work individually, with no system of	Farmers work in organized groups; mutual

Aspects	Before Cluster Formation	After Cluster Formation
	cooperation. Efficiency and productivity are low because there is no organization.	cooperation increases; social solidarity is strengthened.
Production Vulnerability	There is a lot of crop damage due to: post-harvest mismanagement, inadequate tools, harvest delays, pests, and climate change. Knowledge of quality standards is also lacking.	Better harvest and post-harvest management, with environmentally friendly technologies and technical training for yield quality.
Agricultural Technology	Minimal use of technology. No precision irrigation, modern machinery, or processing of own fertilizers. Dependence on traditional methods that have not been optimized.	Technologies such as ecohydrology, organic fertilizer management from household waste (TPS3R), and organic cultivation systems are applied.

Source: Primary Data (2023)

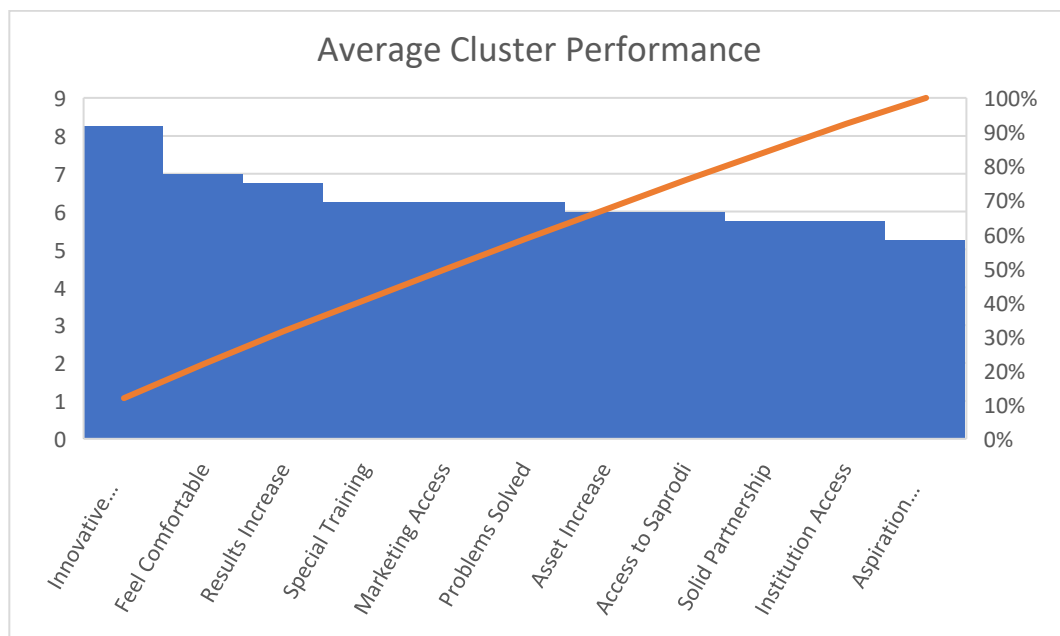


Figure 1. Histogram of the Average Value of Cluster Performance Against Cluster Core Actors

Source: Primary Data (2023)

The histogram shows the average results of cluster performance from the assessors of core actors, including farmers, *paddy milling units*, production input entrepreneurs, and paddy holders. The combined average results provide an overview of the perceptions of all core cluster actors on performance. Based on the average results above, the impact of the first cluster that is very influential is the ability to create agricultural products that are sold more innovatively. Participation from farmers is one of the supporting factors in the innovation process, farmer groups are encouraged to contribute extensively to creating innovations and solutions to needs (Molina et al. 2021). A second very important impact of clusters is that farmers feel comfortable being a member of a farmer group. Some farmers choose to join the cluster in order to get greater benefits, because they believe that joining the cluster will improve the quality and quantity of agricultural products in Bengkel Village. The third impact that greatly affected the farmers was that they could increase production so that the volume of crops increased from 5 tons to 7 tons and the sales of agricultural products became more than before. By joining a farmer group in Bengkel Village, farmers are able to improve the quality of their products in collaboration with other farmers. In farmer groups, farmers exchange information on the use of superior seeds, effective cultivation methods, and integrated pest control, resulting in more consistent and high quality products. In addition, farmer groups function to increase farmers' bargaining power in the market. In this way, collaboration in farmer groups becomes a powerful strategy to obtain better agricultural yields in a sustainable manner.

