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Organic Fertilizer from Animal Waste: A Community-Based Economic Strategy for Sustainable Agriculture

Andini[1*], Mutiara Ramadani[2], Mutiara Cantika[3], Rini[4], Fatimawali[5], Asriyana S Kaseng[6]

[1] Universitas Islam Negeri Datokarama Palu, andinidini20033@gmail.com
[2] Universitas Islam Negeri Datokarama Palu, mutiararahmadani748@gmail.com
[3] Universitas Islam Negeri Datokarama Palu, mutiaracantika235@gmail.com
[4] Universitas Islam Negeri Datokarama Palu, fadillahrini690@gmail.com
[5] Universitas Islam Negeri Datokarama Palu, fatimawali@uindatokarama.ac.id
[6] Universitas Islam Negeri Datokarama Palu, asriyana@uindatokarama.ac.id

*Corresponding email: ndinidini20033@gmail.com

ABSTRACT

Effective animal waste management remains a persistent challenge in rural communities, often resulting in environmental degradation and economic inefficiencies. This community service program aims to empower local farmers and livestock keepers by promoting the conversion of animal waste (kohe) into organic fertilizer, thereby supporting sustainable and economically viable agricultural practices. Employing a Community-Based Research (CBR) approach, the program incorporated participatory training, technology transfer, and hands-on composting activities to build community capacity in organic fertilizer production. Data were collected through structured surveys, in-depth interviews, and laboratory analysis to assess improvements in knowledge, fertilizer quality, and economic outcomes. The results indicate a significant enhancement in participants' understanding of waste management, with 75% demonstrating readiness to adopt the technology. Laboratory tests confirmed that the produced organic fertilizer met established quality standards, contributing to reduced reliance on chemical inputs, lower production costs, and improved soil fertility. Furthermore, the initiative stimulated local economic resilience by fostering new agribusiness opportunities. In conclusion, the CBR-driven model effectively integrates environmental sustainability with economic empowerment, offering a scalable and replicable strategy for community-led agricultural development.

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INTRODUCTION

Using animal waste as organic fertilizer is a strategic solution to support environmentally friendly and economically sustainable agriculture and opens significant opportunities for developing a sustainable local agribusiness value chain. Animal waste such as cattle, goat, and poultry manure produced by farming communities often becomes an

environmental problem due to suboptimal management (Salmita, 2023). If not properly managed, this waste can cause soil, water, and air pollution and unpleasant odors that disturb the surrounding community (Oktaviany et al., 2024). However, animal waste contains essential macro- and micronutrients needed by plants, such as nitrogen (N), phosphorus (P), and potassium (K), as well as various microorganisms that naturally improve soil fertility and structure (Bhunia et al., 2021) These nutrients and microorganisms enhance agricultural productivity while maintaining soil ecosystem health (S Sofyan et al., 2024).

Processing animal waste into organic fertilizer opens great opportunities to build agribusiness models oriented toward commercializing organic fertilizer products. This process creates a value chain involving various actors, from livestock farmers and waste processors to distributors and end consumers (Ahmad Haekal et al., 2025). Farmers and local entrepreneurs can develop new sustainable businesses, increase income, and strengthen community economic resilience by converting waste into value-added products. The revenue model generated not only comes from the sale of organic fertilizer but also from diversified agribusiness products such as biofertilizers, liquid fertilizers, and other by-products that can be utilized in agriculture and horticulture .

Moreover, the development of animal waste-based agribusiness encourages the formation of strong partnerships and supply chain networks between farmers, processors, and local markets (Paul et al., 2023; Syamsu et al., 2024; Y. Xin et al., 2023). This collaboration enables waste collection, processing, and distribution of organic fertilizer products efficiently while expanding market access for farmers and small and medium enterprises(AlQershi et al., 2023; Clark & Dixon, 2023; Syaakir Sofyan et al., 2023). Effective local marketing strategies, such as direct marketing to farmers, cooperation with cooperatives, and utilization of digital platforms, can increase market penetration and strengthen the position of organic fertilizer products in the agribusiness market (Bhunia et al., 2021; Hakim et al., 2023).

Using organic fertilizer from animal waste improves soil fertility and crop yields and reduces dependence on expensive synthetic chemical fertilizers that potentially harm the environment (Syamsu et al., 2024). By processing waste into organic fertilizer, farmers can optimize nutrient cycles within their agricultural systems while reducing the negative environmental impacts of waste, such as water pollution and greenhouse gas emissions. This approach aligns with the principles of a circular economy that prioritizes reusing existing resources to create added value and long-term sustainability in the agricultural sector (Dagoudo et al., 2024; Yusriadi, 2023).

