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A Theoretical Model for Increasing Coffee Farmers Groups' Institutional Capacity in Jember, Indonesia

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Abstract Productivity continues to be an issue faced by farmers, including coffee farmers in Jember. The productivity problem of coffee farmers can be reduced through a comprehensive study of the factors that influence it. This study aims to explain the influence of individual characteristics, external support, the role of extension workers on the capacity and participation of farmers and their influence on the institutional capacity of coffee farmer groups. This research is a survey research in Jember Regency, Indonesia. Respondents in the Jember Regency are coffee farmers using a disproportionate stratified sampling approach. Research data was obtained through questionnaires (interviews), observation, and documentation of respondents. The research instrument used a questionnaire aimed at coffee farmers, while the analysis of research data implemented Structural Equation Modeling (SEM). This research revealed that personal traits, external assistance, and extension agents' involvement influenced farmers' capacity and engagement. Also, farmers' capacity and engagement affected coffee farmer groups' institutional capacity. Farmers actively participated in regional agricultural and environmental initiatives to promote the long-term sustainability of farming enterprises, fostering cooperative and respectful social connections. The role of extension workers is crucial in enhancing the capacity and engagement of farmers, thereby contributing to the improvement of institutional capacity within farmer groups. This research provides an overview and reference for increasing the role of farmer groups and increasing the institutionalization of farmer groups in Indonesia and abroad who have the same problems.

Keywords Coffee Farmers, Participation, Capacity, Institutional Capacity, Farmers Group, Extensionists

1. Introduction

National governments and international development/aid agencies often prioritize agriculture in their programs to reduce poverty and promote economic and social stability. Government programs are usually implemented in rural areas of developing countries with limited employment diversity [1]. The agricultural sector comprises horticulture, food crops, plantation, forestry, livestock, and fisheries sub-sectors [2]. Coffee is one of the largest commodities in the world and an important part of the global economy [3]. Coffee is one of the leading commodities contributing to the country's economic growth [4]. Small producers dominate Indonesia's coffee sector. Global demand for coffee is the ones with high quality and sustainability standards due to its trade show and environmental protection. The capacity for sustainable coffee quality must be considered by coffee producers, especially farmer group institutions [5]. One area with high potential for coffee production in

Jember, East Java, Indonesia [6] is Jember Java Coffee.

Jember Java coffee is a mainstay coffee commodity contributing to the economy and is a government priority in agricultural development. The coffee plantation area in Jember is 6,629.1 ha [7], with 30% as people's gardens. In 2012, Indonesia was the third-largest exporter in the world. However, the value of Indonesia's coffee exports declined in 2015, rivaled by Colombia. The dominance of smallholder plantations results in low coffee productivity. People's coffee is synonymous with low productivity and quality. The factors influencing changes in coffee supply are low productivity, low quality, and weather (disease). Any change in supply can cause market price fluctuations [8].

Food is a basic need that plays an important role in life and becomes a problem for food security [9]. Productivity is a problem continually faced by farmers, including coffee farmers in Jember. However, this problem can be suppressed through a comprehensive assessment of the causal factors, such as farmers' lack of knowledge, attitudes, and abilities. Capacity and farmer participation are the main factors in increasing productivity. There is little understanding of what motivates farmers to participate and what affects their participation in decision-making [10]. The participation and capacity of farmers is a form of farmer behavior in achieving goals. It is crucial to bolster the institutional capability of farmer groups to enhance the proficiency of farmers [11]. The integration of farmer organizations needs to strengthen farmers' bargaining position in facing the complexity of the supply chain system [12]. Community-based organizations are needed to develop the agricultural sector [13]. Involvement in farmer groups has been linked to higher production yields and improved technical efficiency in agriculture [14]. Socioeconomic factors, fertilization, seeds, and land preparation impact farmers and productivity [15].

Strengthening farmer groups is needed to increase farmer knowledge of sustainable agricultural activities [16]. Strengthening farmer groups' institutional capacity through capacity building and farmer participation involves various agricultural institutions and farmers, such as building more active partnerships between farmers, cooperatives, and environmental and rural development organizations in coffee areas. For oil palm farmers, the model for strengthening smallholder institutions involves cooperatives, small farmer groups, and palm oil mills supported by regulatory agencies, finance, and input providers with the joint partnership program [17]. It will lead to sustainable agriculture, so it is important to research by studying and analyzing the influence of individual characteristics of farmers, the extensionists' role, and external support.

