



Singkong for Food Innovation (SINGFOOD): Cassava Product Diversification for Sustainable Food Security in Sukamelang Village

Muhammad Anwar Hidayat^{1,a}, Devi Salsabila Nur Hasanah^{2,b}, Ainaya Cahya Maulia^{3,c}, Frelsa Fairus Addailamy^{4,c}, Najwa Khairun Nisa^{5,c}, Devindra Kevin Andriyoga^{6,d}, Selly Feranie^{7,a*}, Fitri Khoerunnisa^{8,e}, Nanang Winarno^{9,b}

^aDepartment of Physics Education, Faculty of Mathematics and Natural Sciences Education, Universitas Pendidikan Indonesia

^bDepartment of Science Education, Faculty of Mathematics and Natural Sciences Education, Universitas Pendidikan Indonesia

^cNutrition Study Program, Faculty of Sport and Health Education, Indonesia University of Education

^dDepartment of Mathematics Education, Faculty of Mathematics and Natural Sciences Education, Universitas Pendidikan Indonesia

^eDepartment of Chemistry Education, Faculty of Mathematics and Natural Sciences Education, Universitas Pendidikan Indonesia

*Corresponding Author e-mail: sellyferanie@upi.edu

Received: July 2026; Revised: August 2026; Published: September 2026

Abstract: Singkong for Food Innovation (SINGFOOD) programme was designed to empower the community of Sukamelang Village through the diversification of cassava into cookies, sticks, ice cream, and noodles as a strategy to strengthen sustainable local food security. Community service activities comprised programme planning, product trials, training, mentoring, and programme evaluation involving 32 participants, including housewives, PKK members, and micro, small, and medium enterprise (MSME) operators. Programme evaluation employed a four-point Likert-scale questionnaire and structured observations, with data analysed descriptively using percentage distributions. The activity outcomes demonstrated positive participant responses, with over 90% expressing favourable perceptions of cassava product diversification, the availability of cassava as a sustainable local raw material, and its potential for small-scale business development. The programme successfully introduced four cassava-based food products while strengthening participants' practical engagement in food processing and entrepreneurial awareness. These findings suggest that the SINGFOOD programme represents a practical community empowerment approach that supports local food diversification and contributes to strengthening sustainable food security.

Keywords: SINGFOOD, cassava, community empowerment, food security, local food

How to Cite: Hidayat, M. A., Hasanah, D. S. N., Maulia, A. C., Addailamy, F. F. ., Nisa, N. K., Andriyoga, D. K. ., Feranie, S., Khoerunnisa, F. ., & Winarno, N. (2026). Singkong for Food Innovation (SINGFOOD): Cassava Product Diversification for Sustainable Food Security in Sukamelang Village. *Lumbung Inovasi: Jurnal Pengabdian Kepada Masyarakat*, 11(3), 929-938. <https://doi.org/10.36312/linov.v11i3.5622>



<https://doi.org/10.36312/linov.v11i3.5622>

Copyright© 2026, Hidayat et al

This is an open-access article under the [CC-BY-SA](#) License.



INTRODUCTION

Food security has become a major global challenge due to population growth, climate change, and disruptions to food supply chains. Strengthening local food systems through the utilisation of indigenous resources has therefore become an important strategy for improving community resilience and promoting sustainable food consumption. In Indonesia, local food diversification is encouraged to reduce dependence on staple foods while enhancing food security through the sustainable use of locally available agricultural commodities (FAO, 2023; World Food Programme, 2024).

Cassava (*Manihot esculenta* Crantz) is one of Indonesia's strategic local crops because of its high carbohydrate content, adaptability to diverse environmental conditions, and year-round availability. Beyond serving as an alternative staple food, cassava can be processed into a variety of value-added products that improve both nutritional and economic benefits. Previous studies have shown that cassava-based food diversification can strengthen household food security while supporting community entrepreneurship and rural economic development (Ayetigbo et al., 2022; Adeyeye et al., 2023).