However, in practice, managing animal waste into organic fertilizer still faces various complex challenges, especially related to processing technologies that suit the characteristics of the waste and local environmental conditions. Existing fermentation and composting technologies are often not adapted to specific field conditions, resulting in less optimal processing effectiveness and efficiency. Furthermore, as the leading actor in waste management, community empowerment remains

very limited, so the potential benefits have not been maximized. This creates an urgent need to develop more participatory and contextual approaches to managing animal waste (Bhunia et al., 2021; Hakim et al., 2023).

The community-based research (CBR) approach is highly relevant and strategic in addressing these problems by directly involving local communities in the research and development of animal waste processing technologies(Kociuba et al., 2023; Paul et al., 2023; Phillips, 2023; Sardeshpande & Shackleton, 2023). CBR focuses not only on the technical aspects of waste processing but also on the social and economic empowerment of the community. Through active community participation, local knowledge can be integrated with innovations in fermentation and composting technologies, resulting in more adaptive, effective, and sustainable solutions. This approach also encourages capacity building within the community to manage resources independently, create new jobs, and strengthen local economic resilience by developing organic waste-based agribusiness (Dagoudo et al., 2024; Muharram et al., 2021).

The fermentation and composting technologies used in animal waste processing are diverse and continuously evolving. The use of thermophilic microbes, for example, can accelerate the fermentation process by increasing the temperature to a longer and higher thermophilic phase, thus speeding up organic matter decomposition and improving compost stabilization (Akdeniz et al., 2023; Azadi et al., 2023; Qi et al., 2023; Robertson et al., 2023; X. Xin & Ny Avotra, 2023). Microbial inoculation techniques are also applied by adding appropriate microbial populations at the initial composting stage to ensure sufficient enzyme availability, thereby increasing the efficiency of organic matter breakdown(Arantzamendi et al., 2023; Xie et al., 2023; Xu et al., 2023). Additionally, ultra-high temperature aerobic fermentation (UHT-AF) methods involving hyperthermophilic microorganism inoculation can raise fermentation temperatures to 90–100 °C, accelerating the composting cycle and producing faster and more complete lignocellulose degradation (Akdeniz et al., 2023; Syamsu et al., 2024). Pile and trench fermentation methods and vertical and horizontal composting reactors integrating mechanical stirring and ventilation processes have also been developed to suit field conditions and improve process efficiency (Mishra et al., 2023; Syamsu et al., 2022; Y. Xin et al., 2023). Developing innovative and efficient composting equipment allows optimal process control, including measuring decomposition degree and temperature management, ensuring the quality and stability of the produced organic fertilizer (Moya & Camacho, 2023).

From an economic perspective, utilizing animal waste as organic fertilizer provides significant benefits (Abbate et al., 2023; Lu & Li, 2006; Tayade et al., 2023). Using organic fertilizer can reduce agricultural input costs by replacing expensive synthetic chemical fertilizers while reducing environmental pollution risks caused by poorly managed waste disposal (Abbate et al., 2023; Lu & Li, 2006; Tayade et al., 2023). Transforming waste into a valuable resource also opens new economic opportunities and strengthens the economic resilience of local communities through the

development of organic waste-based agribusiness (Bhunia et al., 2021; Salehi & Wang, 2022). Moreover, community-based waste management can enhance the capacity and knowledge of the community to manage resources independently and sustainably, create new jobs, and strengthen social capital, which is crucial for local economic development (Hakim et al., 2023; Yusriadi, 2023).

Thus, developing animal waste processing technology into organic fertilizer through a community-based research (CBR) approach provides effective technical solutions and empowers communities socially and economically. This approach becomes an innovative model that integrates technical, social, and economic aspects to realize sustainable agriculture that is environmentally friendly, economical, and competitive (Bhunia et al., 2021; Dagoudo et al., 2024).

METHODS

The method used in this community service program is the Community-Based Research (CBR) approach, which emphasizes active community involvement throughout all research and program implementation (Dagoudo et al., 2024; Rizkita et al., 2023; Rombe et al., 2023). This approach was chosen because it empowers local communities to independently and sustainably manage animal waste into organic fertilizer while enhancing their economic capacity.

