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Unity in Action: The *Mapalus* Model as a Blueprint for Rural Economic Empowerment

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Abstract

ABSTRACT

Background of study: Circular economy has been widely studied in manufacturing industries, yet its application in rural agricultural communities remains underexplored. Most derivative product developments often overlook whether they meet the real needs of local communities.

Aims and scope of paper: This paper aims to introduce the Mapalus Circular Economic Model, which integrates the traditional Minahasan concept of *mapalus*—a cooperative system based on kinship—into rural economic empowerment. The scope focuses on exploring how agricultural derivative products can be developed and consumed within rural communities to create a sustainable local economy.

Methods: The study employs a literature review method, synthesizing existing research on circular economy, community-based development, and the role of *mapalus* in strengthening collaboration, knowledge transfer, and social cohesion.

Result: : Findings highlight that the Mapalus Circular Economic Model positions rural communities as both producers and consumers of derivative agricultural products. This dual role fosters sustainable economic cycles, enhances community self-reliance, and supports environmental preservation. The integration of local traditions, knowledge resources, policies, and external collaborations is identified as essential for successful implementation.

Conclusion: The Mapalus Model represents a blueprint for rural economic empowerment through circular economy practices grounded in cultural values. By revitalizing *mapalus* traditions, the model fosters collective action, reduces poverty, and strengthens social bonds. However, as this study is based on literature review, empirical validation through field research is required to ensure its practical applicability and effectiveness in real-world settings.

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INTRODUCTION

The study of the circular economy has grown in recent years, with research indicating that environmental sustainability will in turn improve economic growth and resource efficiency. Consequently, discussions of the circular economy are often associated with paradigm shifts and strategies (Urbinati et al., 2017). The circular economy is a form of design intended to optimise resources. One strategy for optimising the use of resources in order to remain efficient is the implementation of upstream-to-downstream business operations. This approach has been demonstrated to be effective in reducing waste and adding value.

The majority of research on the circular economy has been conducted in various manufacturing industrial sectors (Lieder and Rashid, 2016; Shubhrajyotsna Aithal and Aithal P. S., 2023), yet there has been a paucity of investigation into the rural agricultural industry. The development or utilisation of agricultural products into various other derivative products can have an impact on production

optimisation, which aims to make every part of agricultural products usable so that it brings added value. Derivative product development can be considered as a potential avenue for the circular economy (Zikopoulos, 2022). Circular economy, can create a sustainable economic and business cycle for society (Geissdoerfer et al., 2018). In addition to adding value, the circular economy is an economic concept that focuses on the efficient utilisation of resources and benefits the reduction of waste. Despite the lack of a clear definition, there is a consensus that the circular economy aims to achieve sustainable economic growth, reduce pressure on the environment, and improve the efficiency of resource use (Corvellec et al., 2022; EPA, 2023). The concept of the circular economy also discuss about supply chain, where upstream and downstream business can be a way to implement circular economy principles and can extend the product life cycle (De Angelis et al., 2018).

Previous research has idenitifed a number of ways in which the circular economy concept can be applied to the production of agricultural derivatives, including ethanol, biogas and limonene (Dahiya et al., 2020; Machin Ferrero et al., 2022). In Indonesia, the establishment of a national program for the production of biofuels derived from agricultural resources has been initiated. Based on the program, various agricultural products including their waste are being explored for the development of bioethanol as a gasoline blend Other than that, previous research in Indonesia has demonstrated the successful development of agricultural products, such as coconut, into a range of commodities, including coconut oil, accessories, and VCO (Apriyanto, 2019; Muslim and Darwis, 2017; Sondak et al., 2023). The development of derivative products can be regarded as a form of technological innovation, particularly in the context of remanufacturing, which has the potential to result in the production of more environmentally friendly products (Zikopoulos, 2022).

However, previous research has never considered whether each derivative product that is successfully developed is genuinely required by the community itself. Some of these studies appear to overlook the fundamental concept of marketing, which posits that products are created to satisfy human needs. For instance, the successful production of bioethanol for gasoline blending may not be directly consumed by the community due to the necessity for further study and experimentation in order to blend ethanol with gasoline. Consequently, the bioethanol produced by a community group can only be directly distributed to industry or research centres for further development. Furthermore, the production of VCO and coconut oil may appear to be a more promising avenue for direct consumption, yet there is no clear information on why coconut oil and VCO are produced and not others. Recent research findings indicate that successful marketing program depend on an understanding of consumer needs, which remains a highly pertinent issue in the present day (Ganesh et al., 2020). Consequently, it is postulated that circular economics is not merely about optimising production without waste, but also about the creation of products that meet the needs of the community and can become a form of economic cycle. The industrial world, especially in big cities, has the advantage of proficiency in technology, talented people and finance compared to rural areas that lack technology and financial capabilities, plus a shortage of talented people because many educated young people migrate to cities (Wuryaningrat et al., 2017, Wuryaningrat et al., 2023). Therefore, it is essential to introduce a circular economy model that better fits the limitations of rural context, aiming to promote economic well-being among villager (see next section for detailed information). This paper presents a literature review of scientific opinions on circular economy models that are more aligned with the needs and limitations of rural communities in Indonesia. The following sections provide an explanation of these models.

Indonesia is currently one of the countries in the world whose economic growth is consistently positive. Nevertheless, despite the country's positive economic growth, there is still a significant disparity in economic development between western, central and eastern Indonesia. Western Indonesia's economy, technological expertise and human resources (HDI) are considerably more advanced than in other parts of the country (Statistics Indonesia, 2019). One illustrative example is that a significant proportion of villages in North Sulawesi remain unconnected to the internet, which presents a significant obstacle to the region's ability to fully harness the potential of technology. Despite these constraints, the North Sulawesi region, exemplified by Lalumpe village, is home to numerous villages that are economically vibrant, with a strong focus on agricultural production,

including copra, cloves, and rice, as well as pig farming. Another significant challenge is the fact that agricultural businesses tend to focus on upstream operations, with agricultural or livestock harvests being directly sold to buyers without undergoing further processing into derivative products that could potentially add value. Consequently, the concept of a circular economy, which aims to optimise production results through the use of various derivative products, thereby minimising waste, is not yet fully visible.

