



Empowering Institutional and Land Resources Toward Food Security

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Abstract. Food security remains a challenge in Indonesia, as the country is yet to achieve food self-sufficiency. Although known for its agriculture, the country faces problems such as changes in land use and farming issues. This study explores how strengthening economic institutions and managing land resources can improve food security. The use of analytical methods from institutions through in-depth studies and SWOT analysis. The results showed that strong cooperation between community members and institutions created effective social capital. Good land management includes planning for food, supporting sustainable livelihoods, and protecting ecosystems. Therefore, empowering institutions and land management can help improve farmers' welfare and strengthen food security.

Keywords: empowerment, institutional, land resource, food security.

1 Introduction

The natural resources sector, particularly land and agriculture, forms the backbone of Indonesia's economy [1]. Land resources are a part of the environment that is widely consumed, and the economic burden continues to increase. Land resources guarantee the normal lives and activities of current and future generations [2]. Natural resources play an important role in people's lives by relying on agricultural resources and improving livelihoods to realize sustainable development [3]. This is related to agricultural activities and sustainable development goals for developing and utilizing agricultural resources [4]. Sustainable development is supported by land resources, which are among the most important drivers of economic and environmental development [5]. Environmental protection and natural resource utilization experience several problems, including low levels of education, community behavior culture in the field of natural resource utilization, and protected areas that are not sufficiently developed [6]. In addition, there are limited resources and access to technology to sustainably produce food [7].

Food security for poverty alleviation in rural areas where small-scale farmers are low-income [8]. Village development should be participatory, leveraging the potential

of existing rural resources to optimize local skills and capacities [9]. In addition, food security encourages creativity and innovation so that people can solve food security problems in the agricultural sector [10]. Food security problems are caused by declining fertility and land productivity, reduced environmental carrying capacity, expanding critical land, increasing pollution, environmental damage, and increasing numbers of poor and unemployed people in rural areas [11]. Food security system development includes availability, distribution, and consumption subsystems by utilizing local resources for sustainable management. This is related to food security policies aimed at building strategies that focus not only on increasing productivity, but also on strengthening human resources through community empowerment, aligned with local wisdom. Such an approach ensures that communities can independently and sustainably meet their needs [12]. In addition, food availability in the form of resilience is urgent for appropriate institutional management to overcome problems, and requires relevant policies related to food management programs [13].

Empowerment is a goal for the welfare of a community through economic activities. This is intended to encourage increased productivity of community economic businesses, control environmental pollution, and preserve the environment [14]. Optimal utilization of land resources for agricultural productivity will increase and contribute to improved food security has so far largely failed. Empowering institutions as partners has not been optimal for managing land resources to maintain food security [15]. This is because it has not been able to properly carry out its function to assist farmers in maximizing their bargaining position in terms of income and farmer welfare. In addition, climate change adversely affects food security and threatening survival [16]. Therefore, there is a need for agricultural innovation to improve food security related to appropriate technology for farmers [17]. Food security can be achieved if food is easily accessible to all elements of society and meets domestic food needs [18]. The implementation of the concepts of economic institutional empowerment and land resource management to strengthen food security can be achieved by revitalizing sustainable development to encourage food independence in the agricultural sector and downstream products to support Indonesia's sustainable national development.

2 Methods

This study uses an exploratory qualitative method with an analytical descriptive approach by mapping the actual conditions related to economic institutional empowerment and land resource management in farmer groups in Trenggalek Regency. The exploratory method was chosen to explore fact-based information in the field, identify challenges, and formulate strategies to strengthen food security through SWOT (Strength, Weakness, Opportunity, Threat) analysis. The primary data source used was structured interviews with 70 farmers who were selected by purposive sampling based on active involvement in farming and land management institutions. Meanwhile, secondary data use literature review and policy comparisons.

3 Result and Discussion

3.1 Economic Institutional Empowerment of Cassava Farmers

Economic institutions include farmer group institutions, production input provider institutions, production institutions, processing institutions, marketing institutions, and supporting institutions the following Table 1

Table 1. The level of institutional achievement of the Cassava farmer economy ($n=70$)

Indicator	Farmer Score Frequency				Achievement Score	Expectancy Score	Achievement rate (%)	Criterion
	4	3	2	1				
Farmer group institutions	0	30	35	5	165	280	58.93	Enough
Institutional providers of production inputs	4	31	35	0	179	280	63.93	Enough
Production institutions	3	22	21	24	144	280	51.43	Enough
Processing institutions	4	40	26	0	188	280	67.14	Good
Institutional marketing	2	46	22	0	190	280	67.86	Good
Supporting institutions	0	0	40	30	110	280	39.29	Less
TOTAL	13	169	179	59	976	1680	58.10	Enough

Farmer institutions obtained an achievement rate of 58.93 percent and included sufficient criteria. This is because members of farmer groups have performed according to their functions and roles as a forum for learning, production unit, and cooperation. In addition, the empowerment of farmer groups aims to make the community independent by having the ability to solve problems without relying on external parties [19]. Furthermore, participation in farmer groups creates a sense of mutual understanding among group members oriented towards optimizing farmer participation to adopt the innovation process more effectively [20]. Therefore, empowerment of cassava farmer groups is important in the supply chain [21].

