

Empowerment Model of Tenggerese Women Farmers: A Local Wisdom-Based

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Abstract

Women play a crucial role in agricultural production and food security; however, they continue to face limited access to resources, decision-making, and agricultural support services. These challenges are more complex in indigenous communities, where empowerment initiatives often fail to accommodate local socio-cultural contexts. This study aimed to describe the local wisdom of Tenggerese women farmers and formulate a local wisdom-based empowerment model for indigenous women farmers. The research was conducted in the Tengger indigenous community area of Bromo Tengger Semeru National Park, East Java, Indonesia, using a qualitative ethnographic approach. Data were collected through participant observation, in-depth interviews, and focus group discussions involving women farmers, traditional leaders, agricultural extension workers, and village officials. Data were analyzed using an interactive qualitative analysis model. The results revealed that the local wisdom of the Tengger community is reflected in the values of *Makarya Sesarengan* (collective work), *Guyub Rukun* (social harmony), *Yadnya* rituals, and local ecological knowledge, which function as social and cultural mechanisms supporting women's participation in agriculture and community life. Based on these findings, the Tengger Local Wisdom-Based Women Empowerment Model was developed. The model integrates three key components: (1) natural resources, (2) human resources, and (3) government support through local wisdom values to generate economic, social, political, and epistemic empowerment outcomes. The study concludes that women's empowerment in indigenous communities should be rooted in local cultural values and community institutions. The proposed model provides a culturally responsive framework for strengthening women's roles in sustainable agriculture, food security, and rural development.

Keywords: community development; indigenous women farmers; local ecological knowledge; social capital; women empowerment

1. INTRODUCTION

Agriculture is the primary source of food for 8.3 billion people worldwide. Women play a crucial role in the agricultural sector, yet their contributions are largely unrecognized. According to the Food and Agriculture Organization (FAO, 2023), women account for 36% of the global agricultural and food sector workforce. However, the significant role of women in agriculture is not directly proportional to the opportunities and facilities provided to women farmers. Women farmers still face limitations in terms of excessive workloads, access to resources, control over resources and benefits, and participation in farmer groups compared to male farmers (Costa, V., et al., 2023). This is supported by Man et al. (2024) who found that globally, rural women farmers only benefit from 5% of agricultural extension information and 10% of agricultural extension facilities, which impacts their involvement in agricultural development. This

creates a gender gap in the agricultural sector between male and female farmers. As part of efforts to reduce the gap between women and men through the United Nations, this urgency is recognized through the United Nations Sustainable Development Goals (SDGs), specifically SDG 2 (Zero Hunger) and SDG 5 (Gender Equality). SDG 2 (Zero Hunger) and SDG 5 (Gender Equality) emphasize the need for efforts to reduce the gender gap between men and women in the agricultural sector.

According to Kurniasari (2025), one effort to reduce the gender gap between men and women in the agricultural sector is through empowering women farmers. This effort aims to increase access to resources, control over resources and benefits, and participation in farmer groups. Through these efforts, it is hoped that women farmers will be able to fully contribute to food security. Therefore, an empowerment model that aligns with the characteristics of women farmers in each region is needed. This research focuses on women farmers of the Tengger tribe in Probolinggo Regency, East Java. Tenggerese women farmers live in an area located at the foot of the Bromo-Tengger-Semeru volcano complex at an altitude of over 2,000 meters above sea level. The Tenggerese are one of Indonesia's most distinctive indigenous communities. They have traditionally maintained a Hindu-Javanese belief system, a ritual calendar centered on the annual Kasada ceremony, and communal agricultural practices governed by customary governance. Tenggerese women are the primary managers of household food production, cultivating potatoes, leeks, and cabbage on steep volcanic slopes. Furthermore, Tenggerese women farmers play an active role in ritual food preparation and community decision-making through deliberation forums.

Previous research conducted by Quisumbing et al. (2023) showed that women's empowerment impacts food security, household welfare, and sustainable agricultural development. Jemaneh et al. (2023) stated that women's empowerment increases food diversity and household nutritional quality. This is supported by research by Ameridyani et al. (2025) that women's groups play a crucial role in rural development and strengthening community economic capacity. Furthermore, research by Naika et al. (2026) found that social, economic, and environmental factors contribute to the sustainable livelihoods of women farmers. Rahman (2024) concluded that local wisdom is the foundation of food security and the sustainability of traditional communities.