Circular Economic involves creating a regenerative system where resource usage and waste generation are minimized through strategies such as slowing, closing, and narrowing material and energy loops (Geissdoerfer et al., 2018). While not a new idea, circular economy has gained significant traction globally as a potential framework for various stakeholders – including economic, political, and social entities – to unite in addressing environmental challenges and preventing further damage to the planet (Ghisellini et al., 2016). Economic circularity is related to green supply chain management (GSCM), where green economic activities involve all elements of production from producers to consumers (Hazen et al., 2020).

The concept of the circular economy is also applicable to rural economic activities, despite the relatively limited environmental impact of such activities compared to those in urban areas. Previous studies have demonstrated the importance of reducing waste and resources in rural areas to make clean and healthy environment (Bhunia et al., 2022; Mihai et al., 2021; Surya Adnyani et al., 2023; Vinti and Vaccari, 2022; Wang et al., 2018) and poverty reduction (Leal Filho et al., 2020; Si et al., 2021; Zhang et al., 2020). Nevertheless, there are numerous local resources that have yet to be fully explored (see previous section for an example). It would be highly advantageous to make every effort to utilise resources as effectively as possible. The explorative development of derivative products (e.g. agricultural products) also reduces waste, as the development reduces the proportion of agricultural products that are wasted or uderutilized. However, the development of derivative products must consider the needs of the community, particularly rural communities. Failure to do so will result in the development of products that are neither needed nor useful, as they will not address the needs of the community. Another solution is to market the products widely, but this requires significant time, energy, and financial resources, in addition to considering the competitive landscape. It can be conclude two to three derivative products that can provide significant benefits to the village community, are preferable to ten derivative products that cannot be consumed by the community.

Agricultural products that can be developed into various derivative products needed by the community are produced and consumed by the community itself, thereby creating an economic cycle within the community itself. Community-based agricultural product development represents a strategic approach to empowering local communities, in particular rural communities. This development necessitates the active participation of all elements of the community in the creation, consumption and distribution of agricultural-derived products that meet the needs of the community and have added value. The full involvement of village communities will encourage economic growth, self-reliance of village communities and encourage community activities that are useful for sustainability, and the preservation of local knowledge and strengthen social relations between community members. This will also preserve traditional knowledge and strengthen social cohesion. Thus, this community involvement automatically opens up the possibility of exploring local potential and optimally utilising local resources (Nugraha and Maryono, 2018).

METHOD

This study adopts a narrative literature review approach to synthesize theoretical and empirical insights related to the circular economy, community-based development, and the cultural practice of *mapalus*. A narrative review is appropriate because it allows for comprehensive conceptual exploration across interdisciplinary sources and accommodates variations in methodological traditions found within previous research. The data for this study were collected entirely from secondary sources, including peer-reviewed journal articles indexed in Scopus and Google Scholar,

academic books, government documents, institutional reports, and research publications that discuss sustainability practices and indigenous cooperative systems. The literature search was conducted using keywords such as "circular economy," "community-based development," "indigenous cooperation," "mapalus," and "sustainable community engagement," combined with Boolean operators to refine the results. Only articles published within the last ten years were prioritized, except for seminal works related to mapalus that hold historical significance. Inclusion criteria required that the selected literature be relevant to sustainability, local economic practices, and community participation, while sources lacking academic credibility or unrelated to the topic were excluded. All collected literature was reviewed, compared, and synthesized to identify recurring themes and conceptual linkages. The analysis emphasized thematic interpretation by grouping findings into interconnected topics related to circular economic principles, community empowerment, and the local cooperative values embodied in *mapalus*. Through this method, the study integrates existing knowledge and identifies conceptual opportunities for linking *mapalus* with modern sustainability frameworks.

