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FROM WASTE TO VALUE: CIRCULAR BUSINESS MODEL INNOVATION IN TRANSFORMING TOFU BY-PRODUCTS INTO ANIMAL FEED AND DAGE ECONOMIC PRODUCTS

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Abstract

This research aims to examine the application of the circular economy concept and Circular Business Model Innovation (CBMI) in the tofu industry in managing tofu residue waste into value-added products. This study employs a qualitative approach with a descriptive analysis method focused on the "RUN" tofu industry. The results indicate that "RUN" tofu industry have successfully implemented the principles of the circular economy by transforming production residues in the form of tofu waste into animal feed and dage food raw materials. The implementation of Circular Business Model Innovation not only reduces potential environmental pollution but also promotes product innovation that provides additional income sources. There have been innovations in the distribution system and operational cost efficiency, where consumers directly collect products from the "RUN" tofu industry location and the packaging process reuses without incurring additional operational costs. These findings confirm the hypothesis that Circular Business Model Innovation has a positive impact on the creation of value-added products efficiently without requiring large-scale modern technological investment. The collaborative network formed between tofu producers, livestock farmers, and dage makers has successfully created a mutually supportive business ecosystem. The value of this research is expected to contribute theoretically to the literature on sustainable business model innovation and serve as a practical reference for SMEs in realizing resource efficiency as well as economic, social, and environmental sustainability.

Keywords: Circular Business Model Innovation, Circular Economy, Tofu Waste, Economic Added Value, Business Sustainability

INTRODUCTION

In the current era, the issue of industrial waste management has become a key focus in focus in sustainable development. Industrial waste, especially in household industries such as the tofu industry, has attracted attention due to its impact on the environment and public health. Recent research has increasingly highlighted the concept of a sustainable economy as an innovative approach to managing industrial waste. This approach not only emphasizes waste reduction but also the utilization of waste as a product with added economic value in accordance with the principles of a circular economy.

The tofu industry in Indonesia is one of the household industry sectors that produces solid and liquid waste in significant volumes. The tofu industry in Indonesia is dominated by micro, small, and medium enterprises (MSMEs) that generally have not implemented standardized waste management systems. The tofu waste and liquid waste produced are mostly disposed of without further processing, causing environmental problems while also losing potential economic value that could be reutilized Rosida et al., (2025). On the other hand, the tofu waste produced from the soybean slurry filtering process contains fairly high amounts of protein, fiber, and carbohydrates,

so it has the potential to be used as raw material for animal feed or fermentation products such as dage. The circular flow in the tofu industry occurs when solid waste from production is redirected to other producers, such as livestock feed producers, dage producers, and MSME actors who process the waste to be reprocessed into value-added products. Through this mechanism, waste that is generally discarded can be reprocessed into the production and consumption cycle as a new economic product with market value. The implementation of this system not only helps reduce environmental pollution caused by tofu industry waste but also creates additional sustainable income sources for tofu producers.

Several previous studies have examined tofu waste management from various perspectives. The research conducted by Rosida et al., (2025) found an innovation that tofu waste can be processed into marketable food products such as crackers, chips, and flakes. This method not only reduces pollution but also supports a circular economy through added value enhancement and community empowerment. Marhamah et al., (2019) showed that tofu waste are also suitable as livestock feed because their nutritional content is good enough for the growth and productivity of livestock. This utilization reduces waste while providing economic value for entrepreneur and farmers. However, these two studies discuss the use of tofu waste separately as food or feed and have not combined them into a single business model capable of creating, managing, and maintaining value sustainably according to the principles of a circular economy. There has not yet been a study that specifically analyzes how CBMI is applied by tofu MSMEs in transforming tofu waste into both animal feed and dage products as well as analyzing the integration of economic, social, and environmental values sustainably. While also examining sustainable integration. This gap is the focus of this research.