Although various studies have demonstrated the importance of women's empowerment in improving food security, household welfare, and sustainable agricultural development, most studies still focus on the economic dimension, access to resources, or women's participation in formal agricultural institutions. Research on women farmers in indigenous communities is still relatively limited, particularly examining how local wisdom functions as a mechanism driving the process of women's empowerment. Most of the empowerment models currently being developed are built on a universal approach that tends to ignore the local socio-cultural context, so they are often less effective when applied. This applies to indigenous communities with distinctive value systems, institutions, and gender relations.

Furthermore, various studies on the Tengger community have focused primarily on cultural aspects, traditional rituals, social identity, and local ecological knowledge. However, studies specifically linking local wisdom to the empowerment of women farmers are still very limited. Ariani and Wibowo (2021) highlight the importance of cultural identity and social cohesion in maintaining the sustainability of the Tengger community, while Mukaromah et al. (2022) emphasize the contribution of local ecological knowledge to agroecosystem sustainability. Putri et al. (2023) also show that Tengger agricultural practices are still integrated with the local ritual calendar and cultural system. However, no research has yet integrated these various dimensions into a comprehensive model of women's empowerment that can be implemented in agricultural development programs.

Based on these conditions, this study offers a new approach by integrating the Moser Gender Framework, the local wisdom of the Tenggerese community, and a community-based development perspective to formulate the Empowerment Model of Tenggerese Women Farmers: A Local Wisdom-Based Approach. This model positions natural resources, human resources, and government support as key

components, linked through the mechanisms of Tenggerese local wisdom. Thus, this study not only makes an empirical contribution to the study of women's empowerment in indigenous communities but also produces a conceptual model that can serve as a reference for developing gender mainstreaming policies, agricultural extension, and rural development that are more responsive to the local cultural context.

The urgency of this research is that indigenous mountain communities face empowerment constraints that cannot be addressed by frameworks designed for lowland, plantation, or transmigration contexts. The model, rooted in local wisdom, offers a design logic that can be adapted for culturally responsive agricultural extension, rural finance, and gender mainstreaming programs in similar indigenous communities. The novelty of this research is integrating the Moser Gender Framework by developing an empowerment model based on Tenggerese local wisdom. So the purpose of this research is to formulate an EMPOWERMENT MODEL OF TENGGERESE WOMEN FARMERS: A LOCAL WISDOM-BASED. The purpose of this research is (1) to describe the local wisdom of female farmers in Tenggerese (2) to formulate an empowerment model based on local wisdom.

2. MATERIAL AND METHODS

2.1 Research Location and Time

The research was conducted from January to December 2024 in the Tengger indigenous community area within the Bromo Tengger Semeru National Park, Probolinggo Regency, East Java, Indonesia. The location was chosen purposively because the Tengger people still maintain agricultural systems and social life based on local wisdom, such as makarya sesarengan (traditional community gatherings), guyub rukun (community gatherings), Yadnya rituals, and local ecological knowledge passed down through generations (Mukaromah et al., 2022; Putri et al., 2023).

2.2 Research Design and Approach

This research aims to analyze the dimensions of local wisdom that support women's empowerment and formulate a Local Wisdom-Based Empowerment Model for Tengger Women Farmers. The research used a qualitative approach with an ethnographic design to deeply understand the cultural practices, social relations, and experiences of women in the Tengger indigenous agricultural system. This approach was chosen because it explores the relationship between gender, social capital, local knowledge, and culture in the process of women's empowerment (Creswell & Poth, 2024).

2.3 Research Participants

Participants were selected using a purposive sampling technique based on their experience and involvement in agricultural activities and the social life of the Tengger community. Informants included female farmers, members and non-members of the Women's Farmers Group (KWT), traditional leaders, agricultural extension workers, farmer group leaders, and village officials. A total of 30 key informants were involved in the study: 20 female farmers, four traditional leaders, three agricultural extension workers, and three village officials.

2.4 Data Collection

Primary data was collected through participant observation, in-depth interviews, and focus group discussions (FGDs). Observations were conducted to understand agricultural activities, cultural practices, and women's involvement in the community. Semi-structured interviews were used to elicit information on women's roles, access to and control over resources, and local wisdom practices that support empowerment. Focused Group Discussions (FGDs) were conducted with women farmers, traditional leaders, and agricultural extension workers to validate the interview results and identify factors that shape

the local wisdom-based women's empowerment model (Anggraeni et al., 2022; Mardiyanta et al., 2021).