RESULTS AND DISCUSSION

MAPALUS ECONOMIC CIRCULAR

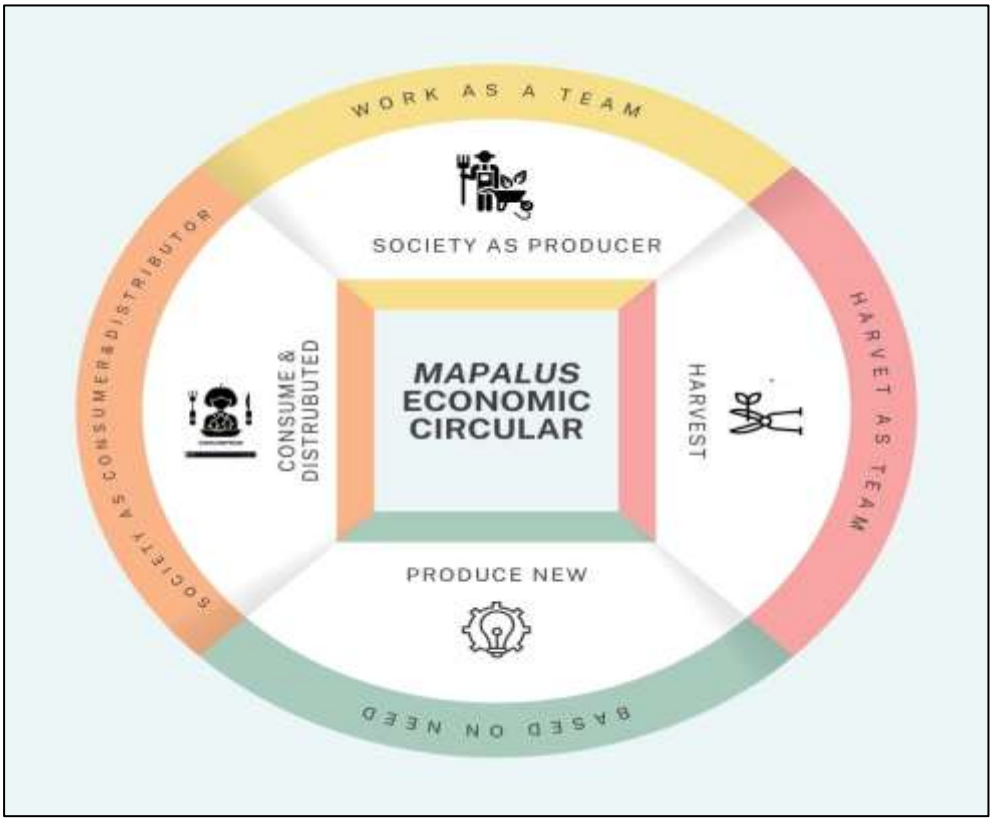

Figure 1. Mapalus Circular Economy

Figure 1 illustrates a mapalus circular economy supply chain that benefits the community. This chain should start at the production stage (planting and harvesting) and continue through production, distribution, and consumption, involving farmers and serving the local community. The circular economic model will necessitate the involvement of the village community in collaborative and cooperative endeavours, imbued with a sense of kinship. Furthermore, success at each stage depends on policy support from stakeholders, including local and village governments, and the availability of knowledge, financial resources, and environmental education.

It may appear challenging to establish a community that is both a producer and consumer of various products of agricultural products. As previously stated, the model depicted in Figure 1 necessitates

the active participation of the village community, which must be willing to collaborate, cooperate, and work together in an emotional bond of kinship. One of the traditions in Indonesia that is implemented with the active involvement of the community is the mapalus tradition. Mapalus is a culture born from the Minahasan philosophy of Si tou tumou tou, which means humans live to humanise humans. Mapalus is a form of mutual cooperation for the welfare of the community and to reduce poverty (Turang, 1983). Even though, the application of mapalus is currently under debate because it has begun to be considered eroded from the life of ethnic Minahasa (Wuryaningrat et al., 2023), however, the mapalus tradition, when integrated into community business development, can serve as a solution to the challenges currently facing the agricultural sector. By fostering collaboration between village communities, the production and marketing of appropriate agricultural derivative products can be streamlined, thereby reducing poverty. The model also aims to encourage the community to re-establish the traditional role of mapalus as a vehicle for collective action and solidarity in poverty alleviation. It seem aligns with the 7th cooperative principle, "concern for community," which emphasizes the cooperative's objective to enhance community well-being in order to promote poverty reduction, gender equality, and environmental sustainability (Von Der Osten et al., 2024).

The mapalus tradition is believed to have originated in the 1680s, mapalus originally began in agriculture, specifically for opening and cultivating farmland (Nelwan et al., 2018). This involved forming a mapalus group of 10 people (or more), typically comprising kin and relatives. Since 1950, mapalus has developed significantly, incorporating elements such as the cash economy, cooperation system, and social system. The political system, both nationally and locally, has leveraged mapalus for development, with these efforts being embraced by mapalus groups. Initially rooted in agriculture, mapalus now spans various aspects of life, including health, social issues, economy and business, community, politics, and security (Nelwan et al., 2018). The original mapalus tradition is currently in a state of decline, as the exchange of energy and knowledge between members has been replaced by financial transactions. (Wuryaningrat et al., 2023). Consequently, the model depicted in Figure 1 reaffirms the original tradition of mapalus and establishes mapalus circular economics as a village movement, rather than a limited initiative confined to a few community groups. Previous studies have demonstrated that when local ideologies (e.g. spirit of mapalus) are firmly established among all villagers, villages can become more resilient and prosperous (Lundgren and Nilsson, 2023).

The mapalus tradition can be linked to social interdependency theory. The deep connection between social interdependency theory and mapalus is evident, as both underscore the importance of mutual support and cooperation within a community (Balliet et al., 2016). Mapalus, serving as a traditional cooperative system, sees community members coming together to collaborate on shared tasks, share resources, and offer aid. This cooperative spirit extends beyond agriculture to encompass various facets of community life, spanning health, social well-being, politics, and security. Through its adherence to the principles of social interdependency theory, mapalus highlights the interconnectedness among individuals and groups, emphasizing the collective endeavor required for prosperity and success. By promoting mutual support, resource sharing, and collective objectives, mapalus strengthens community cohesion and resilience, embodying the practical application of social interdependency theory in fostering communal prosperity. Consequently, leveraging this interdependence and communal needs, it becomes feasible to mobilize the community towards achieving shared objectives, particularly in advancing social welfare. Thus, the mapalus system believed serves as a foundational pillar for the circular economics.

1. Society as producer: Plant and Harvest

In the original mapalus system, a member of the mapalus is a family living in one house. This definition encompasses not only farmers but also their entire family, who are involved in the development of village agriculture. When the farmer works to plant or cultivate the farmland, other family members will help according to their capacity and ability, for example by making food supplies. In other words, no aspect of agricultural production is excluded from the responsibilities of

mapalus members. All members of the mapalus must participate in the planting and harvesting of agricultural products. Group unity can positively influence members, making them more likely to engage in and find enjoyment in challenging cognitive activities (Xie et al., 2019; Xing et al., 2022). In mapalus, there is no differentiation in treatment within a family; all members are considered equal. In practice, agricultural land management within the mapalus system can be carried out by both men and women, regardless of age. Other members who lack agricultural skills can learn and simultaneously assist with other necessary tasks. Previous research provides empirical evidence that mapalus represents a practical form of knowledge transfer (Wuryaningrat et al., 2023).