The institutional providers of production inputs reached an achievement level of 63.93 percent and included sufficient criteria. This is because cassava seeds and fertilizers are easily accessible. Institutional providers of input from individuals and farmers' official stores. The cassava commodity produced serves as a buffer, meets factory capacity, and ensures the continuity of supply [21]. Efforts to increase efficiency and effectiveness using the same amount of production input according to production capabilities [22].

Production and capital institutions are very important because they can contribute to supporting cassava farming. Institutional production or capital can come from farmers themselves, bank loans, and private loans. With credit supply, it will make it easier for cassava farmers to obtain materials, including the purchase of fertilizers, medicines,

and modern equipment for production expansion. The existence of production and capital institutions, with an achievement rate of 51.43%, includes sufficient criteria. This is because the source of credit or capital to support cassava farming comes mostly from farmers' group loans. This means that cassava production is quite responsive to credit, showing that cassava production can be significantly increased by obtaining credit without having to increase land area, fertilizer, or labor [23].

Empowerment is emphasized in providing skills in the processing sector for various types of cassava processing [19]. Institutional processing had an achievement rate of 67.14 percent and included good criteria. This is because the economic players in the food industry, especially the processed food industry, continue to develop their businesses. Therefore, it is necessary to innovate cassava processing so that cassava prices can compete and improve farmers' welfare [24].

Marketing institutions are important for cassava farmers because they contribute significantly to the economic empowerment and development of downstream components of the cassava agricultural sector [25]. In addition, it had an achievement rate of 67.86 percent and was classified as a good criterion. The use of marketing agencies in determining distribution varies owing to the use of marketing channels when producers do not have the time or financial resources to engage in direct marketing. In addition, marketing institutions using intermediaries are able to make products widely available and easily accessible because they have experience [25].

Supporting institutions reached 39.29 percent and were classified as lacking criteria. This is because counseling related to cassava farming is less active. The quality of agricultural extension services has long experience is expected to increase understanding and information for cassava farmers. However, the performance of extension services has not been optimal, because cassava farmers' information has not been conveyed to the local government [26].

3.2 Land Empowerment Management to Strengthen Food Security

The internal strengths of the agricultural sector include sustainable land management and existing infrastructure, which provides a solid foundation for long-term agricultural productivity. Different types of sustainable agriculture and land management utilize land through the intensification of sustainability and collective action, which can result in greater synergistic production in terms of food and ecosystem services [27]. However, the sector faces notable internal weaknesses such as a conventional cultivation system, low interest among youth, high urbanization rates, and limited access to agricultural capital. This is explained in [28], which reveals a series of problems related to young farmers' reluctance to pursue development in areas far from big cities, lack of vacant land, lack of capital for young farmers to set up new farms, deteriorating infrastructure in rural areas as an obstacle to generational change, and rising wages in other economic sectors that affect the attractiveness of agriculture for young people. These weaknesses could hinder innovation and generational renewal in agriculture if not strategically addressed.

Externally, the sector benefits from opportunities, such as the advancement of information technology and cassava farmer empowerment programs, which can be leveraged to modernize agricultural practices and build farmer capacity. Conversely, it also faces serious threats, including land degradation, the conversion of agricultural land to non-agricultural uses, complex supply chains, and low productivity in dryland areas. To harness strengths and opportunities (SO strategy), actions such as implementing sustainable land management practices and empowering cassava farmers with technological tools are essential.

The SO strategy not only utilizes existing resources but also paves the way for sustainable modern agriculture with an integrated approach ranging from technology and training to supporting policies so that the agricultural sector can transform to become more productive and competitive. This is clarified by research [29], which emphasizes agricultural transformation, innovative policies, and technologies for capacity building among smallholders, and proves that effective policies and efficient technologies in agriculture can increase agricultural productivity among smallholders involved in cassava cultivation.

