

| Date | Submitted                  | Accepted                  | Published                    |
|------|----------------------------|---------------------------|------------------------------|
|      | 1 <sup>st</sup> April 2026 | 22 <sup>nd</sup> May 2026 | 12 <sup>th</sup> August 2026 |

## REVITALIZATION OF *GANYONG* (*Canna discolor* L.) AS A PREMIUM FOOD PRODUCT BASED ON LOCAL WISDOM

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## ABSTRACT

*Ganyong* (*Canna discolor* L.) is a local Indonesian tuber with potential as an alternative food that is gluten-free and has a low glycemic index. Despite these advantages, *ganyong* is still commonly regarded as a traditional food with limited economic value. This study aimed to develop a model for revitalizing *ganyong* as a local wisdom-based premium food product by integrating production modernization with the preservation of local cultural values. A qualitative approach with a sequential explanatory design was employed. The research was conducted in Central Java, with four regencies selected purposively: Boyolali, Kudus, Cilacap, and Banjarnegara. Key informants included *ganyong* farmers, *ganyong* processing business owners, officials from the local Department of Agriculture, agricultural extension officers, and academics. Data were collected through in-depth interviews, participatory observation, and focus group discussions (FGDs). The analysis was guided by value chain theory, cultural embeddedness theory, innovation diffusion theory, and the concept of premium products to examine value creation and the acceptance of innovation. The result analysis revealed three key findings. First, *ganyong* remains predominantly used as a subsistence buffer crop, particularly during periods of food insecurity, as consistently reported by farmers across all study areas. Second, value chain actors, especially processors, demonstrated limited product innovation, with most products lacking differentiation in packaging and branding. Third, although strong cultural narratives surrounding *ganyong* persist, these values have not been effectively translated into market-oriented strategies or premium positioning. *Ganyong* can be revitalized through production modernization that builds on local practices, product premiumization through improvements in quality, packaging, and culturally based branding, and the strengthening of value chains supported by social capital and local trust. The proposed model suggests that local wisdom should be seen not as a constraint, but as a source of differentiation and added value in developing *ganyong* as a competitive and sustainable premium food product. Storytelling that emphasizes the cultural and economic value of local foods plays an important role in modern promotion.

**Key words:** Gluten-Free, Glycemic Index, Cultural Branding, Food Product, Innovation

**Citation:** Riptanti EW, Setyowati N and Siswanti Revitalization of *Ganyong* (*Canna discolor* L.) as a Premium Food Product Based on Local Wisdom. *Afr. J. Food Agric. Nutr. Dev.* 2026; **26(6)**: 30137-30157.  
<https://doi.org/10.18697/ajfand.153.27240>



## INTRODUCTION

Indonesia has a high level of biodiversity, including many local tuber crops such as *ganyong* (*Canna discolor* L.). However, the potential of *ganyong* as a strategic food resource has not been fully realized. In many regions, farmers are still not aware of its economic value and its benefits as a food crop [1]. Consequently, *ganyong* is generally viewed as a traditional food with low economic value, even though it has several favorable characteristics; it is gluten-free, rich in carbohydrates, and contains type-3 resistant starch, which has anti-diabetic effects, and contains polyphenolic compounds with antioxidant activity [2]. Promoting food diversification based on local resources is an important strategy to reduce reliance on rice, maize, and wheat [3].

Changes in consumer eating behavior, supported by the growing trends of back-to-nature and clean eating, along with increasing global demand for gluten-free flour [4], have created new opportunities for the commercialization of *ganyong* in modern markets. However, the *ganyong* value chain remains underdeveloped. Most production is still subsistence-based, technological innovation in processing is limited, starch quality is inconsistent, and product branding is weak. At the same time, several rural communities have developed *ganyong* using a local wisdom based approach, including traditional processing methods, environmentally friendly cultivation practices, and the use of home gardens for production [5].