Considering the context above, this study aims to: (1) examine the application of the circular economy concept in the tofu industry, particularly in the utilization of tofu waste; (2) analyze the forms of business model innovation implemented by entrepreneurs in transforming waste into economic products; and (3) identify the combination of circular business models in creating more efficient business sustainability. Theoretically, this study is expected to contribute to the development of research related to the circular economy and sustainable business model innovation, especially in the micro, small, and medium enterprises (MSMEs) sector in the food industry. Concurrently, practically, this research is expected to serve as a reference for tofu industry as well as the community in implementing more effective and sustainable waste management that can also create economic added value. The research results are expected to show that tofu waste management through a circular economy approach can increase the added value of waste, reduce environmental pollution, and create new business opportunities for the local community.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Circular Business Model Innovation is a business model innovation focused on sustainability through the reuse of resources, waste reduction, and the creation of added value from tofu production waste. This concept has emerged as part of the circular economy approach, which aims to reduce waste and maximize the use of resources to ensure they retain economic value. In the tofu industry, circular business model innovation can be implemented by processing tofu residue into new products with economic value, such as animal feed and dage.

According to research by Bastomi et al., (2023) the management of tofu waste, which was previously considered worthless, can provide economic benefits for the community if processed into products that have selling value. The study shows that the utilization of production waste can create new business opportunities and increase the economic productivity of the community. In addition, the research by Rosida et al., (2025) explains that the development of businesses based on waste processing can become a form of business innovation that supports local economic sustainability. Waste management through innovative approaches can help entrepreneurs increase production efficiency while expanding the economic value of waste products.

In the circular economy, business model innovation not only focuses on economic profit, but also on reducing the environmental impact caused by tofu waste management. Therefore, the application of Circular Business Model Innovation in the tofu industry is considered capable of creating a more efficient and sustainable business system. Waste produced from tofu production that still contains quite high nutritional content, such as protein, fiber, and carbohydrates. This content makes tofu waste have the potential to be reused as raw materials for economically valuable products, one of which is as animal feed and dage. The utilization of tofu waste into value-added products is one form of circular economy implementation in the food industry. Research by Marhamah et al., (2019) states that tofu residue has great potential as livestock feed due to its fairly good protein and nutrient content. In addition to being easy to obtain, the cost of processing tofu residue into animal feed is relatively low, thus it can improve livestock production cost efficiency.

Concurrently, the research by Sagita et al., (2024) explains that processing tofu waste into local food products can increase economic added value and create new business opportunities for the community. In addition to providing economic benefits, processing tofu waste into animal feed products helps reduce environmental pollution caused by the direct disposal of tofu production waste. Thus, utilizing tofu waste into value-added products can create economic benefits while supporting environmental sustainability.

The implementation of Circular Business Model Innovation in the tofu industry can drive the creation of new products that have economic value through the utilization of production waste. Circular economy-based business model innovation allows entrepreneurs to transform tofu waste into more valuable products, such as animal feed and dage. The better the implementation of circular business model innovation, the greater the opportunity for creating value-added products from tofu waste. The research by Yusrizal et al., (2025) explained that innovation in processing food industry waste into new products can increase the economic value of waste while supporting business sustainability. This shows that business model innovation has a close relationship with creating added value from products derived from waste processing.

Research published by Donner et al., (2020) explains that agro-industrial waste can be transformed into a source of economic value through innovative circular business models involving reuse, recycling, and valorization processes. The research emphasizes that by-products of the food industry have economic potential if managed through innovative and sustainable business systems. Utilizing waste not only reduces environmental pollution but also creates new business opportunities and improves the efficiency of the production supply chain. The research 'A New Circular Business Model Typology for Creating Value from Agro-Waste' explains that implementing circular business models can create new economic value from agro-industrial waste through innovation, resource efficiency, and alternative product development. The better the implementation of circular business model innovation, the greater the opportunity to create value-added products from production waste. Furthermore, Karim et al., (2025) explains that soybean industrial waste, including tofu waste (okara), has high nutritional content and has the potential to be developed into food products as well as animal feed. The zero-waste processing system strategy is considered able to increase the added value of waste through product processing innovations based on the circular economy.