The steps of the method applied include:

1. Identification and Mapping of Community Assets Conducting an inventory of resources owned by the community, including animal waste, local knowledge, and market potential (Yusriadi, 2023).
2. Training and Technology Transfer Providing technical training on animal waste composting and fermentation processes using simple technologies suitable for local conditions (Hakim et al., 2023).
3. Implementation of Organic Fertilizer Production The community collectively manages the waste into organic fertilizer with guidance from the service team.
4. Monitoring and Evaluation: Collect quantitative and qualitative data on fertilizer quality, crop productivity, and the community's economic impact. Data are gathered through interviews, field observations, and laboratory testing (Bhunia et al., 2021; Kumar et al., 2023).

The data in this study were analyzed using descriptive and comparative methods to evaluate the effectiveness of the program in improving agricultural yields and farmers' income. The descriptive method was employed to provide a comprehensive overview of the conditions before and after the program's implementation, while comparative analysis was conducted to assess the changes resulting from the intervention. Additionally, qualitative analysis was used to understand community perceptions of the program and the level of participation at each stage of its implementation. This approach allowed researchers to capture the social dynamics in the field and identify factors that influenced both the program's success and the challenges encountered (Wahyuni et al., 2024). By combining quantitative and qualitative data, the study aimed to present

a holistic picture of the program's impact on the overall well-being of farmers.

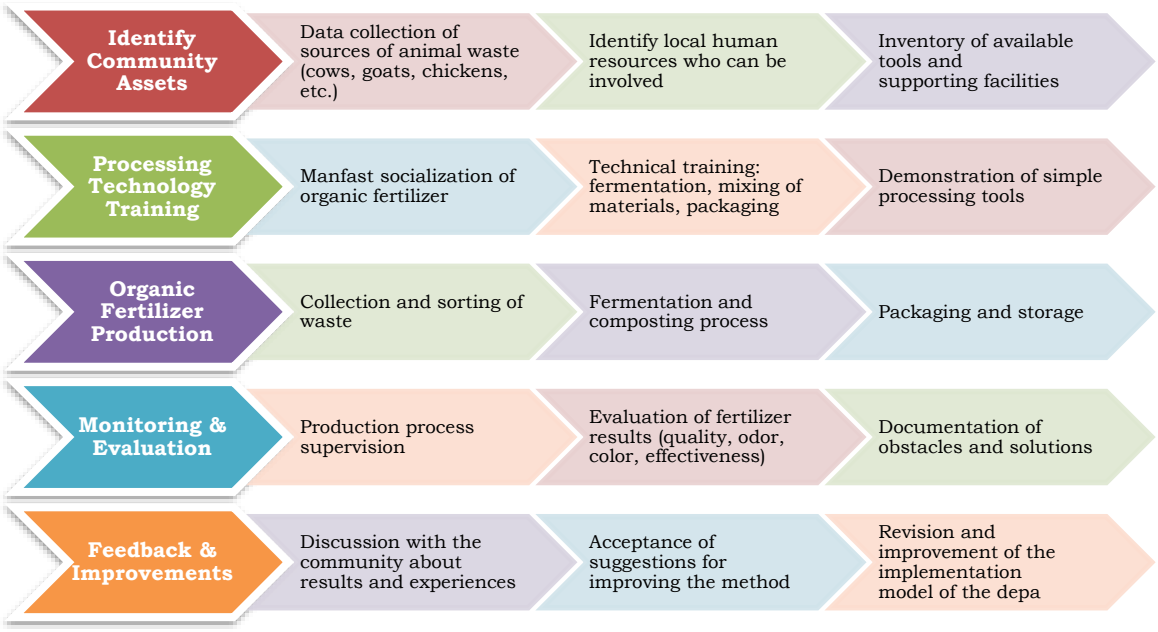

Figure 1. Procesing animal waste into organic fertilizer

This program targets farmer groups and livestock keepers in local communities who use animal waste as a raw material source for fertilizer. The data obtained include primary data from fertilizer production results, crop productivity data, and microeconomic data from farmers' income. Secondary data are obtained from literature and documents related to waste management and agribusiness.

By using the CBR approach, this program aims to produce quality organic fertilizer and build community capacity to manage resources independently and sustainably, thereby providing significant economic impact (Dagoudo et al., 2024; Yusriadi, 2023).

RESULTS AND DISCUSSION

The community service program promoting the utilization of animal manure waste (kohe) as organic fertilizer has shown positive results in increasing awareness, knowledge, and capacity of the local community, especially farmers and livestock keepers, in managing waste sustainably. The Community-Based Research (CBR) approach enables the active involvement of all stakeholders in the learning process, development of simple technologies, and direct implementation in the field (Dagoudo et al., 2024). This approach transfers technology and empowers the community to become the main actors in managing local resources, thereby creating a strong sense of ownership and responsibility for the program's sustainability.