Most existing research on *ganyong* has focused on the physicochemical properties of its starch [6], its nutritional potential [7], and the development of processed products such as glass noodles (*sohun*), composite flour, instant noodles, and fresh noodles based on *ganyong* starch. These studies show that *ganyong* has advantages as a functional food [8] and as an alternative raw material that is gluten-free and low in glycemic index [2]. However, the research remains largely within the field of food technology and does not address the broader aspects of product development. In general, studies on local foods based on local wisdom do not specifically focus on *ganyong*. Instead, they emphasize that local wisdom can serve as a source of competitive advantage and market appeal through cultural narratives, traditional practices, and ecological sustainability [9]. Research that integrates the concept of local wisdom with product premiumization strategies in the food sector remains limited. Therefore, revitalizing *ganyong* as a premium food product has the potential to make a significant contribution to addressing challenges related to food security, climate change, and the growing demand for healthy foods.

This study is important for developing a model to revitalize *ganyong* as a premium food product while preserving the values of local wisdom in designing business models, developing supply chains, and strengthening. The revitalization effort does not focus only on technological and marketing innovations, but also on maintaining

sustainable traditional practices [5]. This study is expected to address the existing research gap by integrating local wisdom, the modernization of local food systems, and strategies for premium product development. The findings are expected to provide practical recommendations for local governments, micro, small, and medium enterprises (SMEs), and farming communities competitive branding strategies for *ganyong*.

## MATERIALS AND METHODS

### The Study Sites

The study was conducted in Central Java Province, with the research locations selected through purposive sampling. The selection of regencies and sub-districts was based on the presence of *ganyong* cultivation and processing activities. The research locations included Selo sub-District in Boyolali Regency, Colo sub-District in Kudus Regency, Bukateja sub-District in Purbalingga Regency, and Dawe sub-District in Cilacap Regency. The research participants consisted of *ganyong* farmers, both those cultivating *ganyong* intensively and those growing it as an intercropping plant, as well as traders of fresh *ganyong* and processed *ganyong* products, and *ganyong* starch processing companies. Key informants were participants from the Central Java Provincial Food Security Agency and Departments of Agriculture in the province and regencies, as well as academics with expertise in agribusiness and local food systems, healthy food advocates, regular consumers of gluten-free products, and experts in local food. Total key informants were 19 people. Key informants are those who know and possess the basic information needed for the research [10].

### Research Approach and Design

This study employed a qualitative research approach using a sequential explanatory design, in which quantitative data were collected and analyzed first, and the results were then used to guide the collection and analysis of qualitative data [11]. The qualitative phase was conducted to deepen the findings [12], by exploring local wisdom values and formulating a *ganyong* revitalization model. This approach was chosen because the revitalization of local food systems requires not only empirical data but also a deeper understanding of social and cultural contexts.

### Data Types and Data Collection Techniques

This study used both primary and secondary data. Primary data included perceptions of local food identity, philosophical and cultural values, traditional processing practices, cultivation techniques, as well as the strengths and weaknesses of *ganyong* products and the opportunities and threats they face. Data were collected through in-depth interviews, which allowed flexibility while ensuring that all relevant topics were discussed systematically [13]. Participatory observation

was also conducted, with the researchers directly engaging with the observed participants to obtain deeper information. Data collection concluded with FGDs, in which the researcher facilitated group discussions to elicit participants' perspectives on the ongoing research findings [14].

### Validation and Reliability Procedures

Validity and reliability were ensured through triangulation across data sources, methods, and theories. Triangulation was used to develop a comprehensive understanding of the research findings and to enhance validity and reliability by examining the convergence of information from different sources [15]. Model validation was conducted through expert judgment, in which specialists evaluated each item based on its relevance and the extent to which it represented the constructs being measured [16].

