

Research Article

Local Wisdom of Banana Farmers in Building Sociocultural Empowerment

Agung Wibowo^{1*}, Eny Lestari¹, and Paramita Rahayu²

¹Department of Agriculture Extension and Communication, Sebelas Maret University, Jl. Ir. Sutami 36 A Surakarta 57141, Indonesia

²Faculty of Engineering, Universitas Sebelas Maret, Jl. Ir. Sutami 36 A, Surakarta, Indonesia

ORCID

Agung Wibowo: <https://orcid.org/0000-0002-5591-8527>

Abstract.

The local wisdom of banana farmers in building sociocultural empowerment is a response to the challenges of globalization and climate change. Integrating tradition with modernization will achieve sustainability, a strong local identity, and community welfare. The revitalization of local wisdom in building socio-cultural empowerment is an important step in preserving traditional cultural heritage, strengthening local identity, and improving the welfare of agrarian communities. This article discusses the mechanism for the revitalization of the local wisdom of banana farmers in building sociocultural empowerment. A qualitative research method is used with a phenomenological approach. The research was conducted in the banana development center in Karanganyar Regency, Central Java. The research results show that the revitalization of the local wisdom of banana farmers in Karanganyar Regency in building sociocultural empowerment is implemented through a mechanism of, (1) education and training of the young generation; (2) development of communities and networking; (3) empowerment of farmers. By understanding how the local wisdom of farmers integrates tradition with modern innovations, the community can build strong sociocultural empowerment; withstand climate change; maintain sustainability of the farming culture; and improve the life quality of the community.

Keywords: local wisdom, banana farmers, sociocultural empowerment

1. Introduction

The local wisdom of banana farmers is a collection of knowledge, practices, and traditional values that have developed in the community of banana farmers over many years. This local wisdom plays a central role in building the socio-cultural empowerment of the banana farmers and their community. In the management of natural resources, banana farmers practice wise techniques, such as the use of organic fertilizer, water conservation, and crop diversification, which not only increases agricultural productivity but also protects the balance of the local ecosystem. In addition, cooperation and collaboration in the community enables the banana farmers to work together to deal with economic challenges. They continue to honor their tradition and their cultural

Corresponding Author: Agung Wibowo; email: agungwibowo@staff.uns.ac.id

Published: 29 August 2024

Publishing services provided by Knowledge E

© Agung Wibowo et al. This article is distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use and redistribution provided that the original author and source are credited.

Selection and Peer-review under the responsibility of the ASABEC 2023 Conference Committee.

OPEN ACCESS

values, which helps to preserve their cultural identity while promoting their banana products both locally and globally. Education and ongoing training programs support the improvement of farmers' skills and encourage their adaptation to environmental and market changes. Banana farming plays a vital role in food security. Bananas are a primary food source for the majority of communities in a number of countries. Therefore, it is important to increase the productivity and sustainability of banana farming in order to meet local and national food needs.

Globalization has brought about changes in agricultural practices, with increasing domination in the use of chemical fertilizer and modern technology. Likewise, climate change has presented new challenges for the agricultural community [1-3]. In this context, local wisdom becomes more important, as it has the ability to offer sustainable solutions which are better suited to local conditions. Practices of local wisdom place emphasis on the wise management of natural resources. In this era of climate change and environmental degradation, these practices are becoming increasingly relevant in protecting the balance of the ecosystem and the sustainability of natural resources.

The revitalization of local wisdom in banana farming can increase the income and the economic independence of the farmers and the community in general [4-6]. Combining traditional knowledge with relevant innovations will create sustainable economic opportunities [7-8]. Local wisdom is an integral part of the culture and identity of a community. Preserving tradition and local knowledge helps to maintain cultural uniqueness and diversity, which is a valuable asset in an increasingly global society [9-11]. Practices of local wisdom are inclined to focus on long-term sustainability rather than immediate agricultural results. This is in line with the vision of economic and environmental sustainability, which prioritizes fulfilling the needs of the future generation [12-14].

By understanding this background, it is not difficult to comprehend the importance of local wisdom in building the social empowerment of banana farmers and their community. The revitalization of local wisdom is not only about increasing agricultural output but also about preserving culture, protecting the environment, and empowering communities holistically. Revitalizing the local wisdom of banana farmers in building socio-cultural empowerment is extremely important in order to protect and preserve the traditional cultural heritage that has existed for centuries. Banana farming practices, customs and traditions, and local knowledge are all integral parts of a unique local culture which includes the language, art, culinary culture, and values associated with the practice of banana farming. Local wisdom plays an important role in strengthening

local identity. A strong local identity can increase the sense of pride and togetherness among members of the community [15-17].