Meanwhile, the WO strategy focuses on addressing internal weaknesses by capitalizing on external opportunities, such as introducing technology-based cassava cultivation and engaging youth through millennial farming initiatives. The WO strategy is a transformative solution to turn weaknesses into opportunities through the adoption of technology in cassava cultivation, youth empowerment, and government collaboration, as well as with an approach to the agricultural sector that is not only more efficient, but also becomes attractive jobs for the younger generation. This is in accordance with [30], which states that the new technology applied has considerable challenges related to the knowledge of cassava farmers regarding the use of technology. Therefore, digitalization is needed to focus on the perspective aspects from the perspective of small farmers.

The ST strategy emphasizes using strengths to counter threats by promoting land-use optimization, adopting new high-yield varieties, and improving supply chain systems. The agricultural sector not only survives threats, but also grows more competitively and sustainably. Thus, increasing the yield potential of cassava through innovative technology has been considered an important strategy to overcome obstacles in ensuring higher crop productivity with less environmental impact [31].

Finally, the WT strategy seeks to mitigate both internal and external threats by designating sustainable moorlands and enhancing cassava land management to ensure productivity and environmental sustainability [32]. Cassava can grow and produce sufficient harvest in areas with declining environmental conditions and per capita resource levels, making it an ideal candidate for a perennial food crop. In addition, food crops that require low agricultural inputs, such as cassava, will increase food and nutrition security at the rural household level [33]. Sustainable agricultural development is based on the optimal management of land and human resources. In addition, changes in land use and the carrying capacity of food agriculture must be considered along with an increase in moor land and the carrying capacity of good cassava varieties.

The SWOT matrix illustrates how external opportunities and threats can be matched to their strengths and weaknesses. The matrix can produce four sets of possible alternative strategies: the SO, WO, ST, and WT strategies.

Table 2. SWOT Matrix

External Factors	Internal Factors	
	Strength (S) 1. Sustainable land management 2. Infrastructure	Weakness (W) 1. The cultivation system is still conventional 2. The interest of the younger generation is low 3. High urbanization rate 4. Lack of agricultural capital
Opportunity (O) 1. Improvement of information technology 2. Cassava farmer empowerment program	Strategy SO 1. Implementation of sustainable land management 2. Implementation of empowerment of cassava farmers related to technology	Strategy WO 1. Application of technology-based cassava cultivation 2. Making youth into millennial farmers
Threat (T) 1. Decreased carrying capacity of land 2. Increasing trend of agricultural land conversion 3. Supply chain complexity 4. Low dryland productivity	Strategy ST 1. Land use optimization 2. Increase productivity by using new varieties 3. Optimizing supply chains	Strategy WT 1. Determination of sustainable moor land 2. Improved land management of cassava commodities

The SWOT analysis shows that institutional empowerment and land power management are in quadrant 1, and in Table 2, there are nine recommendations for land resource management to strengthen food security in Trenggalek District, and there are several main programs that can be suggested by referring to each strategy (SO, WO, ST, and WT).

The first and second strategies are strength-opportunities (SO) designed to use strengths by exploiting opportunities. Recommendations in the field of land management with the application of sustainable land management and implementation of the empowerment of cassava farmers related to technology.

The third and fourth strategies are weakness opportunity (WO), which minimizes weakness by exploiting opportunities. Recommendations for implementing technology-based cassava cultivation and making youth millennial farmers.

The fifth, sixth, and seventh strategies are threat-forces (STs) that use force to overcome threats. Recommendations optimize land use, increase productivity using new varieties, and optimize supply chains.

The eighth and ninth strategies are weakness-threat (WT) strategies, which minimize weaknesses to avoid threats. Recommendations for determining sustainable moor land and improving cassava commodity land management.

The main programs are prioritized for sustainable land management, technology-based cassava modernization, farmer regeneration and millennial farmer development, increasing productivity and superior varieties on dry land, and strengthening the supply chain and marketing of cassava commodities. The program is designed synergistically

to optimally manage land resources and increase agricultural productivity, especially cassava, in the face of internal and external challenges. In addition, local food security based on cassava should be strengthened in a sustainable manner in the Trenggalek Regency.

4 Conclusion

Strengthening economic institutions and developing effective land resources plays an important role in increasing food security. Cohesiveness between members, networks between community institutions, and the involvement of service providers form solid and effective social capital to support food security. This strong collaboration between communities and institutions strengthens the local capacity for decision-making and resource distribution. On the other hand, land management carried out in a planned manner includes food planning, livelihood sustainability, resource degradation control, and sustainable utilization, which can maintain ecosystem resilience and support resilient agricultural development. Therefore, institutional empowerment and sustainable land resource management should focus on improving the welfare of farmers as a basis for strengthening national food security.

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