## RESULTS AND DISCUSSION

### Initial Conditions of Ganyong as a Basis for Revitalization

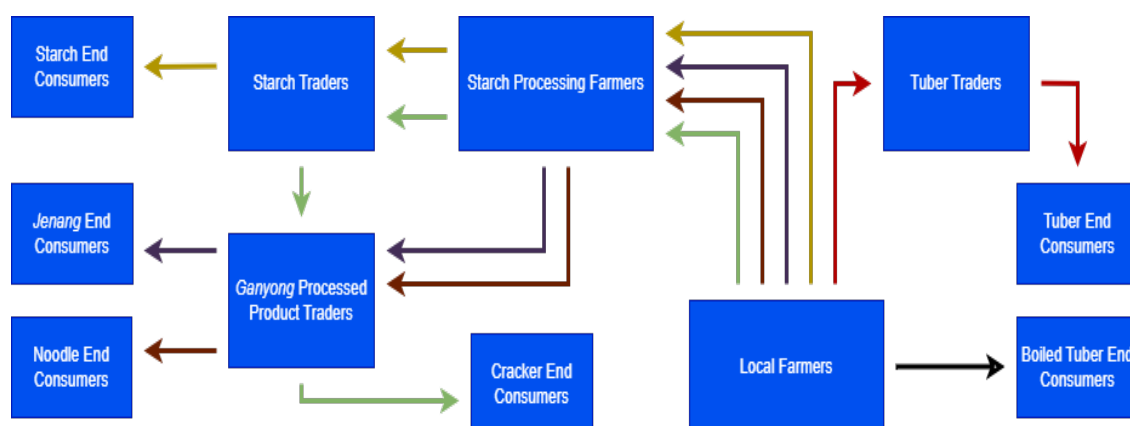
The findings indicate that *ganyong* remains a traditional food with limited use and development in the study areas. Production and processing are carried out on a small scale, using simple technologies, and result in products that lack clear differentiation and market orientation. This situation suggests that *ganyong* remains at a basic production stage within the local food system and has only a narrow market. This condition contrasts with other tuber crops, such as cassava, which has achieved large-scale production and access to international markets [17], as well as *porang*, which has developed a wide market reach and relatively large production scale [18]. These examples indicate that tuber crops are commonly accepted in global markets, suggesting that *ganyong* also has potential to be further developed within the food industry.

The average land area cultivated by farmers was 59.57 m<sup>2</sup>. Most key informants said that *ganyong* is not a main crop, but rather a marginal crop that is relatively rare. In several regencies included in the survey, based on secondary data, *ganyong* cultivation was found only in small, scattered plots. Income analysis shows that *ganyong* farming is profitable, and when converted to a per-hectare basis, the potential returns are very high, exceeding IDR 100 million per hectare. By comparison, the maximum net profit from cassava farming in Nigeria is reported to be ₦1,893,000, equivalent to approximately IDR 21,655,920 per hectare [19]. Net profits from taro farming reach around IDR 56,417,964 per hectare. These comparisons indicate that *ganyong* has higher profit potential than both cassava and taro.

These findings indicate that *ganyong* has not yet been positioned as a value-added commodity, but remains at a basic production stage [20], as illustrated in Figure 1.

Moreover, the value added at each stage of the chain has not yet been directed toward premium products with significant health benefits. Most key informants indicated that *ganyong* has not yet been developed into high-value products, as it is predominantly consumed in a simple boiled form. From an efficiency perspective, as presented in Table 1, *ganyong* farming is economically feasible. However, farmers are reluctant to expand production to a larger scale because the market for *ganyong* products remains limited and consumer demand is not yet consistent.

Processed *ganyong* products have not yet been targeted at upper–middle consumer segments, which is a common characteristic of local food systems. In this context, revitalizing *ganyong* farming should not be understood as large-scale intensification, but rather as part of a process to strengthen *ganyong*'s position within the value chain so that production outputs can gain higher value at subsequent stages. Relationships among actors in the *ganyong* system are largely shaped by informal, trust-based social ties [21]. This pattern suggests that local wisdom plays a role in shaping interactions among actors, although it has not yet promoted optimal value chain integration.