Furthermore, the revitalization of local wisdom can improve the welfare of banana farmers. Effective traditional practices can produce a better yield of crops and reduce production costs, as well as increasing the farmers' income and decreasing their economic vulnerability. Practices of local wisdom also contribute to economic and environmental sustainability [18-19]. Wise management of natural resources, including soil and water, helps to protect the balance of the ecosystem and to support sustainable production [20-22]. Local wisdom can help the community of banana farmers to have a better ability to withstand climate change. Knowledge about local weather and appropriate planting seasons can help reduce the effects of climate change, which is presenting an increasingly real threat [23-26]. Revitalizing traditional practices in crop cultivation can increase the food sovereignty of the community [27-29]. This means that the community has more control over its own production and food supply, which is crucial in order to deal with the global challenges in food security. By revitalizing local wisdom, the community can involve the younger generation in the preservation of its culture and its traditional farming methods. This will help to ensure that these valuable practices and knowledge will be passed on to the next generation.

Integrating these various mechanisms in efforts to revitalize the local wisdom of farmers will help to build sustainable socio-cultural empowerment in the agrarian community [30-31]. The combination of tradition and modern innovations will become the key to success in preserving the farming culture and increasing the welfare of the community [32-33]. Therefore, it is essential to understand and encourage the utilization of the local wisdom of banana farmers in building socio-cultural empowerment in order to promote sustainable development and to ensure that their precious traditional values are preserved and utilized. Research and other programs that focus on this problem can help to identify ways to combine local cultivation practices with modern solutions that support community welfare and cultural preservation. Hence, the goal of this research is to identify the values of local wisdom, to describe the participative approach which plays a role in sustainability, and to describe the mechanism of revitalization of the local wisdom of banana farmers in building socio-cultural empowerment.

According to a preliminary survey conducted by the researcher in 7 (seven) medical clinics in Sidoarjo Regency, only Medika Utama Clinic provides service for patients who are confirmed with COVID-19, but with mild symptoms. Meanwhile, the other clinics cannot handle either patients who confirmed with COVID-19 or vaccination. In Medika

Utama Clinic, they not only provide service for patients who are confirmed with COVID19, but also have facilities for vaccination. In addition, they can also give vaccination by door to door, since some of the societies still have no idea about the vaccine, and it becomes the main obstacle. Moreover, in conducting door to door vaccination, they have to use complete Personal Protective Equipment (PPE) to prevent the infection of COVID-19 during the vaccination process, which takes up to 4 hours, and they use level 3 of the personal protective equipment.

2. Research Methods

The research was carried out in Jenawi District, Karanganyar Regency, in the Province of Central Java (including the villages of Jenawi, Trengguli, Sidomukti, Balong, Lempong, Menjing, and Seloromo), based on a commitment between the Local Government of Karanganyar Regency and Sebelas Maret University to develop a banana center in Karanganyar Regency, with the slogan “Bananas Bloom in Jenawi together with UNS”. This commitment was in accordance with a Partnership Agreement between the Government of Karanganyar Regency and the Faculty of Agriculture in Sebelas Maret University about the Development of a Banana Center in Jenawi District, Karanganyar Regency Number: 423.4/24/PKS/III/2017 and Number: 822/UN27/07/KS/2017. This area is also known to be highly suitable for the cultivation of banana plants [34].

Based on the problem addressed in this research, which focuses primarily on process and meaning, it was determined that the most suitable type of research was a qualitative descriptive study [35]. The characteristics of qualitative research are the natural setting which is used as a data source, the researcher’s role as a key instrument, the descriptive nature of the study, the importance of the process rather than only the result, the tendency to use an inductive data analysis, and the significance of meaning as the essential problem in the qualitative research design [36]. According to [37-38], a qualitative method tends to be connected to the subjective nature of a social reality, which in this case is the holistic development of the banana center in Jenawi, so this method is highly suitable for exploring the important role of environmental sustainability in the development of the banana center through the application of environmentally friendly practices and resource conservation strategies [39]. This research is a case study, which according to [40] is an empirical inquiry that examines a phenomenon in a real life context, in this case focusing on the lives of the banana farmers in Jenawi, utilizing multiple sources of evidence. The data sources for this research are the real

words and actions of the Jenawi community, supplemented with additional data such as documents and other sources.