Many studies have examined the capacity and participation of farmers, but each region has its characteristics related to the capacity and participation of these farmers. The role of agricultural extension workers is needed to increase agricultural sustainability [18]. In addition, this research has an update on the capacity and participation of coffee farmers, which has implications for the institutional capacity of farmer groups and is closely related to differences in conditions regarding individual characteristics, external support, and the extensionists' role, agricultural, institutional community-based resource management planning to meet global demands and sustainability [19].

From state of the art, nothing explicitly discusses the influence of individual characteristics, external support, and the extensionists' role on the capacity and participation of coffee farmers, which has implications for increasing the institutional capacity of coffee farmer groups in Jember, Indonesia. The contributions of previous studies were used as the material for the preparation state of the art, which became a collection of related theories and references, both supporting and not supporting. It makes the research more robust because it can be used as a reference. This study aims to explain the influence of individual characteristics, external support, and the role of extension workers on the capacity and participation of farmers and their influence on the institutional capacity of coffee farmer groups.

2. Material and Methods

2.1. Research Design

This study employed a survey methodology to elucidate the impact or causal connections among variables examined in the study referring to previous studies [20]. The survey model facilitated a holistic comprehension of the factors influencing the advancement of coffee farmer groups and enabled the identification of causal relationships among these variables.

2.2. Population and Sample

The research location was in Jember Regency, Indonesia, considering that Jember is one of the largest coffee-producing districts in East Java. The population was coffee farmers in Jember. The 396 respondents were determined by the model Slovak approach (significance level - 5% sampling error) and taken disproportionately using a stratified sampling technique.

2.3. Instrument

The study's data was obtained through questionnaires (interviews), observation, and documentation of respondents. The research instrument used a questionnaire aimed at coffee farmers. Interviews were conducted directly with coffee farmers at the research location.

2.4. Variable Research

The variables in this study were measured using a Likert

scale, and the measurement results are presented as interval data. Variables and indicators in the research are (1) the role of extension workers (X1) as educators, facilitators, or assistants; (2) external support (X2): central government, local government, and the private sector; (3) individual characteristics (X3): education, experience, and risk; (4) farmer capacity (Y1): technical, managerial, and social; (5) farmer participation (Y2): intensity of involvement and quality of involvement; and (6) institutional capacity of farmer groups (Y3): achievement of institutional objectives, institutional functions and roles, institutional innovation, and institutional sustainability.

2.5. Validity Test

The validity test will make sure whether the findings are valid or not. A questionnaire is said to be valid if the questions can reveal something that the questionnaire will measure. The validity of SEM is known if the "Estimate" is >0.05.

2.6. Reliability Test

Reliability testing is a tool for measuring a questionnaire that indicates the variable. A questionnaire is reliable if a person's answers are consistent or stable over time.

2.7. Data Analysis

The research used data suitability with the Structural Equation Model (SEM). The SEM model was built to explain the variance and correlation between observed variables in a causal system (casual) from unobserved factors.

3. Results and Discussion

Figure 1 illustrates a structural model of the SEM analysis. Figure 1 shows that the individual characteristics variable and the extensionists' role significantly affect farmers' capacity by acquiring coefficients of 0.638 and 0716, respectively. The direct influence of the extensionists' role and individual characteristics on institutional capacity is 0.224 and 0.256, respectively, and the capacity of farmers affects institutional capacity with a coefficient of 0.716. Farmer capacity was chosen as a mediating variable between the extensionists' role and institutional capacity by adopting procedures Baron & Kenny [21] to assess the mediation effect, and the criteria must be met: (1) a significant regression coefficient from the independent to the dependent variable; (2) a significant regression coefficient from the independent to the mediating variable; (3) a significant coefficient from the mediating variable to the dependent variable; and (4) a significant regression coefficient from the mediating variable to the dependent variable. To do this, rerun the model with these four steps. When the farmer's capacity is included in the model, the effect of the extensionists' role and individual characteristics on institutional capacity is lower and insignificant. These changes indicate a full mediating effect of farmers' capacity between extensionists' role and institutional capacity. The current situation of extension services cannot cope with the emerging threats. Therefore, it is necessary to increase the effectiveness of control measures and the institutional capacity of coffee farmers [22].