**Figure 1: Existing Conditions of the *Ganyong* Value Chain in Central Java Province**

### Inconsistency in *Ganyong* Starch Products

To date, *ganyong* cultivation and processing have not been supported by Standard Operating Procedures (SOPs), either at the cultivation, harvesting, or post-harvest processing stages. Current practices rely heavily on individual habits and experience, and there are no formal quality control measures. As a result, both raw material quality and final product quality vary considerably and lack consistency. The study findings indicated that most informants highlighted that *ganyong* quality varies due to differences in cultivation practices, harvesting time, and post-harvest handling. This variability affects key product attributes such as texture, color, and

taste. For instance, several processors noted that inconsistent drying and storage practices lead to variations in flour quality. This lack of consistency poses a challenge for standardization and limits the potential for developing premium products. The absence of quality control makes it difficult to maintain uniform product standards, even though consistency is a key requirement in the development of premium food products [22].

*Ganyong* processing technology remains simple and largely manual, with limited production capacity. This condition not only reduces production efficiency but also affects the consistency of product quality and may lead to a decline in nutritional content [23]. Limited technological capacity constrains efforts to scale up production and develop product innovations, making it difficult for *ganyong* products to meet the quality and volume standards required to enter premium market segments. *Ganyong* starch flour products do not yet have clearly defined quality standards, whether in terms of moisture content, color, texture, or product cleanliness.

### **Institutional Strengthening at the Levels of Farmers, Ganyong Processing Companies, and Marketing Agencies**

The findings show that there is no specific institutional strengthening that coordinates *ganyong* farmers, processing companies, and marketing actors. The absence of such institutions has resulted in fragmented and poorly integrated *ganyong* development efforts. Weak institutional structures also limit effective quality management and hinder innovation [24]. Relationships between farmers and *ganyong* processing SMEs remain informal and are not based on long-term partnerships. The absence of supply and quality agreements creates uncertainty in raw material availability and leads to fluctuations in production [25]. These conditions make it difficult to develop *ganyong* products that require continuity and consistency to qualify as premium products [26].

At present, most *ganyong* products are sold through traditional markets with limited market reach. Access to modern markets remains very limited, and products are generally sold only in local markets. This limited market access positions *ganyong* as a low-value product [27], which has not yet reached premium market segments.

### **Products Tend to Be Low-Value and Basic**

Innovation in *ganyong* products remains very limited and largely homogeneous, in terms of form, function, and processing diversity. *Ganyong* products are generally positioned as traditional foods with low economic value rather than as products with functional advantages or clear market differentiation. This lack of innovation means that *ganyong* products have not yet developed sufficient appeal to compete in upper-end (premium) markets [28].

Most *ganyong* products do not have formal certifications, including distribution permits, food safety certification, or official quality standards. The absence of certification limits the ability of *ganyong* products to access broader markets [29]. Without certification, *ganyong* products do not meet the basic requirements of premium food products in terms of quality assurance and food safety.

*Ganyong* product packaging remains simple, with some products lacking labels or using plain labels that provide only limited information. Design, product information, and visual appeal have not yet received sufficient attention. Packaging that does not adequately represent the product can hinder value perception, reduce consumer satisfaction, and make it difficult to establish a premium image [30].