2. Exploration and produce on New Derivative Product

In the pursuit of sustainable development, the relationship between derivative product creation and sustainability has emerged as a pivotal area of investigation. Derivative products, which are developed by modifying or building upon existing products, can exert a profound influence on the overarching sustainability of a product ecosystem (Savy and Cozzolino, 2022). One of the challenges facing the Indonesian agricultural sector is the lack of value addition in the production of agricultural commodities. Many agricultural products are sold in their raw form, without undergoing any processing or manufacturing. For instance, coconut farmers in North Sulawesi typically sell their products in their raw state, which places them at a disadvantage in the coconut trading system (Hutabarat et al., 2016). Furthermore, there is competition among traders and processors, yet this is ineffective due to the high cost of transport per unit volume. This ultimately leads to unhealthy competition, which dominates the marketing system. It can be posited that the transition from a direct sales model to the reproduction to derivative products tailored to the needs of the local community represents an effort to create added value and profitability, while simultaneously adhering to environmentally conscious practices.

The community's success in creating derivative products needed by the society is essential for local business sustainability and resilience. This reproduction system can optimize the use of agricultural raw materials, minimize waste, and maximize the value of resources. Derivative products drive innovation, increase competitiveness and reduce the environmental impact of production through more efficient processes.

The term of lean six sigma (LSS) is used to describe a methodology for continuous improvement that focuses on eliminating waste and reducing variation in manufacturing, service, and design processes. The implementation of LSS can facilitate the knowledge creation (Asif, 2021), thereby enabling the production of derivative products that meet the needs of the community. In order to create new products that can be produced from agricultural land, LSS prescribes the development of new products known as DMADV (Define-Measure-Analyze-Design-Verify). In essence, the DMADV process enables the creation of new agricultural derivative products. This process is related to the process of identifying the optimal new product, which is a product that is needed by the community/consumers (Bidikar et al., 2022).

The concept of LSS-DMADV, as presented, is consistent with the purpose of marketing as a process of identifying and understanding consumer needs. When these needs are met, the product will sell itself to consumers (Drucker, 2020). The objective of social marketing is to implement a comprehensive campaign that will encourage individuals to recognise, value and support local products (Kotler et al., 2018). The application of social marketing can encourage individuals to value and purchase local products, which in turn can stimulate economic growth, cultural preservation, and community welfare. Furthermore, in the context of this study, the development of derivative products that are naturally adapted to the needs of the community ensures that the products produced by the community (producers) can also be consumed by the community (consumers), or in other words, enjoyed by all levels of the village community. The mapalus circular economy represents a strategic initiative designed to influence the behaviour of the community with regard to the production and consumption of local agricultural derivative products.

The local knowledge is constituted in the basis for decision-making and is an important part of the livelihood of rural families (Gutiérrez García et al., 2020), however, it is not often sufficient to rely on the local knowledge of villagers, as farmers frequently find themselves constrained by their existing knowledge and unable to develop it further (Šūmane et al., 2018). In order to address these challenges and constraints, it is necessary to implement more inclusive and flexible approaches to the organisation of knowledge creation, integration and sharing (Nonaka and Reinmoeller, 2017).

It is evident that the villagers are may unable to ascertain the requisite derivative products without the assistance of external parties. Such assistance can be in the form of research and development that can be carried out in collaboration with external parties such as universities, research institutions, local government and private sector (Kurnia et al., 2019; Taylor and Bhasme, 2018; Wisnumurti et al., 2020). Through this collaboration, villagers can gain a deeper understanding of their own needs and in the future, it will be possible to produce agricultural derivative products that can be consumed by the community and even traded more widely. The research and development conducted by villagers in collaboration with external parties represents a form of absorptive capacity. Absorptive capacity refers to a organization capability to evaluate, integrate, and utilize external knowledge for commercial purposes. Absorptive capacity consists of organizational routines essential for recognizing and applying knowledge and learning (Indarti, 2017). A number of studies have idenitifed that individual, organisational or community innovative plans will not run smoothly in the absence of sufficient absorptive capacity (Rafique et al., 2018), the findings of the study are also applicable to individuals residing in rural areas (Sumual et al., 2020, Sumual et al., 2023). Accordingly, the exploitation of derivative products derived from agricultural products in accordance with marketing concepts and community needs will be significantly influenced by the villager's willingness to learn and collaborate with external parties. Consequently, the advancement of a village circular economy necessitates the establishment of a network comprising a multitude of stakeholders (Liaros, 2022).

3. Society as Consumer and Distributor

Once a new product has been successfully developed, the next stage is to re-engage the community in consuming the products that have been developed together. In this stage, the products that have been successfully developed together are accommodated in the village marketplace. The objective of this marketplace is to facilitate the sale of products that have been developed by the community with the intention of meeting their own needs at a price below the market rate. Once these internal needs have been met, the opportunity arises to market the product to other villages at market prices. Furthermore, the profits generated by the marketplace will be reinvested in the community and used as retained earnings to investments.

This approach enables two key objectives to be achieved: the establishment of a robust economic cycle within the village and the enhancement of the village's resilience to a diverse array of crises and climate change. The current situation of rural agriculture is characterised by a number of challenges, including the migration of rural populations to urban areas, declining incomes for farmers, and social and psychological changes that may have a negative impact on the resilience of rural communities (Wilson et al., 2018).

THE INTERPLAY OF A NUMBER OF INTERRELATED FACTORS

1. Policy

The advancement of a village can be measured by how rapidly it develops. In order for a village to develop, it is necessary for the village government to implement policies and regulations that support the welfare of rural communities. The majority of the world's impoverished people live in rural areas, and villages are also documented as experiencing environmental degradation due to poverty. There has been considerable theoretical and empirical advancement in the fields of household behaviour, institutional economics, community behaviour, and endogenous regional growth. However, there is

often a lack of synchrony and specificity between policies and day-to-day community activities (Van der Ploeg et al., 2017). It is necessary to implement appropriate and specific policies to facilitate the development of villages, enhance food security, increase village income, and prevent the outflow of village resources (Deepak, 2018). This can be achieved through the implementation of appropriate policies that align with the collective interest of the community.