Circular Business Model Innovation in this research refers to the efforts of tofu entrepreneur in managing tofu waste to become new products with economic value, such as animal feed and dage. This innovation is carried out by reusing production waste to generate economic profit while also supporting environmental sustainability. Tofu waste is a byproduct of soybean processing that still contains relatively high protein, fiber, and nutrient content. These contents make tofu waste potentially reusable as value-added products, especially as animal feed ingredients and traditional food products like dage. Based on the article published by Damanik et al., (2017), the utilization of tofu waste waste as animal feed can help improve livestock production cost efficiency because its nutritional content is still suitable for use as an alternative feed source. In addition, processing tofu waste into animal feed can also reduce the amount of organic waste disposed of into the

environment. Another research by Gagnon et al., (2026) explains that tofu waste can be processed into various economically valuable products because they have characteristics that support the development of fermented foods as well as livestock feed ingredients. One form of utilization is processing them into dage, which is a food product resulting from the fermentation of tofu waste that has market value and can become an additional source of income for tofu entrepreneur as well as the local community.

The implementation of Circular Business Model Innovation allows entrepreneurship to transform production waste into products with economic added-value. In the tofu industry, circular economy-based business model innovation can be carried out by utilizing tofu waste as raw material for derivative products such as animal feed and pressed tofu. According to research by Ginting et al., (2024), business innovations based on the circular economy can create new economic value through the utilization of waste and by-products from production. The study explains that transforming waste into value-added products can improve resource efficiency, reduce environmental impacts, and open new business opportunities for the public and small entrepreneur. In addition, the implementation of a circular business model also supports business sustainability by reducing production costs and optimizing the use of materials that were previously underutilized Other research conducted by Feng et al., (2021) explains that waste and by-products from food processing contain nutrients and functional components that can still be utilized into value-added products. The study emphasizes that the reuse of food waste can enhance sustainability in the food production system through waste reduction and optimization of resource use. In addition, innovation in the utilization of by-products also provides opportunities for the development of new products with higher economic value. Based on theory, previous research, and the relationships among these variables, it can be concluded that circular business model innovation plays a crucial role in improving the utilization of tofu waste into economic products such as animal feed and dage.

Based on the literature reviewed, the following hypotheses are formulated:
H1: Circular Business Model Innovation has a positive effect on Animal Feed and Dage as Value-Added Economic Products.

RESEARCH METHODS

This research uses a qualitative approach with a descriptive analysis method. The descriptive method is used to systematically, factually, and in-depth describe the phenomena occurring in the field related to the implementation of the circular economy concept in the tofu industry. This research design focuses on the study of the application of Circular Business Model Innovation in the management of tofu residue waste into livestock feed products and dage as a value-added product.

This study aims to: (1) examine the application of the circular economy concept in the tofu industry, particularly in the utilization of tofu waste waste; (2) analyze the forms of business model innovation carried out by entrepreneurs in transforming waste into economic products; and (3) identify the combination of circular business models in creating more efficient business sustainability. This approach is considered appropriate because the research focuses on understanding entrepreneurs in transforming waste into value-added products, business strategies in converting waste into value-added products, and the waste management process based on actual conditions in the field.

The research population includes tofu industry entrepreneurs who utilize tofu waste waste as a byproduct, such as animal feed and dage. The research sample was determined using a purposive sampling technique, which involves the deliberate selection of informants based on specific criteria aligned with the research objectives. The informant criteria include tofu entrepreneur who understand the production process, waste management, and circular economy-

based business innovations. The main informants in this research are tofu entrepreneur. Data collection techniques were carried out through in-depth interviews and observations. Semi-structured interviews were conducted with the informants to obtain information regarding the tofu production process, tofu waste waste management, business model innovations, and the economic benefits obtained from the waste processing. Observations were conducted directly at the business location to observe the process of converting waste into animal feed and dage.

The research instrument used was in the form of an interview guide prepared based on research indicators related to Circular Business Model Innovation, circular economy, and sustainable waste management. Each construct was measured using indicators adapted from previous studies, such as Damanik, et al., (2017), Geissdoerfer et al., (2018) ,Marhamah et al., (2019), Donner et al., (2020), Feng et al., (2021), Bastomi et al., (2023), Yulistika et al.,(2023), Sagita et al., (2024), Ginting et al., (2024), Rosida et al., (2025), Yusrizal et al., (2025), Karim, et al. (2025), Gagnon et al., (2026). The research materials consisted of primary data obtained directly from interview and observation results, while secondary data were obtained from journal articles, books, and scientific literature relevant to the research.