2.5 Data Analysis

Data were analyzed using the interactive model of Miles, Huberman, and Saldaña (2020), which includes data collection, data condensation, data presentation, and conclusion drawing. All data from observations, interviews, and FGDs were transcribed, coded, and grouped into main themes related to local wisdom, women's empowerment, natural resources, human resources, and government support. Analysis was conducted continuously until patterns and relationships between themes were identified that formed the conceptual model of Tenggerese women's farmer empowerment.

2.6 Data Validity

Data validity was ensured through triangulation of sources, methods, and time. In addition, member checking, peer debriefing, and an audit trail were conducted to increase the credibility, transferability, dependability, and confirmability of the research results (Nowell et al., 2023; Creswell & Poth, 2024).

2.7 Model Development

Model development was carried out in three stages: (1) identifying dimensions of local wisdom and forms of women's empowerment; (2) analyzing the relationship between cultural values, social capital, local ecological knowledge, natural resources, human resources, and government support; and (3) synthesizing empirical findings to formulate the Tengger Local Wisdom-Based Women Empowerment Model. This model positions local wisdom as the foundation for strengthening women's capacity in the economic, social, political, and epistemic dimensions.

3. RESULTS AND DISCUSSION

3.1 Description of the Local Wisdom of the Tengger Community

Local wisdom is a system of knowledge, values, norms, and cultural practices that develops within a community and is passed down from generation to generation as a guideline for regulating human relationships with others, the environment, and the community's belief systems. In the Tengger indigenous community, local wisdom not only serves as a cultural identity but also serves as a foundation for managing social, economic, spiritual, and agricultural life sustainably. Various forms of this local wisdom are still practiced and are an integral part of community life to this day.

The research results indicate that the local wisdom of the Tengger community is built on core values that include *makarya sesarengan* (collective work), *guyub rukun* (social harmony), a *Yadnya*-based ritual system, and local ecological knowledge (*Traditional Ecological Knowledge*) that is passed down between generations. These values form a social system that maintains community cohesion and serves as a mechanism for community adaptation to dynamic mountain environmental conditions. This finding aligns with research by Mukaromah et al. (2022) showed that the Tengger people still maintain traditional ecological knowledge as the basis for managing agro-ecosystems in the Bromo Tengger Semeru region.

One of the most prominent forms of local wisdom is *makarya sesarengan*, a tradition of collective work carried out in various agricultural and social activities. In agricultural practices, communities help each other during land preparation, planting, and harvesting without prioritizing economic rewards. This collective work system strengthens social solidarity, reduces production costs, and creates a mechanism for mutual support among community members. This value serves as important social capital in maintaining the sustainability of the Tengger agricultural system. This finding aligns with various studies showing that local culture-based social capital plays a crucial role in enhancing the collective capacity of rural communities and strengthening community resilience to social and economic change.

Another local wisdom is the value of *guyub rukun*, a principle of harmonious living that emphasizes togetherness, tolerance, and respect for fellow community members. This value is reflected in the high

level of social cooperation, conflict resolution through deliberation, and strong interfaith tolerance within the Tengger community. Despite the diversity of religions, including Hinduism, Islam, and Buddhism, the Tenggerese community maintains its cultural identity as a social glue that unites the community. Recent research shows that social cohesion and tolerance are key characteristics of the Tenggerese community, contributing to social stability and the sustainability of traditional institutions.

Another important dimension is the Yadnya-based ritual and spiritual system, manifested through various traditional ceremonies such as Kasada, Karo, Unan-Unan, and Entas-Entas. These rituals not only have religious significance but also serve as mechanisms for preserving cultural values, strengthening collective identity, and regulating human relations with nature. The Kasada ceremony, for example, is performed as a form of gratitude for agricultural produce and honoring ancestors through offerings of produce. This practice demonstrates that agricultural activities in the Tenggerese community are inseparable from their spiritual value system. Research by Putri et al. (2023) shows that the Tenggerese agricultural calendar remains closely integrated with the traditional ritual cycle, allowing agricultural and cultural practices to develop in a complementary manner.