The data was collected using two methods. First, the collection of primary data was carried out through a research survey, direct observation, in-depth interviews, and a Focus Group Discussion (FGD). The in-depth interviews were conducted with farmers who belong to a farmers' group. Second, the collection of secondary data was carried out through an institutional survey to obtain data and to study relevant documents. In this research, the sampling technique used was purposive sampling, which can be more accurately described as criterion-based selection. In order to guarantee and develop the validity of the data collected in the research, the researcher used four types of triangulation techniques, namely triangulation of data, triangulation of theory, triangulation of method, and triangulation of the researcher.

The unit of analysis in this research is the focus on the development of a banana center in Karanganyar Regency, so a single case analysis is used, with a model suitability analysis based on the innovative practices implemented in the cultivation and management of land, as well as in waste management, in order to achieve the goals of environmental sustainability. According to [41], in a single case analysis, the analytical process for every case is carried out using an interactive analysis model, in which the three components of the analysis are data reduction, data presentation, and the drawing of a conclusion.

3. Research Results and Discussion

Revitalizing the local wisdom of banana farmers is an important step which is needed to build socio-cultural empowerment, to honor traditional cultural heritage, to improve the welfare of farmers, and to deal with future challenges such as climate change and food security. The values of the local wisdom of banana farmers play a key role in building socio-cultural sustainability. These values reflect the knowledge, beliefs, and practices that have been passed down from generation to generation and have shaped the way of life and culture of the banana farmers' community. The table below describes some of the values of local wisdom of the banana farmers which are relevant in the context of the development of socio-cultural sustainability.

TABLE 1: Values of local wisdom of banana farmers in building socio-cultural sustainability.

Value of local wisdom	Role in building socio-cultural sustainability	Impact
Utilization of Local Varieties and Genetic Diversity	Optimizing local resources helps to preserve strong banana varieties.	Banana farmers rely on local varieties that are proven to withstand local diseases and pests.
		Banana farmers act as guardians of genetic diversity.
Shared Ownership and Community Solidarity	Values of local wisdom encourage cooperation and solidarity between banana farmers in the community.	Banana farmers share knowledge, help one other in difficult situations, and make joint decisions in the interest of the development of the center.
		Banana cultivation involving the whole family and community strengthens the social bonds in the community.
		Strengthens values of solidarity and mutual cooperation.
Preservation of Culture and Tradition	Cultural values such as myths, folk tales, and religious practices can play a role in preserving the culture of the community.	Banana farmers integrate these cultural values in their farming practices, which creates a cultural depth in their activities.
Social Justice	These values help to protect the social harmony in the community.	Banana farmers respect the principles of social justice in the distribution of their agricultural products and the access to resources.
Connection with Nature	These values encourage a connection with nature and a respect for the environment.	Banana farmers maintain a healthy and sustainable ecosystem.
		Banana farmers show increasing concern about the conservation of soil, water, and other natural resources.
Skills and Creativity	Helps farmers to increase farm yield and sustainability.	Banana farmers apply innovations with tissue culture seedlings and packing technology for processed food products.

Data source: analysis of primary data through in-depth interviews and FGDs, 2023

The results of the research show that the combination of values of local wisdom helps the banana farmers to implement farming practices which are sustainable from a socio-cultural perspective. It is important to appreciate and support these values in efforts to preserve traditional banana farming and the culture of the farming community. The banana cultivation practices that have been tested for centuries focus on sustainable production. This includes the wise utilization of resources and plant maintenance with the goal of maintaining long-term production. The results of this study are in line with the research of [42-44], which finds that in general, farmers respect their traditional values but are also open to innovations that can increase yield and the sustainability of cultivation. Banana farmers frequently rely on local resources, such as specific banana varieties that have been adapted to suit the local climate and soil conditions. In this

way, they are respecting and utilizing local wealth. This reflects a balance between old patterns and necessary modern innovations.

The research results also show that women play an important role in transferring knowledge about banana cultivation and traditional practices, which is passed on through informal education and direct experience between generations. This reflects the importance of education and learning in the banana farmers' culture. This corresponds to the research of [45-47], which shows that women play an important role in agricultural cultivation, as well as in the rituals and traditions of a community. These values reflect a respect for their cultural heritage and for the role of banana cultivation in their local culture. It also demonstrates the recognition of the women's contribution and the evidence of gender equality. By understanding and respecting these values, efforts for sustainable development can be more effective in utilizing the local wisdom of banana farmers to achieve the greater goal of socio-cultural sustainability, as shown in table 2.