Sukamelang Village possesses considerable potential for cassava cultivation because the commodity is widely available and commonly cultivated by local households. However, preliminary observations conducted before programme implementation indicated that cassava utilisation remained relatively limited. Most households processed cassava only into boiled or fried products or sold it as raw agricultural produce with relatively low economic value. Initial discussions with community members and village representatives also revealed limited knowledge of innovative cassava processing techniques, product diversification, nutritional value, food packaging, and simple business management. These conditions have reduced opportunities to maximise local resources as alternative food products and income-generating commodities. Therefore, strengthening community capacity through practical training and mentoring is necessary to increase the added value of cassava while supporting sustainable local food systems.

Several recent community service programmes and studies have demonstrated the potential of cassava processing for improving community welfare. Community empowerment activities have successfully introduced cassava processing into products such as chips, modified cassava flour (MOCAF), traditional snacks, and other processed foods, resulting in improved community knowledge, technical skills, and entrepreneurial interest (Sari et al., 2021; Pratama & Lestari, 2022; Rahmawati et al., 2023). Likewise, studies on local food diversification have reported positive contributions to household food resilience and the development of micro, small, and medium enterprises (MSMEs) based on agricultural products (Wulandari et al., 2024; Hidayat et al., 2025). Nevertheless, most previous programmes focused on a single processed product or emphasised technical production skills without integrating nutritional education, product diversification, simple packaging, production cost estimation, and entrepreneurship into a comprehensive community.

To address these needs, the Singkong for Food Innovation (SINGFOOD) programme introduces four cassava-based products: cookies, sticks, ice cream, and noodles through product trials, practical training, mentoring, nutritional education, simple packaging, and entrepreneurship-oriented learning. This integrated approach is intended to enhance participants' practical skills, encourage the utilisation of local food resources, and promote community-based food entrepreneurship. The programme also supports SDG 2 (Zero Hunger) through local food diversification, SDG 8 (Decent Work and Economic Growth) by encouraging small-scale entrepreneurship, and SDG 12 (Responsible Consumption and Production) through the sustainable utilisation of local agricultural resources.

Based on these considerations, this article presents the implementation and evaluation of the SINGFOOD programme as a community empowerment initiative for cassava-based food diversification. It further discusses the programme's contribution to strengthening the utilisation of local food resources, enhancing participants' practical engagement in cassava processing, and supporting sustainable food security in Sukamelang Village.

METHODS

The SINGFOOD programme adopted a participatory community service approach to strengthen community capacity in utilising cassava as a local food resource. The programme was conducted in Sukamelang Village, Kasomalang District, Subang Regency, West Java, from July to December 2025. Its implementation consisted of five stages: preliminary observation, programme planning, product development, training and mentoring, and programme evaluation (FAO, 2023; United Nations, 2023).

The programme involved 32 participants selected through purposive sampling, comprising housewives, PKK members, and micro, small, and medium enterprises (MSMEs) interested in cassava processing. Community partners were actively involved in identifying local needs, participating in training, practising food processing, and evaluating programme outcomes. This participatory approach ensured that programme activities addressed community priorities while encouraging active engagement (Chambers, 2021).

Technology transfer was delivered through demonstrations and hands-on practice in producing four cassava-based products: cookies, sticks, ice cream, and noodles. Participants also received a recipe handbook containing production procedures, nutritional information, simple packaging techniques, and basic production cost estimation to support independent production and entrepreneurship (UNESCO, 2022).

Programme evaluation employed a structured questionnaire and observation sheet. The questionnaire consisted of 12 statements measured using a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree) to evaluate participants' perceptions of product innovation, local food utilisation, and business opportunities. Structured observations were conducted during practical sessions to assess participants' ability to prepare ingredients, follow production procedures, use equipment appropriately, maintain food hygiene, and package finished products. The collected data were analysed descriptively using frequencies, percentages, and mean scores to summarise participants' responses and practical performance (Creswell & Creswell, 2023).

Programme success was evaluated using predefined indicators, including at least 80% of participants understanding cassava product diversification, 75% being able to complete the production process, 70% expressing interest in developing cassava-based products independently, and the successful production of four cassava-based food products. These indicators were used to assess the effectiveness of the programme in strengthening practical skills and promoting sustainable local food diversification (FAO, 2023).