Social Impact of Clustering

The subak paddy cluster in Bengkel Village has had a significant social impact on the lives of farmers. Joining a cluster makes farmers feel more comfortable and secure in carrying out their agricultural activities. This sense of comfort arises because of the togetherness created among farmers. Through organized cooperation in farmer groups, farmers can support each other and share experiences, especially in the process of production, distribution, and marketing of agricultural products. The production process becomes more effective due to good coordination in the use of land, fertilizer, and other resources. In addition, the

distribution of crops can be done together, minimizing transportation costs and improving time efficiency. In terms of marketing, farmers have easy access to markets because their crops are marketed collectively, with KUD Pejaten as their marketing partner. The existence of the cluster creates mutual support and benefits for farmers, which in turn improves the welfare of farmers in Bengkel Village.

Economic Impact of Clustering

From an economic perspective, the cluster has also made a major contribution to increasing agricultural productivity and efficiency. Bengkel Village is now able to produce 7 tons/ha of paddy. This shows that Bengkel Village's paddy production not only meets the food needs of the local community, but also provides economic value for farmers. Paddy productivity of up to 7 tons/ha on 300 hectares of land, has a considerable impact on the contribution of the village economy and the fulfillment of food needs. The impact of the cluster can also absorb some community labor that can provide positive benefits to the economy of the surrounding community, for example providing economic opportunities, and improving the standard of living of the surrounding community (Satria and Maharani Wibowo 2021).

The impact of clusterization is also felt by farmers. Joining a cluster gives farmers better access to markets, resources, and supporting partners such as the Center for Agricultural Product Improvement Services (P4HP) as a production partner that provides seeds, fertilizers, and agricultural tools to support increased farmer productivity, PT UD. Boki Murni as a production partner that manages crops into value-added products, Pejaten Village Unit Office (KUD) helps farmers market crops and bridges access to local and foreign markets, the Center for Research and Development of Agricultural Innovations (PPDIP) as a research and development (R&D) partner that provides support in the form of technological innovations and recommendations for more effective and environmentally friendly cultivation techniques, and Bank BRI and Bank BPD as financial partners that provide access to financing, business capital loans, and financial services to support the smooth running of farming businesses. This grouping brings benefits such as reduced transportation costs, greater access to markets, and the ability to negotiate with

buyers. This will result in increased income and economic resilience, and ensure farmer welfare.

Environmental Impact Clustering

The impact of the cluster on the environment and agricultural productivity in Bengkel Village is mutually supportive. The application of environmentally friendly agriculture, such as the use of organic fertilizers and natural pest control, is proven to help maintain the balance of the ecosystem, thereby improving soil quality in the long term. Based on research Anggraeni et al. (2024) this study also shows that the use of organic fertilizers can maintain soil balance, increase productivity, and reduce the negative impact of chemical fertilizers. This directly contributes to the high agricultural productivity in the village. Paddy yields can reach 7 tons per hectare, which is higher compared to Teluk Meranti Village which has a land area of 700 hectares and produces 6-7 tons per hectare (Rohadi et al. 2018). Bengkel Village, with a land area of only 300 hectares, managed to achieve this, indicating better efficiency in resource management. The paddy harvest cycle in Bengkel Village is also quite high, reaching 2-3 times a year, depending on weather and land conditions. This shows that clustering has successfully improved the efficiency of land and water resource management, which is implemented through the Subak system, and supports the overall sustainability of agriculture.

Impact of Clustering Technology

Cluster formation also encourages innovation development. Innovation development is carried out by collaborating between farmers and supporting institutions, access to modern agricultural technology, data utilization, and market information. The innovation seen in Bengkel Village is the use of paddy product packaging in small sizes such as 1kg managed by BUMDes Asasta. This packaging facilitates marketing, increases product added value, and meets market needs. Other innovations developed include the use of modern technology such as the use of superior seeds of the mentik susu variety, biofarm organic fertilizer, and pest control. These innovations not only improve product competitiveness but also open up wider market opportunities for farmers. The existence of farmer group

institutions with a good institutional system can improve the performance of farmers in terms of implementing sustainable innovations (Winarni 2020).