Figure 2. Livestock Waste Utilization Cycle for Organic Farming

Theoretically, the utilization of organic waste as fertilizer is an integral part of the circular economy concept, which aims to optimize resource use and reduce waste that potentially pollutes the environment (Bhunia et al., 2021). Animal manure waste, which has long been considered an environmental problem, can be transformed into a value-added product, namely organic fertilizer rich in essential nutrients such as nitrogen (N), phosphorus (P), and potassium (K) that are vital for plant growth (Lazcano et al., 2011). Proper composting and fermentation processes can enhance the stability of organic matter while maintaining these nutrient contents, making the resulting fertilizer effective in improving soil fertility and crop productivity (Ferraz-Almeida et al., 2019).

The socialization activities conducted in this program include theoretical counseling, technical training on organic fertilizer production, and hands-on practice in processing the waste. Participants, consisting of farmers, livestock keepers, and the public, gain a deep understanding of the ecological and economic benefits of utilizing this waste. Evaluation results show that 85% of participants can understand the waste processing stages well and are ready to apply them in their farming activities. Additionally, participants recognize the potential for production cost savings by reducing the use of relatively expensive chemical fertilizers with negative environmental impacts (Yusriadi, 2023).

From an agribusiness economic perspective, processing the waste into organic fertilizer opens new business opportunities that can increase community income. Farmers can produce fertilizer products that can be sold or used themselves by utilizing waste previously considered worthless, thereby increasing cost efficiency and strengthening local economic resilience (Hakim et al., 2023). The participatory approach in this program also strengthens social networks and collaboration among community

members, which is important social capital in developing community-based agribusiness ventures (Dagoudo et al., 2024).

Figure 3. A photo of socialization and training activities on organic fertilizer production in the field

Source: Author's Documentation 2024

Monitoring and evaluation conducted during and after the program using surveys and in-depth interviews show significant improvements in participants' knowledge and attitudes toward waste management. Quantitative data from pre- and post-training surveys indicate a 75% increase in participants' understanding and a strong commitment to applying organic fertilizer technology in daily farming practices (Wahyuni et al., 2024). Furthermore, laboratory tests on the produced organic fertilizer show nutrient contents that meet organic fertilizer quality standards, making it reliable for improving crop yields.

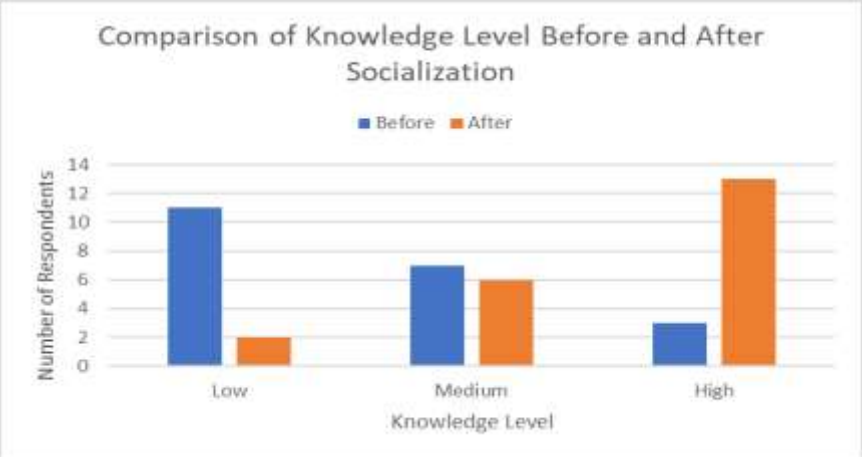

Figure 4. Graph showing the increase in participants ' knowledge and attitudes before and after training

The discussion of these results reinforces the theory that community empowerment through the CBR approach is effective in technology transfer and in building a sustainable local economy. Previous studies also show

that community-based waste management can increase agricultural productivity while reducing the negative environmental impacts of livestock waste (Salehi & Wang, 2022; Shamsuddoha & Nasir, 2024). Thus, this program makes a real contribution to addressing livestock waste problems while supporting food security and local economic resilience.