### **Preservation of Local Wisdom**

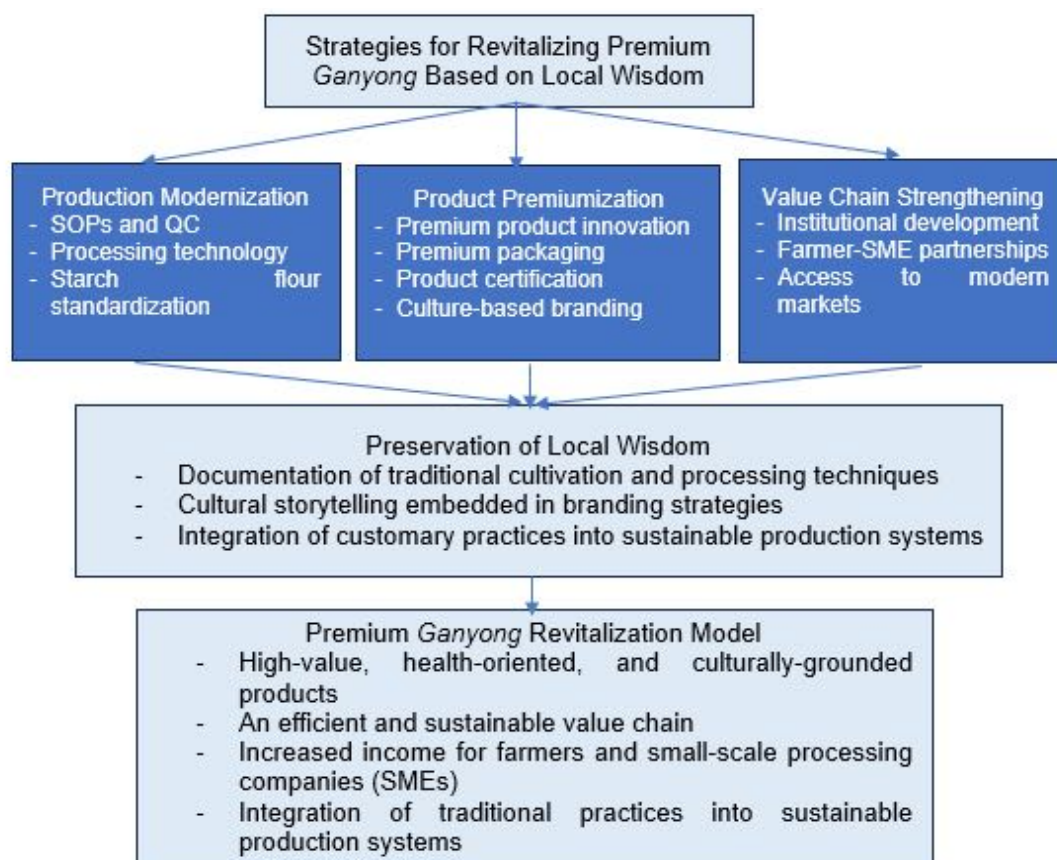
The culture of cultivating and processing *ganyong* as a local food has declined, along with decreasing consumption and market demand. At present, *ganyong* is mostly grown on a subsistence and spatially limited basis and has not been developed as a primary economic commodity. Existing cultivation practices are generally maintained through inherited traditions rather than market orientation or product innovation. *Ganyong* continues to function as a reserve food (buffer stock) during periods of food scarcity, crop failure, or natural disasters. This indicates that local wisdom related to *ganyong* remains alive and adaptive to environmental conditions.

However, this local knowledge has not yet been transformed into sources of product innovation, value-based narratives, or differentiation that could increase *ganyong*'s appeal in modern markets. Community empowerment through village-owned enterprises (*Badan Usaha Milik Desa*/BUMDES) has the potential to integrate local wisdom and traditional values as social capital to support sustainable creative economic innovation. Ignoring local wisdom in innovation processes or in efforts to "premiumize" village products risks product failure in modern markets and reduces development effectiveness due to the loss of public trust [31].

### **Strategies for Revitalizing Premium Ganyong Based on Local Wisdom**

Value enhancement (premiumization) requires coordinated improvements across production, product development, processing, and marketing, rather than isolated interventions [32]. In this study, *ganyong* revitalization is positioned as a process that connects technical modernization with the preservation of local wisdom, ensuring that economic value enhancement does not erode the cultural identity embedded in *ganyong* management practices [33]. The *ganyong* revitalization strategy is formulated as a conceptual model. Figure 2 presents a systematic framework for revitalizing premium *ganyong* based on local wisdom. The strategy consists of three main components: production modernization, product premiumization, and value chain strengthening. The implementation of these three strategies supports the

preservation of local wisdom, which serves as the foundation of *ganyong* revitalization.



**Figure 2: Local Wisdom Strategy Model for Premium *Ganyong* Revitalization Based on Local Wisdom**

### Local Wisdom Based Production Modernization

A product can only reach premium status when it demonstrates constant quality across all outputs [34]. One important step toward achieving such consistency is the implementation of Standard Operating Procedures (SOPs), which function to ensure consistent product quality and improve production efficiency [35]. Standard Operating Procedures are designed to organize and standardize production processes so that product quality can be maintained consistently [36]. Once SOPs are implemented, the next critical step is the application of quality control (QC). Quality control processes serve to verify and recheck whether the quality of the final products meets the established standards and desired specifications [37]. The implementation of SOPs and QC reflects value chain theory, in which process standardization and quality control at each stage of production play a key role in maintaining product consistency, thereby enabling the development of *ganyong* products with premium value.