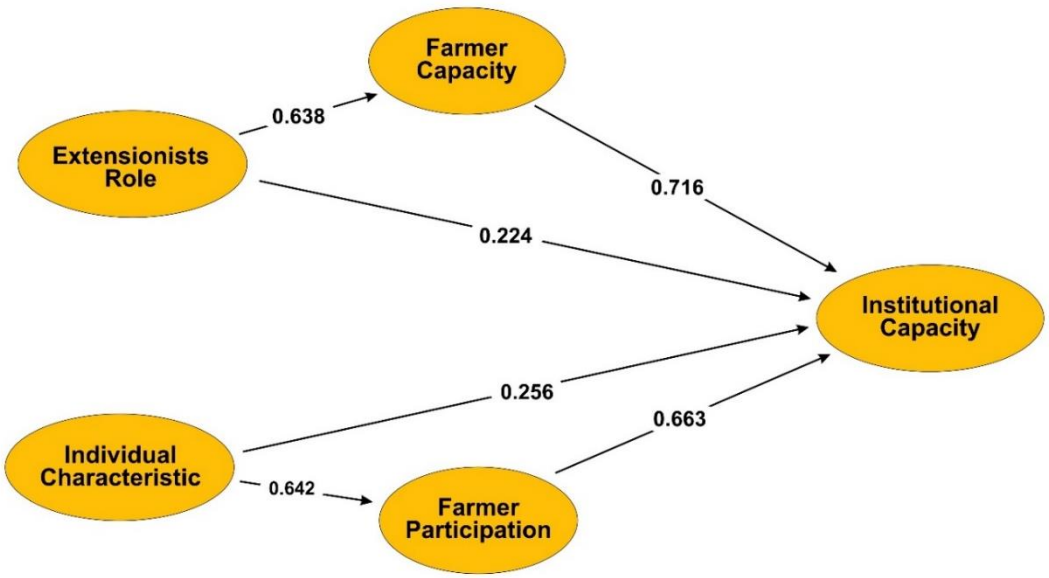

Figure 1. Structural Model of Institutional Capacity Building for Coffee Farmers Group

This relationship cannot be continued to the next analysis. Variables of individual characteristics and the extensionists' role significantly affect the farmers' capacity, while the external support variable has no significant effect on the farmers' capacity. Individual characteristics, external support, and the extensionists' role affect the coffee farmers' capacity. Individual characteristics indirectly affect the participation of farmer groups. Farmers need support to adopt organic fertilizer practices that match their attitudes and decision-making capacities [23]. Based on these gains, the farmer capacity variable can contribute more if the external support variable has a significant influence or is not included in the model.

Häfner & Piorr [24] showed that preferences differ between farm types and farmer characteristics regarding receiving training (advice) and determining cooperation. Farmers' formal education, farming experience, and risk perception affect their capacity. Coffee farmers in Jember have the most formal education, with 52.80% graduating from elementary school and 19.70% failing to complete elementary school. Thus, farmers rely on their experience in coffee farming as the main capital in farming. Most coffee farmers (97%) have more than ten years of farming experience. So, understanding and courage in taking risks are only based on experience. Higher education has significant productivity gains from percentages and absolute values. That is, the capacity of coffee farmers is influenced by their level of education, experience, and understanding of risk. However, it is necessary to consider the operational characteristics of different schemes to change farmers' attitudes toward conservation-oriented thinking. The design extensionists provide content to farmers to strengthen farmer groups' individual and institutional capacities.

For this reason, extensionists must be able to position themselves as educators, facilitators, and assistants to farmers in various agricultural activities. Through organized groups, they will know the type of extension training appropriate and beneficial for rural farmers. Extension professional development is needed to increase the knowledge of farmers and farmer group institutions in the future [25], [26]. The role of extension workers and the experience of farmers significantly influence the intensification of sustainable management of farmer groups [27].