As previously stated, the mapalus circular economics model necessitates the full participation of all elements of the village community in order to realise the derivative products required by the community and to bring in new sources of income. Consequently, in order for this movement to become a village movement, there must be policies and regulations that support the movement. The implementation of policies and encouragement from the village government, the rejection of the mapalus circular economics movement by some individuals may potentially be transformed into acceptance, particularly if the benefits of the movement have been experienced by the community.

2. Knowledge resource

The knowledge-based view (KBV) theory posits that knowledge is a fundamental resource that can continue to grow as it is used to enhance the competitiveness of organisations (Nonaka and Toyama, 2015). Knowledge is defined as a fluid mixture of framed experiences, values, contextual information, and expert insights that provide a framework for evaluating and combining new experiences and information. It can be argued that the knowledge resources owned by the villagers will determine whether the villagers can develop their village or not. Knowledge management practices takes an essential role in the producers' resilience capacity to face and adapt to changing environments in the productive, social and environmental level (Gutiérrez García et al., 2020).

A constructive interaction both horizontally to community members and vertically through linkages with extension agents, research institutions and private sector interests will facilitate the transfer of knowledge (Indarti, 2017; Taylor and Bhasme, 2018). Furthermore, previous research has demonstrated that mapalus represents a viable method of knowledge transfer, as it facilitates the acquisition of agricultural skills among mapalus members (Wuryaningrat et al., 2017). Furthermore, greater ownership of knowledge resources is also associated with organisational learning (Liu, 2017), and empirical evidence indicates that knowledge transfer can facilitate the emergence of rural innovation (Bonfiglio et al., 2017).

3. Financial source

Another crucial resource is financial resources. Financial resources can facilitate the advancement of village-based research and development (R&D). It can be argued that the lack of adequate funding may impede the progress of villages. In accordance with the stipulations of Law No. 6 of 2014, as subsequently amended by Law No. 3 of 2024, the Government of the Republic of Indonesia is obliged to provide a village fund budget. The amount allotted for 2024 is set at 71 billion rupiah (equivalent to approximately 4.4 million US dollars) for all villages in Indonesia. The budget that each village is permitted to receive is approximately 1 million rupiah per year (equivalent to $62,500 per year), with the amount dependent on the population, affirmative status and the village performance. If the circular economics mapalus can be considered a village programme, then part of the village funds can be budgeted for these activities. At each stage of the mapalus, or in part of the village fund, the aforementioned resources may be utilised to finance the aforementioned activities.

The majority of rural communities are dependent on farming for their livelihoods. Consequently, they often face challenges in accessing the capital and financing required to support their agricultural businesses (Khanal and Omobitan, 2020). Consequently, financial assistance from the village government could facilitate the growth of community agricultural businesses, particularly if the mapalus circular economic activity has become a village-wide movement. Previously, it was proposed that mapalus circular economy necessitates a marketplace, which could be fulfilled by a village business in the form of a Village-Owned Enterprise (BUMDES).

In addition to the village funds, external funding assistance can be obtained through collaboration with external parties. For instance, funds from the private sector in the form of corporate social responsibility (CSR) initiatives, research funding from universities or other research institutions, and self-funding from the community itself. To illustrate, farmers in Thailand have established communities or small groups whose members collectively assume responsibility for farmer loans. This approach enables them to secure funding, thereby facilitating their continued operations. Regardless of the form and source of funding that can be obtained, it is essential that the entire community demonstrates a commitment to the utilisation of these funds solely for the benefit of implementing the mapalus circular economy.

4. Environment education

The objective of environmental education is to alter the prevailing paradigm that humans are the primary determinants of nature, to instead espouse a new paradigm that posits that nature and the environment will ultimately determine the trajectory of human life in the future (Ardoin et al., 2020). In general, environmental education for rural communities has numerous benefits. Through environmental education, there is an increase in awareness about the importance of protecting the environment and promoting sustainable practices, such as the production of derivative agricultural products that benefit the community directly and the reduction of agricultural waste. Furthermore, environmental education can encourage sustainable economic development, such as ecotourism (Mandagi et al., 2021). Those who are able to comprehend environmental issues are also better prepared to cope with the consequences of climate change and natural disasters.

Consequently, environmental education not only reinforces community engagement but also ensures that this knowledge and these good practices are passed on to future generations. In order for mapalus circular economics to be effectively implemented, it is essential to consider the factors that can enhance community awareness of environmental issues.

CONCLUSION

Based on the results of research on the participation of street vendors on Jalan Doktor Mansyur, Medan City, the involvement of street vendors in the BPJS Employment program in Medan City is still very low, due to various social and economic barriers. Lack of information and understanding about the program, income uncertainty, and negative perceptions of BPJS Employment effectiveness are the main challenges. To increase participation, a more participatory and community-based approach is needed, as well as more effective socialization. The state must be present socially and not only through digital platforms, respect the diversity of people's economic contexts, and bridge existing gaps in access to social security.

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AUTHOR CONTRIBUTION STATEMENT

All authors contributed substantially to the conception and completion of this manuscript. Nikolas F. Wuryaningrat led the conceptual development of the Mapalus Circular Economic Model, drafted the introduction and theoretical framework, and coordinated the overall structure of the paper. Lydia I.

Kumajas conducted the literature review, synthesized key scholarly sources, and refined the methodological narrative. Deske W. Mandagi contributed to the analysis, interpretation, and formulation of the discussion, as well as ensuring the coherence and scholarly rigor of the final manuscript. All authors reviewed, edited, and approved the final version of the article and take equal responsibility for its content and academic integrity.