The strategy for applying processing technology in the *ganyong* revitalization model emphasizes the adoption of technology within the production system. The technologies employed are intended to improve process efficiency without eliminating the traditional characteristics of *ganyong* processing [38]. Integrating local wisdom with technology can enhance efficiency while preserving the integrity of traditional knowledge systems [39]. Higher efficiency, in turn, supports the development of high-quality premium products [40]. The use of processing technology in this model aligns with innovation theory, in which technologies are adopted gradually and in ways that remain compatible with local wisdom to improve efficiency while supporting the creation of premium *ganyong* products.

Modernization of production in the *ganyong* revitalization model is understood as a process of improving production efficiency and consistency without eliminating long-established local practices. Premium products are required to meet high-quality standards [41]. These standards are developed while preserving the distinctive characteristics of products derived from local techniques [42]. High product quality encourages consumers to pay a premium price [43]. The implementation of rigorous quality standards reflects value chain theory, as an effort to enhance value at the production stage to support the creation of premium products.

### Product Premiumization

Premium product innovation in the *ganyong* revitalization model is conducted by developing processed forms that are already familiar at the local level, particularly *ganyong* starch and *ganyong* noodles. Innovation plays a crucial role in enhancing the competitiveness of a commodity [44]. The integration of local wisdom with innovation can generate products with premium value, and the combination of both elements is key to achieving a competitive advantage [39]. The development of *ganyong* product innovations based on traditional processing practices reflects innovation theory, in which innovation is adopted progressively and aligned with local wisdom to improve competitiveness and support the formation of premium products.

Attractive packaging can enhance a product's value, as consumers are often willing to pay a premium for visually appealing packaging, particularly for traditional food products [45]. Packaging not only serves to protect the product but also communicates its origin, including the cultural values and traditional processes underlying its production [46]. The development of premium packaging, therefore, functions as a medium for conveying both the quality and identity of *ganyong* products [47]. In this context, premium *ganyong* packaging reflects cultural embeddedness theory, as it acts as a medium through which cultural identity and local narratives are embedded in the product, thereby strengthening value addition and reinforcing the perception of *ganyong* as a premium product among consumers.

Developing a premium product is closely tied to the development of a strong brand identity [48]. *Ganyong* branding is therefore oriented toward highlighting the local cultural identity embedded in its production and processing practices. Branding that emphasizes local cultural identity responds to consumers' desire to connect with place, culture, and heritage, developing a sense of authenticity [49]. Narratives surrounding product origin, cultural context, and traditional techniques are integral components of this branding strategy [50]. Consumers are more attracted to and willing to pay a higher price for brands with unique and strong identities [51]. Accordingly, a *ganyong* branding strategy that foregrounds cultural identity and local narratives reflects cultural embeddedness theory, in which cultural attachment and perceived authenticity serve as key sources of differentiation that strengthen value addition and increase consumers' willingness to pay for premium products.

A premium product typically undergoes a certification process. Certification plays a role in building consumer trust, as it serves as a credibility signal for product quality, safety, and consistency [52]. Consumers tend to prefer products with certification or official labeling because they are perceived as more reliable than uncertified products [53]. This trust contributes to stronger purchase preferences, broader market access, and the ability to position products within higher price segments [54].