Moreover, the program raises awareness of the importance of maintaining soil and environmental health through environmentally friendly organic fertilizers. This aligns with the sustainable agriculture concept that emphasizes a balance between productivity and natural resource conservation (Bhunia et al., 2021). Applying organic fertilizer from waste also helps maintain soil microorganism diversity, vital in nutrient cycling and soil structure, thereby supporting long-term productivity (Devi & Khwairakpam, 2022).

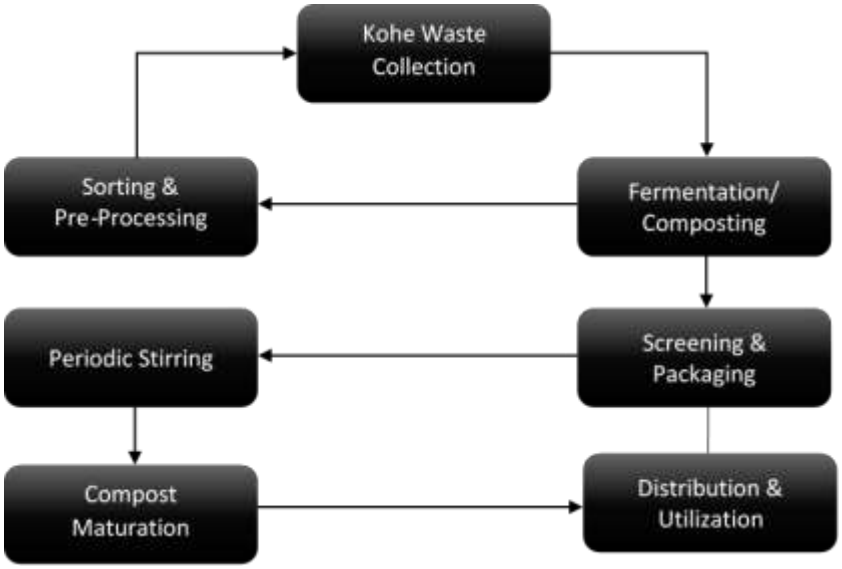

Figure 5. Flowchart of the process of converting the waste into organic fertilizer

Furthermore, the program has significant social impacts. Through active community involvement in organic fertilizer production, social capital in the form of trust, solidarity, and collaboration among community members increases. This is important for the program's sustainability and the development of community-based agribusiness ventures in the future (Yusriadi, 2023). Additionally, the activities open dialogue among farmers, livestock keepers, and other stakeholders, creating synergies supporting holistic, sustainable agricultural development. Regarding challenges, some participants initially experienced difficulties adapting to waste processing technology due to limited knowledge and production facilities. However, these obstacles were gradually overcome with intensive mentoring and continuous training. This underscores the importance of a participatory and sustainable approach in community service programs to achieve optimal long-term impacts.

These results and discussions confirm that socialization and training on using waste as organic fertilizer are effective strategies to increase environmental awareness, agricultural productivity, and

community economic welfare. A community-based approach is key to successfully integrating technical, social, and economic aspects in sustainable agricultural waste management. This program's sustainability can be maintained through ongoing mentoring, appropriate technology development, and strengthening marketing networks for local organic fertilizer products.