REFERENCES

Apriyanto, M. (2019). Pelatihan dan Pendampingan Pengolahan Komoditas Kelapa. *Jurnal Pengabdian Dan Pemberdayaan Masyarakat*, *3*(2), 2579–9126. https://doi.org/10.30595/jppm.v3i2.3691

Ardoin, N., Bowers, A., & Gaillard, E. (2020). Environmental education outcomes for conservation: A systematic review. *Biological Conservation*, *241*, 108224. https://doi.org/10.1016/j.biocon.2019.108224

Asif, M. (2021). Lean Six Sigma institutionalization and knowledge creation: towards developing theory. *Total Quality Management & Business Excellence*, *32*(7–8), 811–828. https://doi.org/10.1080/14783363.2019.1640598

Balliet, D., Tybur, J. M., & Van Lange, P. A. M. (2016). Functional Interdependence Theory: An Evolutionary Account of Social Situations. *Personality and Social Psychology Review*, *21*(4), 361–388. https://doi.org/10.1177/1088868316657965

Bhunia, S., Bhowmik, A., & Mukherjee, J. (2022). Waste management of rural slaughterhouses in developing countries. *Advanced Organic Waste Management*, 425–449. https://doi.org/doi.org/10.1016/B978-0-323-85792-5.00019-8

Bidikar, S. G., Rane, S. B., & Potdar, P. R. (2022). Product development using Design for Six Sigma approach: case study in switchgear industry. *International Journal of System Assurance Engineering and Management*, *13*(1), 203–230. https://doi.org/10.1007/s13198-021-01199-4

Bonfiglio, A., Camaioni, B., Coderoni, S., Esposti, R., Pagliacci, F., & Sotte, F. (2017). Are rural regions prioritizing knowledge transfer and innovation? Evidence from Rural Development Policy expenditure across the EU space. *Journal of Rural Studies*, *53*, 78–87. https://doi.org/10.1016/j.jrurstud.2017.05.005

Chienwattanasook, K., Trisakhon, C., & Ridsomboon, L. (2023). The Success of Training in Social Media Marketing and Adaptation of Community Enterprises in the Era of the COVID-19 Pandemic. *International Journal of Operations and Quantitative Management*, *29*(1), 175–190. https://doi.org/10.46970/2022.29.1.11

Corvellec, H., Stowell, A. F., & Johansson, N. (2022). Critiques of the circular economy. *Journal of Industrial Ecology*, *26*(2), 421–432. https://doi.org/10.1111/jiec.13187

Dahiya, S., Katakojwala, R., Ramakrishna, S., & Mohan, S. V. (2020). Biobased products and life cycle assessment in the context of circular economy and sustainability. *Materials Circular Economy*, *2*, 1–28. https://doi.org/10.1007/s42824-020-00007-x

De Angelis, R., Howard, M., & Miemczyk, J. (2018). Supply Chain Management and the Circular Economy: Towards the Circular Supply Chain. *Production Planning & Control*, *29*(6), 425–437. https://doi.org/10.1080/09537287.2018.1449244

Deepak, C. (2018). Agricultural Policies and Rural Development in Nepal: An Overview. *Research Nepal Journal of Development Studies*, *1*(2). https://doi.org/10.3126/rnjds.v1i2.22425

Drucker, P. F. (2020). *The essential drucker*. Routledge. https://doi.org/10.4324/9780429347979

EPA. (2023). *Circular Economy What is a Circular Economy?* EPA Website. https://epa.gov/circulareconomy/dra-national-strategy-prevent-plastic-

Ganesh, H. R., Aithal, P. S., & P., K. (2020). Need-Based Sales Pitch: Insights from an Experiment. *International Journal of Case Studies in Business, IT, and Education*, 79–87. https://doi.org/10.47992/ijcsbe.2581.6942.0062

Geissdoerfer, M., Morioka, 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

Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner Production*, *114*, 11–32. https://doi.org/10.1016/j.jclepro.2015.09.007

Gutiérrez García, G. A., Gutiérrez-Montes, I., Hernández Núñez, H. E., Suárez Salazar, J. C., & Casanoves, F. (2020). Relevance of local knowledge in decision-making and rural innovation: A methodological proposal for leveraging participation of Colombian cocoa producers. *Journal of Rural Studies*, *75*, 119–124. https://doi.org/https://doi.org/10.1016/j.jrurstud.2020.01.012

Hazen, B. T., Russo, I., Confente, I., & Pellathy, D. (2020). Supply chain management for circular economy: conceptual framework and research agenda. *International Journal of Logistics Management*, *32*(2), 510–537. https://doi.org/10.1108/IJLM-12-2019-0332

Hutabarat, B., Pranadji, T., & Nasution, A. (2016). Dimensi perdagangan kelapa dan kopra rakyat di Sulawesi Utara. *Forum Penelitian Agro Ekonomi*, *11*(2), 24–36. https://epublikasi.pertanian.go.id/berkala/fae/article/view/1244

Indarti, N. (2017). Impacts of external knowledge and interaction on innovation capability among Indonesian SMEs Nurul Indarti. *International Journal of Business Innovation and Research*, *13*(4), 430–450. https://doi.org/10.1504/IJBIR.2017.085100

Islam, T., Pitafi, A. H., Arya, V., Wang, Y., Akhtar, N., Mubarik, S., & Xiaobei, L. (2021). Panic buying in the COVID-19 pandemic: A multi-country examination. *Journal of Retailing and Consumer Services*, *59*, 102357. https://doi.org/10.1016/j.jretconser.2020.102357

Khanal, A. R., & Omobitan, O. (2020). Rural Finance, Capital Constrained Small Farms, and Financial Performance: Findings from a Primary Survey. *Journal of Agricultural and Applied Economics*, *52*(2), 288–307. https://doi.org/10.1017/aae.2019.45

Kotler, P., Keller, K. L., Ang, S. H., Tan, C. T., & Leong, S. M. (2018). *Marketing management: an Asian perspective* (7th ed.). Pearson London.