RESULT AND DISCUSSION

1. Community Initial Conditions

Sukamelang Village has considerable potential for cassava cultivation, as the commodity is widely grown and readily available throughout the year. However, preliminary observations conducted before programme implementation indicated that approximately 80% of local households, particularly housewives, still processed cassava using traditional methods, such as steaming, producing cassava chips, *awug*, and other traditional snacks commonly found in the village. Most cassava was also sold as raw agricultural produce, resulting in relatively low economic value and limited product diversification.

Initial observations and discussions with community representatives further revealed limited knowledge and practical skills in developing value-added cassava products. Participants had little exposure to innovative food processing techniques, nutritional information, product packaging, or simple business planning, despite recognising cassava as an abundant local resource. These conditions limited opportunities to utilise cassava as a diversified food product with greater economic potential.

Based on these initial conditions, the SINGFOOD programme was designed to strengthen community capacity through practical training and mentoring in processing cassava into cookies, sticks, ice cream, and noodles. The baseline findings served as the foundation for programme implementation and as a reference for evaluating its outcomes in promoting local food diversification, community empowerment, and sustainable food security.

2. Implementation of the SINGFOOD Programme

The SINGFOOD programme was implemented from July to December 2025 through a series of participatory community empowerment activities. The implementation began with a preliminary survey on 22 July 2025 to identify community needs and existing cassava utilisation practices. Based on the survey findings, the programme continued with product development through recipe trials and standardisation before the official launch on 5 October 2025. The overall implementation timeline is presented in Table 1.

Table 1. Timeline of the SINGFOOD Programme Implementation

Stage	Period	Main Activities	Expected Outputs
Preliminary observation	22 July 2025	Community needs assessment	Baseline data
Programme launching	5 October 2025	Opening Ceremony	Community Participation
Product development	6-25 October 2025	Recipe trials and standardisation	Four product formulations
Community awareness	26 October 2025	Introduction to programme objectives	Increased awareness
Practical training	2-23 November 2025	Training on cassava sticks, cookies, noodles, and ice cream	Improved practical skills
Comprehensive practice	30 November 2025	Independent product preparation	Product prototypes
Material distribution	7 December 2025	Distribution of ingredients and recipe handbook	Learning resources
Monitoring and evaluation	8-20 December 2025	Observation and questionnaire	Programme evaluation
Programme closing	24 December 2025	Closing ceremony	Programme completion

Activities began with an initial survey conducted on 22 July 2025 to identify the initial conditions regarding the community's utilisation of cassava.



Figure 1. Opening of the PM-BEM programme

The programme was officially launched on 5 October 2025 through the opening ceremony of the Community Empowerment Programme organised by BEM in Sukamelang Village. Following the opening, a trial and error phase for SINGFOOD products was conducted from 6-25 October 2025, focusing on testing recipes and processing techniques.



Figure 2. a. Training make cassava stick, b. Training make cassava cookies



Figure 3. a. Training make cassava noodle, b. Training make cassava ice cream

The core programme consisted of practical training on making cassava sticks, cookies, noodles, and ice cream. The sessions involved 15 participants in the cassava sticks and cookies training, 18 participants in the cassava noodles training, and 8 participants in the cassava ice cream training. All participants were actively involved in each stage of the production process.

3. Programme Outcomes

Participant Responses

Participant responses were evaluated using a structured questionnaire consisting of 12 statements that assessed perceptions of cassava product diversification, food security, product acceptability, business opportunities, and programme implementation. Responses were measured using a four-point Likert scale ranging from strongly disagree to strongly agree. The distribution of participants' responses for each indicator is presented in Table 2 below.