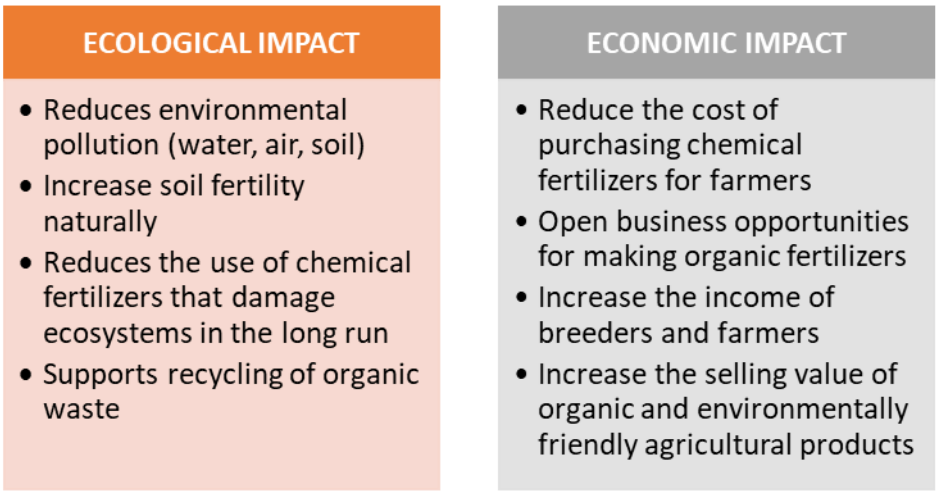

Figure 6. Ecological and Economic Impacts of Organic Fertilizer Utilization

CONCLUSIONS

Program promoting the utilization of animal manure waste (kohe) as organic fertilizer through the Community-Based Research (CBR) approach has successfully increased awareness, knowledge, and community capacity in managing waste sustainably. Using waste provides ecological benefits by reducing environmental pollution, but it also delivers economic value through reduced production costs and new business opportunities in the agribusiness sector. However, the program has several limitations, including limited facilities and infrastructure for organic fertilizer production in some locations and the need for ongoing support to ensure optimal adoption of the technology by the community. A more in-depth evaluation of the long-term impacts on agricultural productivity and the local economy is also needed. As a recommendation, it is suggested that the program's scope be expanded by involving more communities and strengthening marketing networks for organic fertilizer products. Technical assistance and advanced training must also be enhanced to maintain the program's sustainability. Further research on innovations in waste processing technology and comprehensive analyses of economic and ecological impacts are essential to support the development of sustainable agribusiness based on local resources

REFERENCES

Abbate, S., Centobelli, P., & Cerchione, R. (2023). The digital and sustainable transition of the agri-food sector. *Technological Forecasting and Social Change, 187*. https://doi.org/10.1016/j.techfore.2022.122222

Ahmad Haekal, Racmawati A. Rifai, N. Syamsu, Dewi Salmita, & M. Saiful. H. (2025). Optimalisasi Penjualan Makanan Ringan Forum Disabilitas Madamba Rara Di Kota Palu Melalui Shopee Dengan Pendekatan Asset Based Community Development (ABCD). *J-ABDI: Jurnal Pengabdian Kepada Masyarakat*, *4*(8), 1737–1748. https://doi.org/10.53625/jabdi.v4i8.9577

Akdeniz, H. B., Yalpir, S., & Inam, S. (2023). Assessment of suitable shrimp farming site selection using geographical information system based Analytical Hierarchy Process in Turkey. *Ocean and Coastal Management*, *235*. https://doi.org/10.1016/j.ocecoaman.2022.106468

AlQershi, N. A., Saufi, R. B. A., Yaziz, M. F. B. A., Ramayah, T., Muhammad, N. M. N., & Yusoff, M. N. H. B. (2023). The relationship between green entrepreneurship, human capital and business sustainability in Malaysian large manufacturing firms: An empirical study. *Technological Forecasting and Social Change*, *192*. https://doi.org/10.1016/j.techfore.2023.122529

Arantzamendi, L., Andrés, M., Basurko, O. C., & Suárez, M. J. (2023). Circular and lower impact mussel and seaweed aquaculture by a shift towards bio-based ropes. *Reviews in Aquaculture*. https://doi.org/10.1111/raq.12816

Azadi, M., Toloo, M., Ramezani, F., Saen, R. F., Hussain, F. K., & Farnoudkia, H. (2023). Evaluating efficiency of cloud service providers in era of digital technologies. *Annals of Operations Research*. https://doi.org/10.1007/s10479-023-05257-x

Bhunia, S., Bhowmik, A., Mallick, R., & Mukherjee, J. (2021). Agronomic Efficiency of Animal-Derived Organic Fertilizers and Their Effects on Biology and Fertility of Soil: A Review. *Agronomy*, *11*(5), 823. https://doi.org/10.3390/agronomy11050823

Clark, G. L., & Dixon, A. D. (2023). Legitimacy and the extraordinary growth of ESG measures and metrics in the global investment management industry. *Environment and Planning A*. https://doi.org/10.1177/0308518X231155484

Dagoudo, B. A., Ssekyewa, C., & Tovignan, S. (2024). *Organic Fertilizers and Biopesticides: Eco-Innovations, Circular Economy, and Agribusiness Developed by Organic Farmers in Uganda*. https://doi.org/10.5772/intechopen.1005854

Devi, C., & Khwairakpam, M. (2022). *Vermicompost for Sustainable Agriculture and Bioconversion of Terrestrial Weed Biomass Into Vermicompost*. https://doi.org/10.5772/intechopen.100615

Ferraz-Almeida, R., Queiroz, I. D. S., Mikhael, J. E. R., Oliveira, R. C. d., & Borges, E. N. (2019). Enriched Animal Manure as a Source of Phosphorus in Sustainable Agriculture. *International Journal of Recycling of Organic Waste in Agriculture*, *8*(S1), 203–210. https://doi.org/10.1007/s40093-019-00291-x