### Strengthening the Value Chain

Institutional strengthening in the *ganyong* revitalization model is intended to organize and formalize relationships among actors that have traditionally been based on informal social ties. Relationships among actors play a crucial role in any organizational system, and understanding stakeholder roles as well as patterns of collaboration is essential [55]. In this context, institutional strengthening is not designed to replace existing local practices, but rather to reinforce the already existing coordination mechanisms. Establishing partnerships and formal institutional strengthening is necessary to ensure that collaborative efforts are sustainable and receive official support [56]. This approach to institutional strengthening aligns with the sustainable livelihood framework, as it emphasizes the reinforcement of social assets through improved coordination, partnerships, and inter-actor relationships, without replacing the local practices. Partnerships between farmers and *ganyong* processing SMEs are built upon long-standing social relationships within the local community. These partnerships are designed to strengthen upstream–downstream relations to ensure a more stable supply of raw materials and a more consistent processing flow. Such farmer SME partnerships reflect the sustainable livelihood framework by reinforcing social assets rooted in local relationships, which in turn support supply continuity and business stability.

Access to modern markets in the *ganyong* revitalization model is apprehended as market expansion without abandoning its local basis. Premium *ganyong* products

grounded in local wisdom are therefore directed to reach broader market segments. Promoting these products in modern markets encourages local products to reach wider consumer segments and strengthens the overall value chain. This strategy represents a form of market upgrading that enhances the economic value of local products.

### Preservation of Local Wisdom

The documentation of traditional techniques is undertaken to ensure that local knowledge is not lost during the revitalization process [32]. Documentation practices position local wisdom as an asset that can be passed on across generations and replicated, in line with cultural embeddedness theory, which emphasizes the close relationship between economic activities and cultural contexts. Cultural storytelling serves to transform local practices into value narratives that can be appreciated by consumers. Local wisdom is not only practiced but also communicated, aligning with narrative theory, which views stories as a means of shaping the meaning of a product. The integration of traditional practices ensures that the revitalization of *ganyong* remains in harmony with local norms and customs. Economic activities are not separated from their socio-cultural context, making the revitalization process more widely accepted and sustainable.

The implementation of a premium *ganyong* revitalization strategy based on local wisdom, as formulated in the proposed model, is expected to produce *ganyong* products with higher added value, not only in terms of quality and health benefits but also through the cultural dimension embedded in their production and processing. Strengthening production modernization, product premiumization, and the value chain simultaneously has the potential to create a more efficient and sustainable *ganyong* agribusiness system, characterized by a better-coordinated flow of raw materials and enhanced market competitiveness. This increase in product value and value chain efficiency is expected to improve the income of farmers and *ganyong*-processing SMEs, while also maintaining the continuity of local practices as an integral part of community livelihoods.

### CONCLUSION AND RECOMMENDATIONS FOR DEVELOPMENT

This study develops a model for revitalizing *ganyong* as a premium food product grounded in local wisdom, which emphasizes the integration of production modernization, product premiumization, value chain strengthening, and the preservation of local knowledge. The findings indicate that *ganyong* is still at a basic production stage with low added value due to limitations in quality standardization, innovation, institutional support, and market access, despite its high economic potential for development. The revitalization model indicates that modernization is carried out through the development of SOPs, implementation of quality control, and

adoption of technologies compatible with local practices, while premiumization is achieved through product innovation, the development of culturally based packaging and branding, and obtaining certifications as prerequisites for building trust and expanding market reach. Strengthening institutions and social-capital-based partnerships plays a key role in enhancing coordination among actors and ensuring consistent quality, so that overall, the model provides a strategic framework for developing *ganyong* as a sustainable premium product that remains rooted in local wisdom.

## ACKNOWLEDGEMENTS

We are grateful to the Chancellor of Universitas Sebelas Maret for providing a publication grant through the 2026 Research Group Grant scheme.

## CONFLICT OF INTEREST

There is no conflict of interest.

**Table 1: Average costs, revenue, profit, and efficiency of *ganyong* farming in Central Java Province (IDR/farm/growing season)**

| Description          | Amount     |
|----------------------|------------|
| Explicit Costs (IDR) | 128,365.73 |
| Implicit Costs (IDR) | 280,851.66 |
| Total Revenue (IDR)  | 734,134.50 |
| Income (IDR)         | 608,769.77 |
| Profit (IDR)         | 324,917.12 |
| Efficiency Ratio     | 1.48       |

Source: Primary data analysis (2025)

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