Furthermore, the Tenggerese possess traditional ecological knowledge, developed through long experience interacting with the mountainous environment. This knowledge encompasses understanding seasonal patterns, soil fertility, conservation of sloping land, natural pest control, and selecting planting times based on the traditional calendar. This knowledge has been passed down orally from generation to generation and is still used in agricultural practices today. Recent studies have shown that the Tenggerese traditional ecological knowledge contributes significantly to the sustainability of agroecosystems and supports the community's ability to adapt to environmental changes and ecological pressures.

Overall, the Tenggerese local wisdom demonstrates that the local cultural system serves not only as a traditional heritage but also as a social, ecological, and institutional resource that supports the sustainability of community life. This local wisdom serves as an important foundation for building social resilience, preserving the environment, strengthening community solidarity, and creatingResult and discussion must be written in the same part. They should be presented continuously start from the main result to the supporting results and equipped with a discussion. This section must show the acuity of the analysis and synthesis carried out critically including a description of the findings of the work that discusses incisive, its relation to previous concepts or theories, compares them critically with the work of others, and corroborates or corrects to the previous findings. Unit of measurement used should follow the prevailing international system. All figures and tables should be active and editable by an editor. The discussion should explore the significance of the results of the work. Please highlight differences between your results or findings and the previous publications by other researchers.

This finding reinforces the argument that sustainable indigenous community development must be based on local cultural values that have been proven to maintain balance between humans, nature, and the community.

3.2 Formulating a Model for Empowering Tenggerese Women Farmers Based on Local Wisdom

Research results indicate that the empowerment of Tenggerese women farmers cannot be separated from the socio-cultural system of the indigenous community, which has developed over \generations. Unlike conventional empowerment models that focus solely on increasing individual capacity, women's empowerment in the Tenggerese community is built through the interaction of natural resources, human resources, and institutional support, grounded in local wisdom. These findings demonstrate that the success of women's empowerment is determined not only by access to economic resources but also by the community's ability to utilize available social, cultural, and institutional capital.

a. Natural Resources as a Foundation for Empowerment

The Tenggerese community lives in a mountainous region with distinctive agro-ecosystem

characteristics and relies heavily on the horticultural agricultural sector. The relatively fertile natural resources serve as a key asset in building women's household economic activities. Tenggerese women are actively involved in the management of potatoes, cabbage, carrots, leeks, and various other horticultural crops, which serve as the primary source of family income.

However, this study found that natural resources do not automatically generate empowerment. These resources only become empowering factors when supported by local knowledge in their management. Tengger women's local ecological knowledge regarding seasonal patterns, land conservation, soil fertility management, and traditional pest control is a crucial factor enabling them to utilize natural resources sustainably. This finding aligns with research by Mukaromah et al. (2022), which shows that the Tengger community's local ecological knowledge contributes to the sustainability of the Bromo Tengger Semeru agro-ecosystem. Furthermore, Reyes-García et al. (2019) explain that the local knowledge of indigenous communities is a crucial asset in enhancing socio-ecological resilience and sustainable rural development.

In the context of women's empowerment, natural resources serve as an economic base that enables women to earn income, strengthen their bargaining position within the household, and increase their contribution to family food security. This finding supports the research of Kurniasari et al., which shows that women's involvement in agricultural activities contributes to increasing household economic capacity and food security in rural communities.

b. Human Resources as a Driver of Empowerment

The second aspect identified in this study is human resources, encompassing individual capacity, education, farming experience, women's leadership, social capital, and local institutions. The results indicate that Tenggerese women possess extensive farming experience and local knowledge acquired through intergenerational learning.

The resulting empowerment model demonstrates that social capital is a key driving factor. The values of *makarya sesarengan* (working together in harmony) and *guyub rukun* (building harmony) create a collective work system that enables women to gain access to information, labor, and social support in agricultural activities. This strengthens women's capacity to participate in various productive and social activities.

These findings align with research by Purnomo and Wibowo (2022), which demonstrates that social capital plays a crucial role in strengthening the capacity of women's farming groups and increasing the success of community-based empowerment programs. Similarly, research by Dwiyanita Anela Kurniasari and Hamidah Hendrarini on empowerment strategies for Tenggerese women farmers demonstrates that strengthening human resource capacity through education, extension services, and strengthening women's institutions is a key factor in improving women's position in the local agribusiness system. The results of this study also reinforce the findings of an article in the *Caraka Tani Journal*, which stated that increasing human resource capacity through education, training, and agricultural extension is a key prerequisite for building sustainable women's empowerment in the agricultural sector. High individual capacity enables women to access innovation, expand their social networks, and improve their decision-making skills in farming.

c. Government Support as an Enabling Environment

The third aspect influencing women's empowerment is government support. The results show that the existence of extension programs, women's farmer groups, production input assistance, entrepreneurship training, and gender mainstreaming policies provide greater opportunities. It is crucial for women to increase their capacity and participation in agricultural development.