The results of this research stress that a participative approach involving the local community plays a central role in empowering farmers to achieve sustainability in managing the agricultural environment. Through collaboration, increasing knowledge, and joint action, the local community is able to formulate concrete solutions to tackle environmental challenges and to create a more sustainable future for farming. The research of [48-49] shows that a participative approach which involves the local community in agricultural environmental management significantly increases farmers' awareness about the importance of environmental sustainability. Through discussions, training, and exchanging knowledge, farmers gain a better understanding of the impacts of agricultural practices on the environment. In addition, [50-51] find that a participative approach involving the local community creates a strong connection between environmental management and socio-economic welfare, and has the potential to achieve sustainability which is more durable and has a greater long-term impact. This is in line with a study by [52] which shows that sustainable development refers to development that has the ability to meet the needs of the present generation without endangering the health and safety of the future generation, solely in order to meet current needs. This means that economic development should always utilize natural resources in a way that enables the future generation to continue the development efforts that are being made at the present time.

The revitalization of the local wisdom of banana farmers in Karanganyar Regency in building socio-cultural empowerment is done through: (1) education and training

TABLE 2: Forms of participative approach that play a role in sustainability.

Forms of Participative Approach	Description	Contribution in sustainability
Joint planning	Banana farmers participate in planning the steps of environmental management, by identifying environmental problems, setting goals, and formulating strategies for developing the center through a joint agreement.	Their active participation in this process ensures that solutions are relevant and acceptable.
		The active participation of the local community provides a greater sense of belonging towards environmental conservation measures and maintains long-term sustainability.
Involvement in decision making	Farmers and the local community all have a voice in making decisions related to environmental management.	The community is able to adapt to environmental changes, including climate change.
		The local community plays a role in monitoring and evaluating the effectiveness of environmental action. This helps to identify positive change and to make any necessary adjustments.
Training and capacity strengthening	The participative approach includes training and mentoring farmers so that they understand and adopt sustainable environmental management practices, such as sustainable farming and waste reduction.	Provides the chance for farmers and the local community to access new economic opportunities through the development of sustainable agricultural products or ecotourism.
		Farmers and the local community work together in implementing environmental conservation steps, such as tree planting, erosion control, and water management.
Development of local knowledge	This approach respects the local knowledge of farmers and the local community, and integrates it with scientific knowledge to develop better solutions.	Increases community awareness about the importance of conservation.
		The local community can collaborate in awareness campaigns and environmental education, each with their own individual role.

Data source: analysis of primary data through in-depth interviews and FGDs, 2023

of the young generation; (2) development of communities and networking; and (3) empowerment of farmers.

The revitalization of the local wisdom of banana farmers in building socio-cultural empowerment involves a number of mechanisms and strategies. The aim of this is to strengthen traditional practices that are sustainable and support the culture of the farmers' community.

TABLE 3: Mechanism of revitalization of local wisdom of banana farmers in building socio-cultural empowerment.

Revitalization mechanism	Activity	Impact
Education and training of the young generation	Training about traditional cultivation techniques, knowledge about local weather, and sustainable practices.	Helps to transfer knowledge and skills to the next generation.
	Involvement of the young generation in the process of revitalization.	The young generation implements values of local wisdom from an early age.
Development of communities and networking	Regular meetings, group discussions, and social activities.	Promotes the exchange of knowledge and experiences between farmers.
	Collaborations with external parties, including government institutions, non-government organizations, and universities.	Helps in the development and implementation of revitalization programs. This may include funding, technical resources, and access to broader networks.
Empowerment of farmers	Formation of farmers' groups or cooperatives which promote sustainable practices and share knowledge about local wisdom.	These groups can function as a forum for discussion, collaboration, and developing joint initiatives to build socio-cultural empowerment.
	Promoting recognition of farmers for their contribution in preserving local wisdom and culture, including appreciation and involvement in decision making.	Banana farmers play an active role in designing agricultural policies and programs that affect them.
	Development of a community-based approach in decision making and agricultural development planning.	Creates efficiency and increases productivity of banana plants.