Hakim, T., Sulardi, S., & Wasito, M. M. (2023). Analysis of the Utilization of Agricultural Waste Fermentation in Increasing Shallot Production. *Jurnal Ilmiah Membangun Desa Dan Pertanian*, *8*(2), 61–67. https://doi.org/10.37149/jimdp.v8i2.221

Kociuba, D., Sagan, M., & Kociuba, W. (2023). Toward the Smart City Ecosystem Model. *Energies*, *16*(6). https://doi.org/10.3390/en16062795

Kumar, S., Sami, S., Agarwal, S., & Yadav, D. (2023). Sustainable fuzzy inventory model for deteriorating item with partial backordering along with social and environmental responsibility under the effect of learning. *Alexandria Engineering Journal*, *69*, 221–241. https://doi.org/10.1016/j.aej.2022.11.023

Lazcano, C., Revilla, P., Pintos, R. A. M., & Domínguez, J. (2011). Yield and Fruit Quality of Four Sweet Corn Hybrids (<i>Zea Mays</I>) Under Conventional and Integrated Fertilization With Vermicompost. *Journal of the Science of Food and Agriculture*, *91*(7), 1244–1253. https://doi.org/10.1002/jsfa.4306

Lu, J., & Li, X. (2006). Review of rice-fish-farming systems in China - One of the Globally Important Ingenious Agricultural Heritage Systems (GIAHS). *Aquaculture*, *260*(1–4), 106–113. https://doi.org/10.1016/j.aquaculture.2006.05.059

Mishra, R., Singh, R. K., & Subramanian, N. (2023). Exploring the relationship between environmental collaboration and business performance with mediating effect of responsible consumption and production. *Business Strategy and the Environment*, *32*(4), 2136–2154. https://doi.org/10.1002/bse.3240

Moya, S., & Camacho, M. (2023). Developing a Framework for Mobile Learning Adoption and Sustainable Development. *Technology, Knowledge and Learning*, *28*(2), 727–744. https://doi.org/10.1007/s10758-021-09537-y

Muharram, S., Hakim, A. R., Rahmah, J., & … (2021). Pembangunan Taman Agrowisata Horti Berbasis Pemberdayaan Masyarakat Di Desa Simpang Empat Kecamatan Simpang Empat Kabupaten Banjar. *Journal of ….*

Oktaviany, M., Syamsu, N., Guci, D. A., Akbar, Lestari, N. P., Suherman, U. D., Aisyah, S., Ansar, Muafiqi, H., & Wibowo, U. D. A. (2024). Manajemen Bisnis Syariah. In *CV Rey Media Grafika*.

Paul, A., Shukla, N., & Trianni, A. (2023). Modelling supply chain sustainability challenges in the food processing sector amid the COVID-19 outbreak. *Socio-Economic Planning Sciences*. https://doi.org/10.1016/j.seps.2023.101535

Phillips, J. (2023). Quantitative and dynamic scenario analysis of SDGs outcomes upon global sustainability 1990–2050. *Anthropocene Review*. https://doi.org/10.1177/20530196231170367

Qi, B., Shen, Y., & Xu, T. (2023). An artificial-intelligence-enabled sustainable supply chain model for B2C E-commerce business in the international trade. *Technological Forecasting and Social Change*, *191*. https://doi.org/10.1016/j.techfore.2023.122491

Rizkita, M., Rosmiati, M., Situmorang, M. L., Pratama, M. D., Rosefa, S., & Suantika, G. (2023). Sustainability status analysis and strategy development for common carp (Cyprinus carpio L.) hatchery industry in Ciparay District, West Java, Indonesia. *Aquaculture International*. https://doi.org/10.1007/s10499-023-01097-5

Robertson, K. J., Brar, R., Randhawa, P., Stark, C., & Baroutian, S. (2023).

Opportunities and challenges in waste management within the medicinal cannabis sector. *Industrial Crops and Products*, *197*. https://doi.org/10.1016/j.indcrop.2023.116639

Rombe, E., Zahara, Z., Adam, R. P., Suardi, S., Wahyuningsih, W., & Taufal, M. (2023). Marine Tourism-Based Sustainable Community Empowerment Model in the New Normal Era. *Journal of Environmental Management and Tourism*, *14*(2), 513–521. https://doi.org/10.14505/jemt.v14.2(66).20

Salehi, B., & Wang, L. (2022). Critical Review on Nanomaterials for Enhancing Bioconversion and Bioremediation of Agricultural Wastes and Wastewater. *Energies*, *15*(15), 5387. https://doi.org/10.3390/en15155387

Salmita, D. (2023). Analisis Risk Management Disclosure: Leverage, Profitabilitas dan Kepemilikan Publik (Studi pada Perbankan yang terdaftar di Bursa Efek Indonesia). *Jurnal Ilmu Perbankan Dan Keuangan Syariah*.