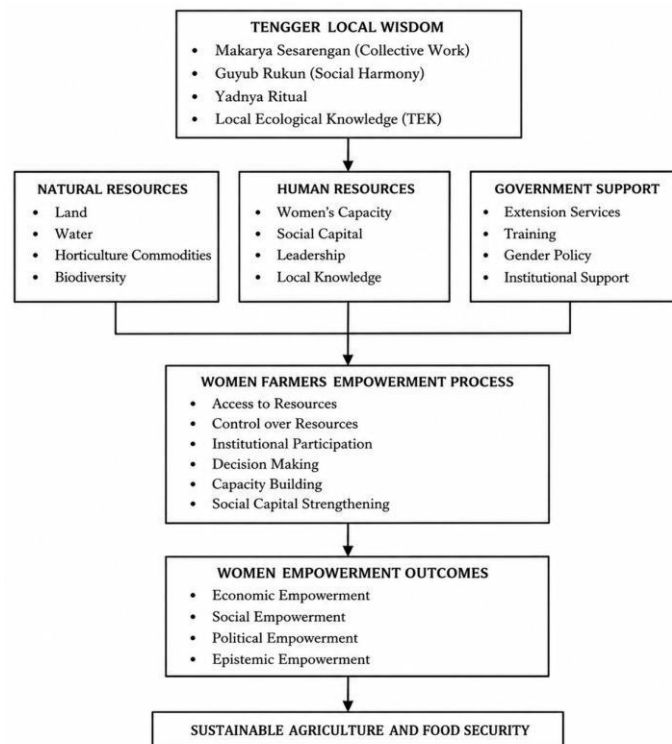
Government support serves as an enabling environment that strengthens the relationship between natural and human resources. When women gain access to training, technological information, capital assistance, and agricultural institutions, their ability to utilize local resources is optimized. This finding aligns with Farahdiba and Soesilowati (2021), who explain that gender-responsive agricultural policies

play a crucial role in increasing women's access to productive resources and decision-making in agricultural development.

Furthermore, research by Kurniasari et al. (2025) on the empowerment of women farmers shows that the involvement of village governments, universities, and agricultural extension workers is a crucial factor in strengthening the capacity of women farmers through knowledge transfer, business mentoring, and local institutional development.

d. Tengger Women Farmers Empowerment Model Based on Local Wisdom

Based on the synthesis of research findings, a Tengger Women Farmers Empowerment Model Based on Local Wisdom was formulated, consisting of three main components: Natural Resources, Human Resources, and Government Support, integrated through the values of the local wisdom of the Tengger community. The model can be described as follows:



Picture 1. Tengger Local Wisdom-Based Women Empowerment

This model demonstrates that Natural resources provide the economic base and livelihoods of communities, Human resources serve as the driving force, managing resources through local knowledge, social capital, and individual capacity and Government support acts as a reinforcing factor, creating a supportive environment through policies, outreach, training, and institutional strengthening.

These three components are integrated by local wisdom values such as makarya sesarengan (community-building), guyub rukun (community-building), Yadnya rituals, and local ecological knowledge, which serve as social mechanisms in the empowerment process. The integration of these three components produces four main outcomes: economic empowerment, social empowerment, political empowerment, and women's epistemic empowerment.

4. CONCLUSION

This study reveals that Tengger local wisdom Makarya Sesarengan, Guyub Rukun, Yadnya rituals, and local ecological knowledge serves as the foundation for empowering women farmers. The proposed Tengger Local Wisdom-Based Women Empowerment Model integrates three key components: Natural Resources, Human Resources, and Government Support, which collectively promote economic, social, political, and epistemic empowerment. The findings highlight that women's empowerment in indigenous communities should be rooted in local socio-cultural values. Tengger Local Wisdom-Based Women Empowerment Model offers a culturally responsive framework to strengthen women's roles in sustainable agriculture, food security, and community development.

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