Table 2. Participants' Responses to the SINGFOOD Programme Questionnaire

Indicator	Answer				Positive Response (%)	Mean Score
	Strongly Disagree	Disagree	Agree	Strongly agree		
Knowledge of cassava-based product processing	0	3	22	7	90,63	3,13
Understanding of the benefits of processed cassava products	0	1	20	11	96,88	3,31
Acceptance of the taste of cassava-based products	0	3	15	14	90,63	3,24
Purchase intention	0	2	23	7	93,75	3,16
Business opportunity	0	2	15	15	93,75	3,41
Availability of raw materials	0	2	14	16	93,75	3,44
Ease of product preparation	0	4	20	8	87,50	3,13
Ability to use processing equipment	0	6	21	5	81,25	2,97
Contribution to household food security	0	1	17	14	96,88	3,41
Utilisation of local food resources	0	1	16	15	96,88	3,44
Effectiveness of the training programme	0	2	22	8	93,75	3,19
Clarity of the information provided	0	2	21	9	97,35	3,22

Table 2 shows that participants responded positively across all indicators, with positive responses (*agree* and *strongly agree*) ranging from 81.25% to 96.88%. The highest agreement was found for understanding the benefits of processed

cassava products, household food security, and the utilisation of local food resources (96.88%), while the ability to use processing equipment received the lowest positive response (81.25%).

To facilitate the interpretation of the questionnaire results, the distribution of participants' responses across all questionnaire indicators is illustrated in Figure 4. The chart presents the frequency of responses for each indicator using the four-point Likert scale, providing a visual overview of participants' perceptions of the SINGFOOD programme.

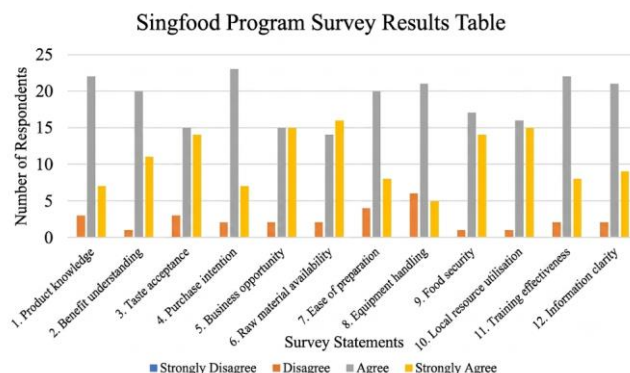


Figure 4. Distribution of Participants' Responses to the SINGFOOD Programme Questionnaire

As shown in Figure 6, most responses were concentrated in the Agree and Strongly Agree categories across all indicators, while Disagree responses were minimal and no participants selected Strongly Disagree. These findings indicate positive participant perceptions and broad acceptance of cassava-based food diversification through the SINGFOOD programme.

Practical Skills Observation

Practical observations were conducted throughout the training sessions to monitor participants' engagement during ingredient preparation, product processing, equipment use, and product packaging. Participants actively followed each stage of the demonstrations and were able to complete the production process under facilitator guidance, indicating positive participation throughout the programme.

The observations were complemented by informal interviews conducted with several participants after the training. The interviews indicated that cassava had previously been processed mainly into traditional foods such as *oyek*, cassava chips, *gegetuk*, and other local snacks. Following the programme, participants became familiar with a wider variety of cassava-based products, including cookies, sticks, noodles, and ice cream, reflecting broader awareness of local food diversification.

Participants also perceived that the programme provided new knowledge on processing locally available cassava into products with greater nutritional and economic value. In addition to introducing new product variations, the practical sessions encouraged participants to consider cassava as a potential resource for household food diversification and small-scale entrepreneurship.

Furthermore, participants expressed the need for follow-up mentoring to reinforce the knowledge and practical experience gained during the programme. These qualitative findings complement the questionnaire results by demonstrating

positive participant engagement and supporting the potential sustainability of cassava-based food innovation within the community.

4. Discussion

The findings indicate that the SINGFOOD programme was well accepted by the participants, as reflected in the consistently positive responses across all evaluation indicators. Positive responses ranged from 81.25% to 96.88%, with the highest levels of agreement observed for understanding the benefits of processed cassava products, household food security, and the utilisation of local food resources. These findings suggest that introducing diversified cassava-based products can increase community awareness of the importance of local food utilisation while encouraging the adoption of alternative food sources. Similar findings were reported by Ayetigbo et al. (2022), who emphasised that cassava diversification contributes to improving food security by expanding food choices and increasing the value of locally available crops.