Impact of Agricultural Facilities and Infrastructure

The availability of adequate facilities and infrastructure in Bengkel Village, Kediri Subdistrict, Tabanan, Bali has had a real impact on the development of agricultural businesses, especially in increasing the productivity and efficiency of farming. One of the main impacts can be seen from business infrastructure that supports market access, so that product distribution becomes smoother. With good market access, producers can set competitive pricing strategies, which has an impact on increasing product competitiveness in the market (Main 2019). Concrete evidence of this is the increase in the number of sales of agricultural products that can reach 20 tons per month. In addition, easy access to information through media such as WhatsApp, Google, and market mapping to local minimarkets and distributors has also contributed greatly to strengthening the marketing system. These information tools allow farmers to develop more effective marketing strategies, monitor sales performance in real-time, and conduct evaluations for continuous improvement.

Infrastructure support is also an important element, such as road access to facilitate transportation, smooth communication between producers and consumers, and a stable supply of electricity and water. Good infrastructure not only supports smooth operations, but also improves the quality of life of the community (Chatra et al. 2023). Overall, adequate facilities and infrastructure have a positive impact on the smooth running of community activities. Improvements in public facilities, such as access to education, health services, and religious facilities, improve the quality of life and support economic activity. In addition to accelerating the distribution of products to consumers, good facilities also strengthen the image of Desa Bengkel as an advanced and competitive agricultural area.

Impact of Government Support

Government support at various levels has made an important contribution to the development of the Subak paddy cluster in Bengkel Village. At the village level, the Village Government (PEMDES) has empowered farmers through a more

organized Subak farmer group, so that the way farmers work will be more structured. Although Subak has existed for generations, this institutional strengthening aims to adapt Subak to the needs of modern agriculture, such as access to technology, marketing, and training. This effort is in line with the local wisdom values of Subak as a traditional irrigation system that plays an important role in maintaining agricultural sustainability (Bengkel et al. 2023). Furthermore, the Tabanan District Government (PEMKAB) contributes by providing technical assistance and supporting facilities required by farmers. In addition, PEMKAB also facilitates wider market access, so that Subak farmers' crops can compete in regional and national markets at more favorable ppaddys (Sigapura 2021).

Government support at a higher level, namely the Bali Provincial Government (PEMPROV), also plays a role in harmonizing development in all districts/cities. PEMPROV encourages renewal in agriculture that remains based on traditional Subak values, which means combining modern agricultural technology while maintaining the principles of local wisdom that uphold social, environmental, and spiritual balance, so that this world cultural heritage can remain sustainable while increasing agricultural productivity (Muhadir et al. 2018). Meanwhile, central ministries/agencies support through national policies that prioritize the development of agricultural clusters. This support is realized in the form of the application of precision agricultural technology and coaching of farmers, which aims to improve the efficiency and quality of subak paddy farming yields (Lina Sudarwati and Nasution 2024). This support can be seen in the presence of training or coaching to farmers, the use of modern tools or technology, and the involvement of partners or institutions that work together with Bengkel Village.

CONCLUSION

The establishment of the Subak paddy cluster in Bengkel Village in 2022 has had a significant impact on increasing productivity and farmer welfare. Prior to clustering, farmers faced various challenges, such as low yields, limited capital, and difficulties in accessing markets. With clusterization, these problems can be overcome through the creation of a more organized work structure, higher

production efficiency, and wider market access. In addition, the application of more advanced agricultural technology and environmentally friendly farming methods contribute to increasing yields without damaging the balance of the ecosystem.

Socially, the cluster also strengthens solidarity among farmers who previously worked individually. Economically, the cluster brings significant benefits with the support of financial institutions and business partners, which help stabilize farmers' incomes. Government support has also played an important role in clustering, with technical assistance and market access also playing an important role in the success of the cluster. Overall, the Subak paddy cluster in Bengkel Village not only increases agricultural productivity, but also creates a more sustainable farming system and farmer welfare. This can be seen through increased farmer income, increased yields, and the balance of the farmland ecosystem.