Kurnia, G., Sukayat, Y., Nugraha, A., & Judawinata, M. G. (2019). Beyond resilience: surviving agricultural treadmill in a global village (a case study of farming styles in Ubud, Bali,

Indonesia). *IOP Conference Series: Earth and Environmental Science*, *306*(1), 012036. https://doi.org/10.1088/1755-1315/306/1/012036

Leal Filho, W., Taddese, H., Balehegn, M., Nzengya, D., Debela, N., Abayineh, A., Mworozi, E., Osei, S., Ayal, D. Y., & Nagy, G. J. (2020). Introducing experiences from African pastoralist communities to cope with climate change risks, hazards and extremes: Fostering poverty reduction. *International Journal of Disaster Risk Reduction*, *50*, 101738. https://doi.org/10.1016/j.ijdrr.2020.101738

Liaros, S. (2022). A network of circular economy villages: design guidelines for 21st century Garden Cities. *Built Environment Project and Asset Management*, *12*(3), 349–364. https://doi.org/10.1108/BEPAM-01-2021-0004

Lieder, M., & Rashid, A. (2016). Towards circular economy implementation: a comprehensive review in context of manufacturing industry. *Journal of Cleaner Production*, *115*, 36–51. https://doi.org/10.1016/j.jclepro.2015.12.042

Liu, C. H. (2017). Creating competitive advantage: Linking perspectives of organization learning, innovation behavior and intellectual capital. *International Journal of Hospitality Management*, *66*, 13–23. https://doi.org/10.1016/j.ijhm.2017.06.013

Lundgren, A. S., & Nilsson, B. (2023). "For the good of the village": Volunteer initiatives and rural resilience. *Journal of Rural Studies*, *102*, 103104. https://doi.org/10.1016/j.jrurstud.2023.103104

Machin Ferrero, L. M., Wheeler, J., & Mele, F. D. (2022). Life cycle assessment of the Argentine lemon and its derivatives in a circular economy context. *Sustainable Production and Consumption*, *29*, 672–684. https://doi.org/10.1016/j.spc.2021.11.014

Mandagi, D. W., Centeno, D. D. G., & Indrajit. (2021). Brand gestalt scale development and validation: A takeoff from tourism destination branding. *Journal of Destination Marketing & Management*, *19*, 100539. https://doi.org/10.1016/j.jdmm.2020.100539

Mihai, F.-C., Gündoğdu, S., Markley, L. A., Olivelli, A., Khan, F. R., Gwinnett, C., Gutberlet, J., Reyna-Bensusan, N., Llanquileo-Melgarejo, P., & Meidiana, C. (2021). Plastic pollution, waste management issues, and circular economy opportunities in rural communities. *Sustainability*, *14*(1), 20. https://doi.org/10.3390/su14010020

Muslim, C., & Darwis, V. (2017). Peningkatkan Kesejahteraan Petani Melalui Inovasi Teknologi Produk Turunan Kelapa Dalam Di Sulawesi Barat (Improving Farmers' Welfare Through Technological Innovation of Coconut Derivative Products in West Sulawesi). *SEPA*, *14*(1), 18–27. https://doi.org/10.20961/sepa.v14i1.21038

Nelwan, J. E., Widjajanto, E., Andarini, S., Djati, S., & Sumampouw, O. J. (2018). The Role of Mapalus Culture by Minahasa Ethnic in North Sulawesi to the Coronary Heart Disease Incidents. *International Journal of Scientific and Research Publications (IJSRP)*, *8*(3). https://doi.org/10.29322/ijsrp.8.3.2018.p7508

Nonaka, I., & Reinmoeller, P. (2017). Creating Value: Winners in the New Businee Environment Chapter 6: Knowledge Creation and Utilization: Promoting Dynamic Systems of Creative Routines. In *Creating Value: Winners in the New Business Environment*. https://doi.org/10.1002/9781405164092

Nonaka, I., & Toyama, R. (2015). The knowledge-creating theory revisited: knowledge creation as a synthesizing process. In *The Essentials of Knowledge Management* (pp. 95–96). https://doi.org/10.1057/palgrave.kmrp.8500001

Nugraha, F. A., & Maryono, M. (2018). Community Concern on Environmental Conservation. *E3S Web of Conferences*, *31*, 1–4. https://doi.org/10.1051/e3sconf/20183108023

Peng, Z., & Zhang, S. (2021). Challenges for Huawei to Go Global Under the Trade Disputes. *2021 3rd International Conference on Economic Management and Cultural Industry (ICEMCI 2021)*, 1424–1433. https://doi.org/10.2991/assehr.k.211209.232

Rafique, M., Hameed, S., & Agha, M. H. (2018). Impact of knowledge sharing, learning adaptability and organizational commitment on absorptive capacity in pharmaceutical firms based in Pakistan. *Journal of Knowledge Management*, *22*(1), 44–56. https://doi.org/10.1108/JKM-04-2017-0132

Savy, D., & Cozzolino, V. (2022). Novel fertilising products from lignin and its derivatives to enhance plant development and increase the sustainability of crop production. *Journal of Cleaner Production*, *366*, 132832. https://doi.org/10.1016/j.jclepro.2022.132832

Shubhrajyotsna Aithal, & Aithal P. S. (2023). Importance of Circular Economy for Resource Optimization in Various Industry Sectors – A Review-based Opportunity Analysis. *International Journal of Applied Engineering and Management Letters (IJAEML)*, *7*(2), 191–215. https://doi.org/10.47992/IJAEML.2581.7000.0182

Si, S., Ahlstrom, D., Wei, J., & Cullen, J. (2021). Business, Entrepreneurship and Innovation Toward Poverty Reduction. In *Business, entrepreneurship and innovation toward poverty reduction* (1st ed.). Routledge. https://doi.org/10.4324/9781003176107

Sondak, L., Hadi Darwanto, D., & Rahayu Waluyati, L. (2023). Partnership Pattern of Desiccated Coconut Value Chain in North Sulawesi. *E3S Web of Conf.*, *444*. https://doi.org/10.1051/e3sconf/202344402021

Statistics Indonesia. (2019). Pertumbuhan Ekonomi Indonesia Triwulan III-2020 (Indonesia's Economic Growth in the Third Quarter of 2020). *Berita Resmi Statistik, No. 15/02/*(15), 1–12.