Data source: analysis of primary data through in-depth interviews and FGDs, 2023

4. Conclusion

The local wisdom of banana farmers plays an extremely important role in building socio-cultural empowerment in the agrarian community. The local wisdom of banana farmers is a collection of the traditional knowledge, practices, and values that have been passed down from previous generations. Traditional cultivation practices often reflect a deep understanding of environmental sustainability. Banana farmers take great care to protect the local ecosystem, avoiding environmental degradation, and preserving the genetic diversity of plants. Banana cultivation practices that are sustainable have the ability to increase the income of farmers and have a positive effect on the economic and social welfare of the farmers' community. The activities of banana farmers involve the active participation of various members of the community, thereby strengthening the social bonds in the community. This also creates opportunities for women to become involved in economic and social activities. Banana cultivation is an integral part of the cultural

identity of the community, as banana plants play a role in various rituals, traditions, and celebrations that enrich the local culture. Banana farmers rely on local resources, such as specific banana varieties and cultivation practices that have withstood the test of time. This is a reflection of their appreciation of their local wealth and their understanding of the local environment. Banana farmers have also adopted modern innovations while continuing to preserve their traditional values and practices. This shows that there is a wise balance between traditional and modern practices. By understanding how the local wisdom of banana farmers integrates tradition with modern innovations, the community can build strong socio-cultural empowerment, withstand climate change, maintain the sustainability of the farming culture, and improve the quality of life of the community.

References

- [1] Baranski M. *The globalization of wheat: A critical history of the Green revolution*. University of Pittsburgh Press; 2022 Nov 15.
- [2] Anlauf A. An extractive bioeconomy? Phosphate mining, fertilizer commodity chains, and alternative technologies. *Sustainability Science* 2022;18:633–44. <https://doi.org/10.1007/s11625-022-01234-8>.
- [3] Khurshid N, Khurshid J, Shakoor U, Ali K. Asymmetric effect of agriculture value added on CO2 emission: Does globalization and energy consumption matter for Pakistan. *Frontiers in Energy Research* 2022;10. <https://doi.org/10.3389/fenrg.2022.1053234>.
- [4] Wulansari P, Rasidin M, Witro D. Revitalization of food barns to support community and national food security. *Jurnal Ekonomi dan Kebijakan Publik*. 2021 Jul 27;12(1):45-56.
- [5] Ibrahim H, Yanti R. Empowerment of women farmers on sustainable food Security with dynamics system modelling (in Nagari Koto Tuo, Harau Sub-district, Limapuluh Kota Regency, West Sumatera). *InIOP Conference Series: Earth and Environmental Science* 2019 Jul 1 (Vol. 299, No. 1, p. 012022). IOP Publishing.
- [6] Noorbani MA, Nur M, Nurrahmah N, Iswanto A. Religion and local wisdom as social capital to facing recession due to pandemic. *Analisa: Journal of Social Science and Religion*. 2022 Dec 30;7(2):265-81.
- [7] Scoones I, Stirling A, Abrol D, Atela J, Charli-Joseph L, Eakin H, et al. Transformations to sustainability: combining structural, systemic and enabling approaches. *Current Opinion in Environmental Sustainability*. 2020 Feb 1;42:65-75.