The research, the researcher acts as the main instrument who directly conducts data collection, data interpretation, and analysis of research results. The research was carried out on a tofu industry business that implements the utilization of tofu waste as a value-added product. The research location was chosen based on the presence of waste management activities that support the concept of a circular economy. The validity of the data was examined using source and method comparison techniques. Source comparison was conducted by comparing interview results among informants as well as comparing field data with relevant literature studies. The data analysis technique employed a descriptive qualitative analysis method consisting of three stages: data reduction, data presentation, and conclusion drawing. Data reduction was carried out by selecting and simplifying data relevant to the research focus. Data presentation was carried out in the form of descriptive narratives to make it easier to understand and analyze. The final stage was drawing conclusions based on the results of the data analysis obtained, which could explain how the circular business model innovation is applied in converting tofu waste waste into livestock feed and fermented tofu products with economic value and supporting business sustainability.

RESULTS AND DISCUSSION

This section presents and discusses the research findings based on the three objectives formulated in the introduction, namely: (1) examining the application of the circular economy concept in the tofu industry, particularly in the utilization of tofu waste; (2) analyzing the forms of business model innovation carried out by entrepreneurs in transforming waste into economic products; and (3) identifying the combination of circular business models in creating a more efficient business sustainability. The data were obtained through in-depth interviews and direct observations at the "RUN" tofu industry located at Jl. Watu Gede RT.01/RW.09 Arcawinangun, owned by Mr. Runadi.

Based on the observations conducted at the "RUN" tofu industry located at Jl. Watu Gede RT.01/RW.09 Arcawinangun, owned by Mr. Runadi, in-depth interview data and direct observations at the tofu industry regarding the implementation of sustainable circular economy were obtained. The main focus of this research is to examine the application of the circular economy concept in the tofu industry, particularly in the utilization of tofu waste. Based on the results of field observations and interviews, the "RUN" tofu industry has implemented the basic principles of the circular economy in its production activities. This is reflected in the management of solid waste in the form of tofu waste, which are not treated as final residues but are reused to become products that have utility and added economic value-added.

The results of the interview with the entrepreneur explain that the use of tofu waste as animal feed has been carried out since the business was first established and has continued to be

passed down from generation to generation until now. The entrepreneur stated that tofu waste are used for various types of livestock feed, including cows, goats, rabbits, and chickens, without requiring additional processing. As explained by the informant: "Since the beginning of Mr. Runadi's tofu business, the tofu waste have already been used as animal feed, which has continued to be utilized from the beginning until now." This statement indicates that the principle of reusing resources has become an important aspect of the production system of this business.

In addition to being used as animal feed, tofu waste are also processed into raw material for making dage. According to the informant, the process of making dage involves several stages, namely washing the tofu waste, pressing them until dry, mixing with yeast flour and cassava flour, steaming, and then cutting according to needs. The informant explained: "As for the process of managing tofu waste into dage, it was not explained specifically by the dage producers. It was only explained in broad terms, such as the tofu waste being washed, pressed until dry, then placed in a container and mixed with yeast flour and cassava flour, and then steamed." This process reflects the application of the principle of resource reuse in the context of a circular economy, where production waste is recycled into new products that have added economic value.

In terms of liquid waste management, this business has also installed a dedicated drainage system that connects directly to the wastewater treatment facility near the production area. The entrepreneur explained: “At the tofu production site, there is a drainage channel used to discharge liquid waste from tofu production, which is directly connected to the wastewater treatment facility.” Although this liquid waste management system is still relatively simple, this effort demonstrates the entrepreneur’s awareness of the need to reduce the environmental impact of their production activities.

The findings from these interviews and observations align with the research by Rosida et al., (2025), which states that processing tofu residue can reduce the potential for environmental pollution while increasing economic value for the local community. Furthermore, this perspective is supported by Donner et al., (2020), who explain that agro-industrial waste can be transformed into a source of economic value through innovative circular business models involving reuse, recycling, and valorization. Thus, it can be concluded that the “RUN” tofu industry has implemented the circular economy concept through the productive utilization of tofu residue, although its implementation remains based on simple technology and local social relationships.