Participants also perceived cassava as having considerable potential for household-scale entrepreneurship. The indicators related to business opportunities (93.75%), purchase intention (93.75%), and raw material availability (93.75%) demonstrate that participants recognised cassava not only as a staple food but also as a commodity with economic value. This perception was reinforced by interview findings, in which participants explained that cassava had previously been processed mainly into traditional products such as *oyek*, cassava chips, and other local snacks. After participating in the programme, they became familiar with innovative products including cookies, sticks, noodles, and ice cream, thereby broadening their understanding of value-added food processing. These findings are consistent with previous community empowerment programmes that reported positive impacts of local food processing on entrepreneurship and household economic resilience (Adeyeye et al., 2023).

Although all evaluated indicators received positive responses, the ability to use processing equipment recorded the lowest positive response (81.25%). This finding suggests that participants required more practical experience in operating food-processing equipment than in understanding the concepts introduced during the programme. Since most participants had limited prior experience with processing technologies, continuous mentoring and repeated practice are needed to strengthen technical confidence. Similar observations have been reported by Rahmawati et al. (2023), who found that practical repetition and mentoring play a key role in developing technical competence in community-based food processing programmes.

Beyond participant responses, the programme contributes to the achievement of several Sustainable Development Goals (SDGs). By promoting cassava-based food diversification, SINGFOOD supports SDG 2 (Zero Hunger) through the utilisation of local food resources to strengthen household food security. The programme also contributes to SDG 8 (Decent Work and Economic Growth) by introducing opportunities for household-scale food enterprises, and SDG 12 (Responsible Consumption and Production) by encouraging sustainable processing and utilisation of locally available agricultural commodities. These outcomes align with recommendations from the Food and Agriculture Organization (FAO, 2023), which highlights local food diversification and value-added agricultural processing as important strategies for strengthening resilient food systems.

Despite these positive outcomes, this programme has several limitations. The evaluation primarily measured participants' perceptions after programme implementation and did not include pre-test and post-test assessments or long-term monitoring of business development. Therefore, the findings should be interpreted as evidence of positive participant responses and active engagement rather than measurable improvements in knowledge, practical skills, or household income. Future community service programmes should incorporate longitudinal evaluation, product standardisation, shelf-life testing, food safety certification, packaging development, and digital marketing assistance to strengthen the sustainability and economic impact of cassava-based food innovation.

CONCLUSION

The SINGFOOD programme introduced four cassava based food products, namely cookies, sticks, noodles, and ice cream, through product trials, practical training, mentoring, and programme evaluation in Sukamelang Village. The programme demonstrated that integrating product diversification with practical learning encouraged greater utilisation of cassava as a local food resource while supporting community based food innovation.

The evaluation results showed consistently positive participant responses across all indicators, with positive responses ranging from 81.25% to 96.88%. Participants recognised the benefits of processed cassava products, the contribution of cassava to household food security, the availability of cassava as a sustainable raw material, and its potential for small-scale entrepreneurship. These findings indicate that cassava based food diversification is a feasible strategy for strengthening community empowerment and promoting sustainable local food.

The programme also highlights the importance of continuous community assistance to ensure long term sustainability. Future community service activities should emphasise advanced technical training, product standardisation, packaging improvement, food safety certification, and market development through digital marketing. These efforts are expected to strengthen the long term economic value of cassava based products while supporting resilience.

RECOMMENDATION

Based on the implementation of the SINGFOOD Programme, it is recommended that communication and coordination between the programme implementation team and partner villages be further enhanced and maintained on an ongoing basis. Better communication regarding programme objectives, participant mobilisation, and activity arrangements can improve community participation and ensure that programme implementation aligns with local needs.

In addition, the scheduling of practical training activities, particularly cooking demonstrations, should be planned more carefully by considering the community's daily routines and existing village agendas. Selecting an appropriate time for implementation is expected to increase participant attendance, engagement, and the overall effectiveness of the programme.