REFERENCES

- Adi, R. Kunto;, Moh; Harisudin, and Minar Ferichani. 2015. "Analysis of Determinants of Cluster Success (Study on Integrated Agriculture Cluster of Sukoharjo Regency)." *Caraka Tani: Journal of Sustainable Agriculture* 30(2):81. doi: 10.20961/carakatani.v30i2.11922.
- Anggraeni, Listy, Nadiah Akifah Anwar, Damanhuri, Robi'in, and Thohir Zubaidi. 2024. "The Effect of Liquid Organic Fertilizer from Fruit Peel and Leaf Waste as a Substitute for Chemical Fertilizer on the Growth and Production of Soybeans." 13(2):145-57.
- Astuti, Widi, and Catur Rini Widyastuti. 2017. "Environmentally Friendly Organic Pesticide for Vegetable Pest Control." *Journal of Technology Application and Learning* 14(2):115-20. doi: <https://doi.org/10.15294/rekayasa.v14i2.8970>.
- Bengkel, Tani Subak, Bengkel Village, Kediri District, and M. Si. 2023. "Journal of Community Service (SEWAGATI) Management and Labeling Training for the." 2(2):36–39.
- Chatra, M. Afdhal, Ahmad Syamil, Subawa, Indra Budaya, Musran Munizu, Ni Luh Darmayanti, Muhammad Ainul Fahmi, Sulistianto Sutrisno Wanda, Ina Agustini Murwani, Fitriani Nur Utami, and Irma Maria Dulame. 2023. *Supply Chain Management*. First edition. edited by Efitra. Jambi: Sonpedia Publishing Indonesia.
- Darmayasa, D. N. 2014. "Level of Success of Integrated Farming System in Tabanan District." *DwijenAGRO* 4(2).
- Efendi, Elfin. 2016. "Implementation of Sustainable Agriculture System in Supporting Agricultural Production." *Jurnal Warta* 47:1689-99. doi:

<https://doi.org/10.46576/wdw.v0i47.231>.

- Fajar, Putu, Kartika Lestari, Wayan Windia, Ni Wayan, and Sri Astiti. 2015. "The Application of Tri Hita Karana for the Sustainability of the World Cultural Heritage Subak System: The Case of Subak Introduction to Literature Review." *Journal of Agribusiness Management* 3(1):22–33.
- Ismail, Taufiq Randi, Kusnandar, Erlyna Wida Riptanti, and Universitas Sebelas Maret. 2023. "Temporal Analysis of the Impact of Pandemic on the Income of Citrus Fruit Traders in Pasar Gede, Surakarta City." *Journal of Socio-Economic Dynamics* 24(2):10. doi: 10.54239/2319-022-001-001.
- Lestari, Ni Putu Nina Eka, Made Kembar Sri Budhi, I. Made Suidarma, Ketut Elly Sutrisni, I. Ketut Nuraga, and Desak Made Sukarnasih. 2023. "Strengthening of Subak Economic Business Institutions (Lues) for Sustainable Agriculture in Subak Pulagan Tampaksiring, Bali." *Journal of Applied Quantitative Economics* 16(1):31. doi: 10.24843/jekt.2023.v16.i01.p03.
- Lina Sudarwati, and Nabila Fahira Nasution. 2024. "Government Efforts and Agricultural Technology in Improving the Development and Welfare of Farmers in Indonesia." *Journal of Agrarian Studies and Food Sovereignty (JKAKP)* 3(1):1-8. doi: 10.32734/jkakp.v3i1.15847.
- Molina, Natalia, Gianluca Brunori, Elena Favilli, Stefano Grando, and Patrizia Proietti. 2021. "Farmers' Participation in Operational Groups to Foster Innovation in the Agricultural Sector: An Italian Case Study." *Sustainability (Switzerland)* 13(10):1-27. doi: 10.3390/su13105605.
- Muhadir, Octawinanda, I. B... Pujaastawa, A. A. Ay. Murniasih, and Unud. 2018. "The Impact of Modernization on Tri Hita Karana-Based Agricultural Systems in Bugbug Village Karangasem-Bali." *Humanis* 22:207. doi: 10.24843/jh.2018.v22.i01.p31.
- Murdiyanto, Eko. 2020. *Rural Sociology: An Introduction to Understanding Village Society*. 1st ed. edited by E. Murdiyanto. Yogyakarta: Institute for Research and Community Service (LP2M) UPN "Veteran" Yogyakarta Press.
- Natalia, Angga, and Erine Nur Maulidya. 2023. "Actualization of the Four Pillars of Sustainable Development Goals (SDGs) in Rural Natar District, South Lampung Regency." *Jiip: Scientific Journal of Government Science* 8 (1): 21-41. doi: 10.14710/jiip.v8i1.16513.
- Rohadi, Dede, Tuti Herawati, Mamat Rahmat, Bonda Winarno, and Suwarno Eno. 2018. "Teluk Meranti Village." *Center for International Forestry Research* 0–16.
- Salim Lubis, Fachruddin, Nalwida Rozen, Siska Efendi, and Mahasaraswati University Denpasar. 2021. "Building Synergies Between Universities and the Agricultural Industry in the Framework of Implementing Independent Campus Learning." *National Seminar in the Framework of the 45th Anniversary of UNS in 2021* 5(1):245–52.
- Satria, Dias, and Joshi Maharani Wibowo. 2021. "The Role of Tourism Clusters on