Šūmane, S., Kunda, I., Knickel, K., Strauss, A., Tisenkopfs, T., Rios, I. des I., Rivera, M., Chebach, T., & Ashkenazy, A. (2018). Local and farmers' knowledge matters! How integrating informal and formal knowledge enhances sustainable and resilient agriculture. *Journal of Rural Studies*, *59*, 232–241. https://doi.org/10.1016/j.jrurstud.2017.01.020

Sumual, T. E. M., Kawulur, A. F., Wuryaningrat, N. F., & Soputan, G. J. (2023). The Mediating Role of Absorptive Capacities on the Relationship of Human Capital and Social Capital on Innovation Capabilities (Study on Woman Entrepreuner in North Sulawesi, Indonesia). *International Journal of Professional Business Review*, *8*(8), 5. https://doi.org/10.26668/businessreview/2023.v8i8.2368

Sumual, T. E. M., Soputan, G. J., & Kawulur, A. F. (2020). The Innovation of Tibo-Tibo Fisherwomen's Business Development. *Journal of International Conference Proceedings*, *3*(2), 164–170. https://doi.org/10.32535/jicp.v0i0.916

Surya Adnyani, I. A. K., Handoko, R., & Maduwinarti, A. (2023). Implementation of Village Integrated Reduce Reuse and Recycle (TPS3R) Waste Management Site Policy In Gianyar Regency, Bali Province. *International Journal of Scientific and Research Publications*, *13*(6), 51–59. https://doi.org/10.29322/ijsrp.13.06.2023.p13808

Taylor, M., & Bhasme, S. (2018). Model farmers, extension networks and the politics of agricultural knowledge transfer. *Journal of Rural Studies*, *64*, 1–10. https://doi.org/10.1016/j.jrurstud.2018.09.015

Turang, J. (1983). *Mapalus di Minahasa (Mapalus in Minahasa)*. Posko operasi mandiri (Mapalus at Minahasa). Tomohon: Daerah Tingkat II Kabupaten Minahasa.

Urbinati, A., Chiaroni, D., & Chiesa, V. (2017). Towards a new taxonomy of circular economy business models. *Journal of Cleaner Production*, *168*, 487–498. https://doi.org/10.1016/j.jclepro.2017.09.047

Van der Ploeg, J. D., Renting, H., Brunori, G., Knickei, K., Mannion, J., Marsden, T., De Roest, K., Sevilla-Guzmán, E., & Ventura, F. (2017). Rural development: from practices and policies towards theory. In *The Rural* (pp. 201–218). Routledge. https://doi.org/10.4324/9781315237213

Vinti, G., & Vaccari, M. (2022). Solid waste management in rural communities of developing countries: An overview of challenges and opportunities. *Clean Technologies*, *4*(4), 1138–1151. https://doi.org/10.3390/cleantechnol4040069

Von Der Osten, F. L., Martins, T. S., Dong, H., & Bailey, A. (2024). What does the 7th cooperative principle (concern for community) really mean? *Management Review Quarterly*. https://doi.org/10.1007/s11301-024-00421-4

Wang, F., Cheng, Z., Reisner, A., & Liu, Y. (2018). Compliance with household solid waste management in rural villages in developing countries. *Journal of Cleaner Production*, *202*, 293–298. https://doi.org/10.1016/j.jclepro.2018.08.135

Wilson, G. A., Hu, Z., & Rahman, S. (2018). Community resilience in rural China: The case of Hu Village, Sichuan Province. *Journal of Rural Studies*, *60*, 130–140. https://doi.org/10.1016/j.jrurstud.2018.03.016

Wisnumurti, A. A. G. O., Candranegara, I. M. W., Suryawan, D. K., & Wijaya, I. G. N. (2020). Collaborative Governance: Synergity Among the Local Government, Higher Education, and Community in Empowerment of Communities and Management of Potential Tourism Village. *2nd Annual International Conference on Business and Public Administration (AICoBPA 2019)*, 112–115. https://doi.org/10.2991/aebmr.k.201116.024

Wuryaningrat, N. F., Kawulur, A. F., & Kumajas, L. I. (2017). Examining an endangered knowledge transfer practice known as “mapalus” in an Indonesian village: Implications for entrepreneurial activities and economic development. *International Journal of Business and Society*, *18*, 309–322. https://www.ijbs.unimas.my/images/repository/pdf/Vol18-S2-paper5.pdf

Wuryaningrat, N. F., Mandagi, D. W., & Rantung, D. I. (2023). Mapalus As A Knowledge Transfer Practice To Improve Innovation Capability: Success Or Not Success. *Revista de Gestao Social e Ambiental*, *17*(1). https://doi.org/10.24857/RGSA.V17N1-028

Xie, K., Hensley, L., Law, V., & Sun, Z. (2019). Self-regulation as a function of perceived leadership and cohesion in small group online collaborative learning. *Br. J. Educ. Technol.*, *50*, 456–468. https://doi.org/10.1111/bjet.12594

Xing, W., Zhu, G., Arslan, O., Shim, J., & Popov, V. (2022). Using learning analytics to explore the multifaceted engagement in collaborative learning. *Journal of Computing in Higher Education*, *35*, 633–662. https://doi.org/10.1007/s12528-022-09343-0

Zhang, H., Wu, K., Qiu, Y., Chan, G., Wang, S., Zhou, D., & Ren, X. (2020). Solar photovoltaic interventions have reduced rural poverty in China. *Nature Communications*, *11*(1), 1969. https://doi.org/10.1038/s41467-020-15826-4

Zikopoulos, C. (2022). On the effect of upgradable products design on circular economy. *International Journal of Production Economics*, *254*, 108629. https://doi.org/https://doi.org/10.1016/j.ijpe.2022.108629