The implementation of the circular economy concept in the “RUN” tofu industry not only impacts waste reduction and environmental pollution, but also encourages the emergence of business model innovations capable of turning tofu waste into economically valuable products. Through productive use of waste, entrepreneurs have begun to develop various business strategies oriented towards creating added value, both through product innovation and distribution and business network collaborations.

In terms of product innovation, tofu residue previously considered a worthless byproduct has been successfully transformed into two types of economically viable products: animal feed and an ingredient for making dage. This utilization provides additional income for business operators. Based on interview data, tofu waste is sold in several forms: per sack for Rp50,000, per tofu press board for Rp7,000–8,000, and per piece of tofu waste cloth for Rp10,000, or two bundles of cloth for Rp15,000. The owner of the “RUN” tofu business explained, “Utilizing this waste helps increase income; one sack of tofu residue can be sold for Rp50,000. If sold as just one block of pressed tofu, it’s priced at Rp7,000–8,000; if sold as a cloth bundle made from the squeezed tofu residue, it’s priced at Rp10,000; and if you buy two cloth bundles of tofu residue, it costs Rp15,000.” Although the income contribution from selling these tofu residues is not as significant as the income from the main product, tofu, this additional income still helps support the business’s sustainability.

In terms of distribution system innovation, the 'RUN' tofu industry has developed a flexible and adaptive distribution model according to consumer needs. For the transaction process, consumers come directly to the production site to take tofu waste, so the entrepreneur do not have to bear delivery costs. The entrepreneur explained, "The distribution of tofu waste to other parties

is done by having the other parties pick up the tofu waste directly at the tofu site, so the tofu party does not deliver it to other places." Meanwhile, for large orders such as the MBG program, the tofu business delivers directly to the destination. This distribution system shows that business model innovation does not always require complex technological investments, but can be realized through an adaptive approach based on local socio-economic needs.

Besides in terms of innovation and distribution, the interview results also explained the efficiency of production costs, which revealed that no additional costs were incurred in the management of tofu waste. The packaging used also utilizes used soybean sacks that are no longer in use. This was conveyed by the informant as follows: "The container used to wrap the tofu waste only uses used sacks from soybean purchases that were used to make tofu." This reflects a practical circular economy approach, where available resources are maximized without adding to operational costs.

These findings collectively reinforce the theory of Circular Business Model Innovation (CBMI) proposed by Ginting et al., (2024), which explains that circular economy-based business innovation can create new economic value through the utilization of waste and by-products from the production process. This study is also supported by the statement of Bastomi et al., (2023), that the management of tofu waste, which was previously considered worthless, can provide economic benefits to the community if processed into products that have market value.

The implementation of a combined circular business model in the “RUN” tofu industry demonstrates efforts to build a business system that is oriented not only toward economic profit but also toward environmental sustainability and resource efficiency. Through the interconnection between the tofu production process and the utilization of waste by livestock farmers and dage producers, a mutually supportive business relationship is created. This situation demonstrates that production waste is no longer viewed as a byproduct to be discarded, but rather as a resource that can be reused to generate new economic value in a sustainable manner.

The sustainability of this business model is supported by long-established partnerships built on trust and mutual needs. The entrepreneur explained: “The owner knows that they already have regular customers who collect tofu residue daily to process into animal feed and pressed tofu. So, it is ensured that if the tofu owner has leftover production residue, it can be directly taken by the people making animal feed and pressed tofu.” This statement illustrates that at the micro-business level, formal coordination mechanisms are not always necessary, but can rather grow organically from existing social and economic relationships in the community.

From a resource efficiency perspective, the circular business model implemented has contributed to more optimal material usage. The entrepreneur stated that the sustainable circular economy concept is directly applied in their production system: "We strive to reduce the amount of waste from the production stage, reuse materials that are still viable as animal feed, and recycle production leftovers into new products such as dage. In this way, the use of raw materials becomes more efficient and production costs can be reduced." This indicates that resources can maintain their economic value for a longer time within the production cycle, which is a main principle of the circular economy.