- [8] Di Sacco A, Hardwick KA, Blakesley D, Brancalion PH, Breman E, Cecilio Rebola L, et al. Ten golden rules for reforestation to optimize carbon sequestration, biodiversity recovery and livelihood benefits. *Global Change Biology*. 2021 Apr;27(7):1328-48.
- [9] Eko BS, Putranto H. The role of intercultural competence and local wisdom in building intercultural and inter-religious tolerance. *Journal of Intercultural Communication Research*. 2019 Jul 4;48(4):341-69.
- [10] Tanjung IS, Tanjung H, Wibowo YS. Development of tourism communication model based on local wisdom in Padangsidempuan. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*. 2021 Nov 9;4(4):9877-85.
- [11] Sutrisno S. Changes in Media consumption patterns and their implications for people's cultural identity. *Technology and Society Perspectives (TACIT)*. 2023 Aug 31;1(1):18-25.
- [12] Kopnina H. Education for the future? Critical evaluation of education for sustainable development goals. *The Journal of Environmental Education*. 2020 Jul 3;51(4):280-91.
- [13] Ali K, Kausar N, Amir M. Impact of pollution prevention strategies on environment sustainability: role of environmental management accounting and environmental proactivity. *Environmental Science and Pollution Research*. 2023 Aug;30(38):88891-904.
- [14] Velenturf AP, Purnell P. Principles for a sustainable circular economy. *Sustainable Production and Consumption*. 2021 Jul 1;27:1437-57.
- [15] Maspul KA, Almalki FA. Preserving local wisdom: Unaizah's coffee culture and dates farming sustaining cultural heritage. *J-CEKI: Jurnal Cendekia Ilmiah*. 2023 Sep 10;2(6):639-64.
- [16] Tohri A, Rasyad A, Sururuddin M, Istiqlal LM. The urgency of Sasak Local wisdom-based character education for elementary school in East Lombok, Indonesia. *International Journal of Evaluation and Research in Education*. 2022 Mar;11(1):333-44.
- [17] Ridwan R. From local to global: The transformation of the value of togetherness in Songah. *Journal of Arts and Humanities*. 2020 Dec 6;9(10):49-60.
- [18] Anwar C, Kom S, Kom M, Santiari CN, Sitorus Z. *Buku Referensi Sistem Informasi Berbasis Kearifan Lokal*. 2023.
- [19] Gathala MK, Laing AM, Tiwari TP, Timsina J, Islam S, Bhattacharya PM, Dhar T, Ghosh A, Sinha AK, Chowdhury AK, Hossain S. Energy-efficient, sustainable crop production practices benefit smallholder farmers and the environment across three countries in

- the Eastern Gangetic Plains, South Asia. *Journal of cleaner production*. 2020 Feb 10;246:118982.
- [20] Das A, Gujre N, Devi RJ, Mitra S. A review on traditional ecological knowledge and its role in natural resources management: North East India, a cultural paradise. *Environmental management*. 2021 Nov 17:1-22.
- [21] Aryal K, Thapa PS, Lamichhane D. Revisiting agroforestry for building climate resilient communities: A case of package-based integrated agroforestry practices in Nepal. *Emerging science journal*. 2019 Oct 1;3(5):303-11.
- [22] Banerjee A, Jhariya MK, Meena RS, Yadav DK. Ecological footprints in agroecosystem: An overview. *Agroecological footprints management for sustainable food system*. 2021:1-23.
- [23] Zayan SA. Impact of climate change on plant diseases and IPM strategies. In: *Plant diseases-current threats and management trends 2019* Aug 29. IntechOpen.
- [24] Dorward P, Osbahr H, Sutcliffe C, Mbeche R. Supporting climate change adaptation using historical climate analysis. *Climate and Development*. 2020 May 27;12(5):469-80.
- [25] Sun W, Shahrajabian MH, Khoshkharam M, Cheng Q. Adaptation of acupuncture and traditional Chinese herbal medicines models because of climate change. *Journal of Stress Physiology & Biochemistry*. 2020;16(1):85-90.
- [26] Farooq MS, Uzair M, Raza A, Habib M, Xu Y, Yousuf M, Yang SH, Ramzan Khan M. Uncovering the research gaps to alleviate the negative impacts of climate change on food security: A review. *Frontiers in plant science*. 2022 Jul 11;13:927535.
- [27] Gutierrez BV, Kaloostian D, Redvers N. Elements of successful food sovereignty interventions within indigenous communities in the United States and Canada: a Systematic Review. *Current Developments in Nutrition*. 2023 Jul 18:101973.
- [28] Dower B, Gaddis J. Relative to the landscape: Producer cooperatives in native food sovereignty initiatives. *Journal of Co-Operative Organization and Management*. 2021 Dec 1;9(2):100147.
- [29] Sowerwine J, Sarna-Wojcicki D, Mucioki M, Hillman L, Lake F, Friedman E. Enhancing food sovereignty: A five-year collaborative tribal-university research and extension project in California and Oregon. *Journal of Agriculture, Food Systems, and Community Development*. 2019 Nov 14;9(B):167-90.
- [30] Suwanto S, Wibowo A, Lestari E, Rahayu R. Revitalization of local wisdom in the conservation of the upstream watershed region, on Java Island, Indonesia. *InE3S Web of Conferences 2022* (Vol. 361, p. 03019). EDP Sciences.