- the Creative Economy of Banyuwangi Regency in the Industry 4.0 Era." *Journal of Indonesian Tourism: Journal of Indonesian Tourism Research and Development* 15(2):134-47. doi: 10.47608/jki.v15i22021.134-147.
- Sigapura. 2021. "Tabanan-Will-Synergize-Building-Agriculture-as-a-Source-of-New-Economic-Growth @ Bmc.Baliprov.Go.Id."
- Sukteri, Ni Putu, I. Gusti Ayu Diah Yuniti, I. Made Suryana, and Yenny Verawati. 2021. "The Role of Subak in Managing Farmer Behavior to Achieve Sustainable Agriculture in Bali." *Journal of Balinese Studies* 11(2):407-26. doi: 10.24843/JKB.2021.v11.i02.p09.
- Surayasa, Made Tusan, Johanna Suek, Roni Haposan Sipayung, and Charles Kapioru. 2024. "Multifunctionality of Yards as a Sustainable Agriculture System to Support Rural Food Availability in Kupang Regency." *Journal of Socio-Economic Dynamics* 15(1):37-48. doi: 10.31315/jdse.v25i1.12228.
- Utama, Iston Dwija. 2019. "Analysis of Marketing Strategies in Micro, Small and Medium Enterprises (MSMEs) in the Digital Age in Bandung City." *EQUILIBRIUM: Scientific Journal of Economics and Learning* 7 (1): 1. doi: 10.25273/equilibrium.v7i1.3829.
- Wasis, Basuki. 2023. "Preservation of Subak Farming System, Forest, Environment and its Obstacles in Bali Province." (August). doi: 10.13140/RG.2.2.22094.88643.
- Wati, Herlina, and Charina Chazali. 2015. "Indonesia's Paddy Farming System in the Perspective of Social Efficiency." *Journal of Social Analysis* 19(1):41–56.
- Winarni, Endah Dwi. 2020. "Village Institutional Empowerment Strategy: A Case Study in Nagarawangi Village, Rancakalong District, Sumedang Regency." *Scientific Journal of Social Protection and Empowerment (Lindayasos)* 2(1):1-19. doi: 10.31595/lindayasos.v2i1.247.
- Windia, Wayan. 2018. "Subak Resilience in the Era of Globalization." *Journal of Bali Building Bali* 1(2):125-44. doi: <https://doi.org/10.51172/jbmb.v1i2.27>.
- Wirata, Gede. 2020. *Shrinkage of Paddy Fields in Denpasar City*. Vol. 7. first. edited by W. Kurniawan. Central Java: CV. Pena Persada.