From the perspective of business resilience to risk, informants also conveyed that waste utilization contributes to long-term business stability. The owner stated: "The impact of utilizing tofu waste on long-term business stability is obtaining a definite income from every tofu production, which of course will produce tofu waste that will become added value for additional income." Nevertheless, this study also identified several challenges that affect the stability of the circular business model. The entrepreneur acknowledged: "When soybean prices rise, income decreases, because the selling price of tofu and tofu waste does not change or remains the same. Secondly, if the soybeans are of poor quality, the resulting tofu waste are also of lower quality." These challenges indicate that the sustainability of the implemented business model innovation is still highly dependent on the primary production.

In addition, this study also found that the implementation of environmentally friendly principles has not been fully realized, as entrepreneur still use plastic packaging for their main tofu products. This condition indicates that the integration of a circular economy in micro-enterprises is still in the transition phase from a conventional production system to a production system fully based on sustainability principles. These findings are in line with the research of Karim et al., (2025), which emphasizes that a zero-waste processing system strategy can increase the added value of waste through product processing innovations based on the circular economy. Furthermore, Feng et al., (2021) also explained that waste and by-products from food processing that still contain nutrients and functional components can be optimized into value-added products, provided there is consistent commitment and innovation from entrepreneur.

Therefore, it can be concluded from the research results that the combination of circular business models implemented by the 'RUN' tofu industry, through the integration of waste utilization, flexible distribution systems, and collaborative networks among local entrepreneur, has been able to create a more effective business sustainability and generate added economic value without requiring large-scale modern technology investments. These findings confirm hypothesis H1, that Circular Business Model Innovation (CBMI) has a positive effect on animal feed and dage as value-added economic products.

CONCLUSION

Based on the results of research conducted on the "RUN" tofu industry in Arcawinangun, it can be concluded that the implementation of the circular economy concept has been carried out through the utilization of tofu waste into value-added products in the form of animal feed and raw materials for making dage. Waste that was previously considered production residue has been successfully transformed into an economic resource that provides benefits for entrepreneur and the surrounding community. This practice demonstrates the application of Circular Business Model Innovation (CBMI) through productive, effective, and sustainable waste management.

This research shows that business model innovation is not only realized through processing waste into economically valuable products, but also through collaboration between producers, farmers, and tofu producers in forming a sustainable economy. This integration allows tofu waste to re-enter the economic cycle, thereby increasing resource efficiency, reducing potential environmental pollution, and providing additional income for entrepreneur. In addition, liquid waste management is carried out simply through special disposal channels, which indicates the awareness of entrepreneur regarding the reduction of environmental impacts from production activities.

The results of this study provide practical implications that the application of a circular economy in the tofu industry can serve as an alternative strategy to improve waste management efficiency while also creating additional income sources for entrepreneur. The use of tofu waste as animal feed and for making dage can also serve as an example of implementing a circular business model based on local potential that can strengthen economic relationships among entrepreneur in the surrounding environment. In addition, this study shows that collaboration among local entrepreneur plays an important role in supporting the sustainability of a circular economy-based supply chain without having to rely on large-scale modern technology.

Thus, this research still has several limitations. The research was only conducted on one tofu entrepreneur, so the results of the study cannot yet be generalized to all tofu entrepreneurs in other areas. In addition, this study has not quantitatively measured the magnitude of income increase, the cost efficiency of waste management, or the environmental impact resulting from the implementation of the circular economy. The results of this study also have not discussed the use of more modern and environmentally friendly waste processing technology.

Based on these limitations, the next research is recommended to expand the research subjects to several tofu entrepreneurs in different regions to obtain more comprehensive results

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regarding the implementation of Circular Business Model Innovation in SMEs. The subsequent study can also examine liquid waste management more thoroughly, including its potential for processing into products with economic value or alternative energy. In addition, future research is expected to be able to measure economic, social, and environmental impacts quantitatively so that the effectiveness of circular economy implementation in the tofu industry can be analyzed in a more measurable and in-depth manner.