Sardeshpande, M., & Shackleton, C. (2023). Fruits of the city: The nature, nurture and future of urban foraging. *People and Nature*, *5*(1), 213–227. https://doi.org/10.1002/pan3.10428

Shamsuddoha, M., & Nasir, T. (2024). Utilizing Dairy Waste Processing for Organic Agricultural Production: A Sustainable Approach to Producing Organic Goods. *Processes*, *12*(11), 2521. https://doi.org/10.3390/pr12112521

Sofyan, S, Yamani, N. G., Sofyan, A. S., Syamsu, N., Noval, N., & Fatimawali, F. (2024). Mapping Scholarly Trails: Embarking on a Bibliometric Pilgrimage of Research Exploration. In *Proceeding of International Conference on Islamic and Interdisciplinary ….*

Sofyan, Syaakir, Sofyan, A. S., Syamsu, N., & Mansyur, A. (2023). Investigating the Effect of Halal Awareness on Purchase Decision for Halal Products in Indonesia: A Metadata Analysis. In *IQTISHADIA Jurnal Ekonomi & Perbankan Syariah* (Vol. 10, Issue 2, pp. 212–224). https://doi.org/10.19105/iqtishadia.v10i2.10388

Syamsu, N., Salmita, D., Rifai, R. A., Zainuddin, M. A., Rifki, M., Ilham, A., & Nurhanifa. (2024). Developing Muslim Entrepreneurs Through Socialization of Sharia-Based Entrepreneurship. *Journal of Community Service: In Economics, Bussiness, and Islamic Finance*, *1*(2), 59–64. https://doi.org/10.24239/jcsebif.v1i2.3329.59-64

Syamsu, N., Sofyan, S., Aisya, S., & MD, M. (2022). Integration of Using Fintech and Social Media for The Business Sustainability in Pesantren. *Ekonomi Syariah: Journal of Economic Studies*, *6*(2), 167. https://doi.org/10.30983/es.v6i2.6024

Tayade, A. S., Geetha, P., Anusha, S., Arunkumar, R., & Vasantha, S. (2023). Agro-technologies to Sustain Sugarcane Productivity Under Abiotic Stresses. In *Agro-industrial Perspectives on Sugarcane Production under Environmental Stress* (pp. 231–266). Springer Nature. https://doi.org/10.1007/978-981-19-3955-6_13

Wahyuni, T. H., Setyono, P., & Handoko, C. T. (2024). Exploring Waste Processing Technology in Animal Husbandry Practices Among Millennial Farmers in Sleman District. *Iop Conference Series Earth and*

Environmental Science, *1317*(1), 12022. https://doi.org/10.1088/1755-1315/1317/1/012022

Xie, J., Xia, Z., Tian, X., & Liu, Y. (2023). Nexus and synergy between the low-carbon economy and circular economy: A systematic and critical review. *Environmental Impact Assessment Review*, *100*. https://doi.org/10.1016/j.eiar.2023.107077

Xin, X., & Ny Avotra, A. A. R. (2023). Role of environmental ownership and associated parameters to assess green patents in technologies with environmental scanning system as a controlling factor. *Environmental Research*, *227*. https://doi.org/10.1016/j.envres.2023.115809

Xin, Y., Dilanchiev, A., Esmira, G., & Ai, F. (2023). Assessing the nexus between corporate social responsibility and environmental performance: A way forward towards sustainable development. *Energy and Environment*. https://doi.org/10.1177/0958305X231164691

Xu, D., Zhu, Q., Ros, G. H., Xu, M., Wen, S., Zhang, F., & de Vries, W. (2023). Model-based optimal management strategies to mitigate soil acidification and minimize nutrient losses for croplands. *Field Crops Research*, *292*. https://doi.org/10.1016/j.fcr.2023.108827

Yusriadi, Y. (2023). Food Security and Sustainable Development: Overcoming Poverty Through Sustainable Agriculture. *Jissr*, *4*(1), 12–18. https://doi.org/10.59065/jissr.v4i1.130