ACKNOWLEDGMENT

The authors express their deepest gratitude to the community of Sukamelang Village, for their active participation, cooperation, and high level of enthusiasm throughout the entire series of community empowerment activities. The authors also extend appreciation to the team of supervising lecturers Mrs.Selly Feranie, Fitri

Khoerunnisa, and Nanang Winarno who provided guidance, mentoring, and scientific input throughout the planning, implementation, and evaluation of the activities. Deepest gratitude is also extended to the Ministry of Higher Education, Science, and Technology through the Community Empowerment Programme by the Student Executive Board (PM-BEM) for the 2025 Funding Year, which provided financial support and facilitation.

REFERENCES

- Adeyeye, S. A. O., Oyewole, O. B., & Obadina, A. O. (2023). Cassava processing and product diversification: Opportunities for food security and economic growth in developing countries. *Journal of Agricultural and Food Research*, 12, 100-115. <https://doi.org/10.1016/j.jafr.2023.100511>
- Ayetigbo, O., Latif, S., Adebayo, A., & Müller, J. (2022). Value-added products from cassava (*Manihot esculenta* Crantz) and their contributions to global food security: A review. *Trends in Food Science & Technology*, 123, 45-59. <https://doi.org/10.1016/j.tifs.2022.03.003>
- Chambers, R. (2021). *Participatory Workshops: A sourcebook of 21 sets of ideas and activities*. Routledge. <https://doi.org/10.4324/9781849772112>
- Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). SAGE Publications. <https://www.sagepub.com/en-us/nam/research-design/book254160>
- FAO. (2023). *The State of Food Security and Nutrition in the World 2023: Urbanization, agrifood systems transformation and healthy diets across the rural-urban continuum*. Food and Agriculture Organization of the United Nations. <https://doi.org/10.4060/cc3017en>
- Hidayat, A., Kurniawan, R., & Nugroho, S. (2025). Strategi keberlanjutan program diversifikasi pangan berbasis potensi lokal di pedesaan. *Jurnal Ilmu Pengolahan dan Komunitas*, 14(1), 45-58. <https://jurnal.unpad.ac.id/jipk>
- Pratama, B., & Lestari, D. (2022). Analisis penerimaan konsumen dan minat beli terhadap produk olahan singkong non-beras. *Jurnal Teknologi dan Industri Pangan*, 33(2), 112-121. <https://doi.org/10.25181/jtip.v33i2.2450>
- Rahmawati, E., Wijaya, C., & Utami, M. (2023). Pendampingan masyarakat dalam pengembangan usaha mikro berbasis pangan fungsional tradisional. *Jurnal Pemberdayaan Masyarakat Sains dan Teknologi*, 7(3), 204-215. <https://doi.org/10.22146/jpms.v7i3.7841>
- Sari, M., Putri, A., & Ramadhan, F. (2021). Peningkatan pengetahuan produk dan keterampilan pengolahan pangan lokal untuk mendukung ketahanan pangan rumah tangga. *Jurnal Gizi dan Pangan*, 16(2), 89-98. <https://doi.org/10.25182/jgp.2021.16.2.89-98>
- UNESCO. (2022). *Technical and vocational education and training for rural development and entrepreneurship: A guide for community-based programmes*. United Nations Educational, Scientific and Cultural Organization. <https://unesdoc.unesco.org/ark:/48223/pf0000382104>
- United Nations. (2023). *The Sustainable Development Goals report 2023: Special edition*. United Nations Publications. <https://unstats.un.org/sdgs/report/2023/>
- World Food Programme. (2024). *Indonesia annual country report 2023: Country strategic plan (2021-2025)*. World Food Programme. <https://www.wfp.org/publications/indonesia-annual-country-report-2023>
- Wulandari, S., Santoso, T., & Fitriani, N. (2024). Edukasi dan efektivitas pelatihan pembuatan produk turunan singkong di pedesaan. *Jurnal Pengabdian Kepada Masyarakat*, 10(4), 310-322. <https://doi.org/10.31849/jpm.v10i4.15243>