BIBLIOGRAPHY

Bastomi, M., Fitria, E. W., Setyowati, N. A., & Wahyudi, R. (2023). Pengolahan ampas tahu menjadi produk inovasi bernilai jual. *Jurnal Pembelajaran Pemberdayaan Masyarakat (JP2M),* 4(4), 915–923. https://doi.org/10.33474/jp2m.v4i4.20638

Damanik, R. N. S., Pratiwi, D. Y. W., Widyastuti, N., Rustanti, N., Anjani, G., & Afifah, D. N. (2017). Nutritional Composition Changes During Tempeh Gembus Processing. *IOP Conf. Series: Earth and Environmental Science,* 116, 012026. 10.1088/1755-1315/116/1/012026

Donner, M., Gohier, R., & Vries, H. De. (2020). A new circular business model typology for creating value from agro-waste. *Science of the Total Environment*, 716, 137065. https://doi.org/10.1016/j.scitotenv.2020.137065

Feng, J.-Y., Wang, R., Thakur, K., Ni, Z.-J., Zhu, Y.-Y., Hu, F., Zhang, J.-G., & Wei, Z.-J. (2021). Evolution of okara from waste to value added food ingredient: An account of its bio-valorization for improved nutritional and functional effects. *Trends in Food Science & Technology,* 116, 669–680. https://doi.org/10.1016/j.tifs.2021.08.011

Gagnon, R. D., Langevin, M. E., Lutin, F., & Bazinet, L. (2026). Toward a circular economy in the tofu production: Valorization of tofu whey in functional ingredients and coagulant agents through membrane processes. *Separation and Purification Technology*, 383, 1383-5866. https://doi.org/10.1016/j.seppur.2025.136065

Geissdoerfer, M., Marioka, S. N., de Carvalho, M. M., & Evans, S. (2018). Business models and supply chains for the circular economy. *Journal of Cleaner Production*, 190, 712-721. https://doi.org/10.1016/j.jclepro.2018.04.159

Ginting, E., Adi, D., Elisabeth, A., Khamidah, A., Rinaldi, J., Ambarsari, I., & Satya, S. (2024). The nutritional and economic potential of tofu dreg (okara) and its utilization for high protein food products in Indonesia. *Journal of Agriculture and Food Research*, 16, 101175. https://doi.org/10.1016/j.jafr.2024.101175

Karim, A., Freddy, E., & Khalloufi, S. (2025). Innovative strategies for valorization of byproducts from soybean industry: A review on status, challenges, and sustainable approaches towards zero-waste processing systems. *Heliyon*, 11(3), 2405-8440. https://doi.org/10.1016/j.heliyon.2025.e42118

Marhamah, S. U., Akbarillah, T., & Hidayat. (2019). Feed Nutrition Quality of Fermented Concentrate Based on Tofu and Coconut Waste Waste Material with Different Compositions and Acceptability Levels on Goats. *Jurnal Sain Peternakan Indonesia*, 14(2), 145-153. https://doi.org/10.31186/jspi.id.14.2.145-153

Rosida, D. F., & Anggraeny, F. T. (2025). Potensi pengembangan produk inovatif pangan dari limbah tahu sebagai produk diversifikasi bernutrisi tinggi. *Jurnal Inovasi Hasil Pengabdian Masyarakat*, 8(3), 612–625. https://doi.org/10.33474/jipemas.v8i3.24137

Sagita, D., Shofia, S. M., Putri, R. S., Yulianingsih, R. E., & Diniati, B. T. (2024). Pemanfaatan Limbah Ampas Tahu Menjadi Nilai Ekonomis di Desa Bendosari Kediri. *Community Empowerment : Jurnal Pengabdian dan Pemberdayaan Masyarakat*, 2(2), 147–159. https://doi.org/10.15575/commen.v2i2.964

Yulistika, E., Suprihatin., & Purwoko. (2023). Potential Application of Circular Economy Concepts for Sustainable Development of Tofu Industry. *Jurnal Teknologi Industri Pertanian*, 33(3), 254–266. https://doi.org/10.24961/j.tek.ind.pert.2023.33.3.254

Yusrizal., Gusrianty., & Kurniawan, W. J. (2025). Pelatihan Pemanfaatan Ampas Tahu sebagai Produk Bernilai Ekonomi Desa Tarai Bangun, Kampar. *Jurnal Pengabdian Inovasi dan Teknologi Kepada Masyarakat*, 5(2), 586-593. https://10.0.229.170/jdt.v5i2.1719