- [31] Hasdiansyah A, Suryono Y. Empowerment of farmers: The role of actor and the persistence of coffee farmers in rural pattongko, indonesia. *The Qualitative Report*. 2021 Dec 1;26(12):3805-22.
- [32] Guiné RP, Florença SG, Barroca MJ, Anjos O. The duality of innovation and food development versus purely traditional foods. *Trends in food science & technology*. 2021 Mar 1;109:16-24.
- [33] Curry GN, Nake S, Koczberski G, Oswald M, Rafflegeau S, Lummani J, et al. Disruptive innovation in agriculture: Socio-cultural factors in technology adoption in the developing world. *Journal of Rural Studies*. 2021 Dec 1;88:422-31.
- [34] Mujiyo M, Romdhani F, Widiyanto H, Herawati A. Land suitability evaluation for banana in Jenawi district, Karanganyar, Indonesia. *AGROLAND The Agricultural Sciences Journal (e-Journal)*. 2021 Jul 19:60-71.
- [35] Schreier M, Stamann C, Janssen M, Dahl T, Whittal A. Qualitative content analysis: Conceptualizations and challenges in research practice.
- [36] Awasthy R. Nature of qualitative research. In: *Methodological issues in management research: Advances, challenges, and the way ahead 2019* Nov 11 (pp. 145-161). Emerald Publishing Limited.
- [37] Maxwell JA. Why qualitative methods are necessary for generalization. *Qualitative Psychology*. 2021 Feb;8(1):111.
- [38] Bulmer M. The value of qualitative methods. In: *Social science and social policy 2021* Dec 29 (pp. 180-203). Routledge.
- [39] Sulistyono SB, Ritonga AM, Satriani R, Oktaviani E, Leana NW, editors. *Proceedings of the 3rd International Conference on Sustainable Agriculture for Rural Development (ICSARD 2022)*. Springer Nature; 2023 Apr 19.
- [40] Yin RK. *Case study research: Design and methods*. sage; 2009.
- [41] Miles MB, Huberman AM. *Qualitative data analysis: An expanded sourcebook*. sage; 1994 Jan 12.
- [42] Avgoustaki DD, Xydis G. How energy innovation in indoor vertical farming can improve food security, sustainability, and food safety? In: *Advances in food security and sustainability 2020* Jan 1 (Vol. 5, pp. 1-51). Elsevier.
- [43] Saleh C, Riyadi BS. The relationship of community empowerment and social capital towards production capacity of agricultural product in Indonesia. *International Journal of Membrane Science and Technology*. 2023.
- [44] Van Delden SH, SharathKumar M, Butturini M, Graamans LJ, Heuvelink E, Kacira M, et al. Current status and future challenges in implementing and upscaling vertical farming systems. *Nature Food*. 2021 Dec;2(12):944-56.

- [45] Burton RJ, Forney J, Stock P, Sutherland LA. The good farmer: Culture and identity in food and agriculture. Routledge; 2020 Sep 13.
- [46] Bisht IS, Rana JC, Pal Ahlawat S. The future of smallholder farming in India: Some sustainability considerations. *Sustainability*. 2020 May 6;12(9):3751.
- [47] Akinola R, Pereira LM, Mabhaudhi T, De Bruin FM, Rusch L. A review of indigenous food crops in Africa and the implications for more sustainable and healthy food systems. *Sustainability*. 2020 Apr 24;12(8):3493.
- [48] Zarei Z, Karami E, Keshavarz M. Co-production of knowledge and adaptation to water scarcity in developing countries. *Journal of environmental management*. 2020 May 15;262:110283.
- [49] Atieno M, Herrmann L, Nguyen HT, Phan HT, Nguyen NK, Srean P, Than MM, Zhiyong R, Tittabutr P, Shutsrirung A, Bräu L. Assessment of biofertilizer use for sustainable agriculture in the Great Mekong Region. *Journal of environmental management*. 2020 Dec 1;275:111300.
- [50] Massari S, Principato L, Antonelli M, Pratesi CA. Learning from and designing after pandemics. CEASE: A design thinking approach to maintaining food consumer behaviour and achieving zero waste. *Socio-Economic Planning Sciences*. 2022 Aug 1;82:101143.
- [51] Martín EG, Giordano R, Pagano A, Van Der Keur P, Costa MM. Using a system thinking approach to assess the contribution of nature based solutions to sustainable development goals. *Science of the Total Environment*. 2020 Oct 10;738:139693.
- [52] Hajian M, Kashani SJ. Evolution of the concept of sustainability. From Brundtland Report to sustainable development goals. In *Sustainable resource management 2021* Jan 1 (pp. 1-24). Elsevier.