Figure 1 also shows that the variables of individual characteristics and the extensionists' role significantly affect farmer participation with coefficients of 0.642, respectively, and farmer participation affects institutional capacity with a coefficient of 0.663. Institutional capacity becomes low and insignificant if farmer capacity is included in the model. These changes indicate a full mediating effect of farmer participation between the extensionists' role and institutional capacity. The external support variable has no significant effect on farmer participation, with a coefficient of 0.185, and farmer participation has a direct and insignificant effect on institutional capacity, with a coefficient of 0.251. So, this relationship cannot be continued for further analysis. The individual characteristics variable and the extensionists' role significantly affect farmer participation, while the external support variable has no significant effect. Individual characteristics, external support, and the extensionists' role affect the participation of coffee farmers. Based on these gains, it is also possible that the farmer participation variable gets a higher contribution if the external support variable has a significant influence or is considered not included in the model.

Farmers participate in regional agricultural and environmental schemes to enhance their agricultural enterprises' long-term viability by fostering cooperative and respectful social relationships and forging social bonds. Farmers must be encouraged to raise awareness and engage in discussions to increase awareness of agricultural issues [28]. Farmer capacity is one factor that actively encourages farmers to participate in agricultural activities. Farmer participation is influenced by their technical capacity, managerial ability, and social capacity. In other words, the greater a farmer's technical, managerial, and social capacity, the greater their involvement in coffee farmer group institutions. Agricultural extension services can be improved by increasing farmer participation in activities for farmer groups' sustainability [29].

Overall, the capacity and participation of farmers are directly affected by the increase in the institutional capacity of farmer groups. The main business actors in fostering agricultural institutions continue to improve through counseling. Extensionists can use the expansion and maturation of farmer institutions to become farmers' economic institutions that are productive, competitive, have good governance, and are sustainable. The government needs to build more farmer groups to increase the value of agriculture and agricultural institutions [30]. Farmer groups need support from their members to carry out their duties and functions [31]. Diverse stakeholders are required to strengthen farmer group institutions, such as partnerships, policy support, science and technology, costs, and assistance. Policy for the Revitalization of Agriculture, Fisheries and Forestry 2005-2025 states that the central government supports the capacity building of farmers' institutions at the micro and macro levels. Stakeholder participation in policy making is necessary to balance agricultural institutional and management mechanisms [32], [33]. Every type of agriculture and opportunities for innovation through risk buffers mechanisms and strengthens social organizations [34]. Group farming can provide an effective alternative, depending on the specific conditions and adaptation of the model to the local context [35].

The analysis results found variables whose path coefficients are insignificant, so it is necessary to improve the hypothesized model structure using path analysis of the trimming model. The trimming model is employed to

enhance the structural model of path analysis by eliminating exogenous variables from the model if their path coefficients are statistically insignificant. This approach aims to obtain a model that aligns with the empirical data. In the trimming model, the path coefficients are collectively tested, and any variables found to be insignificant are subsequently excluded. The path coefficients are recalculated using the trimming model, excluding exogenous variables exhibiting insignificance.

Regarding the trimming model in this study, the researchers only discussed the appropriate conceptual and theoretical model. Therefore, further studies are required. The theoretical model of the research results after the path analysis of the trimming model is shown in Figure 2.

Enhancing the institutional capacity of farmer groups can directly impact the capacity and engagement of participating farmers. The institutional presence of farmer groups is specifically designed to advocate for the welfare and interests of their members. Farmer group institutions can assist farmers in accessing markets, credit, and rural extension services and managing shared natural resources. Farmer institutions can improve farmers' production, marketing, and leadership skills and strengthen welfare [36].

Institutional strengthening of farmer groups can support sustainable agriculture and food security. The participatory extension can reshape a farming culture and enhance institutional logic [37]. A framework for evaluating the resilience of farming systems considers various challenges, including economic, environmental, social, and institutional factors that may hinder the farming system's ability to provide the desired public benefits. [38]. Strengthening family farmers' organizations and capacities to generate knowledge, represent farmers, and provide inclusive services can be part of the United Nations Decade of Family Farming 2019-2028 Global Action Plan [39].

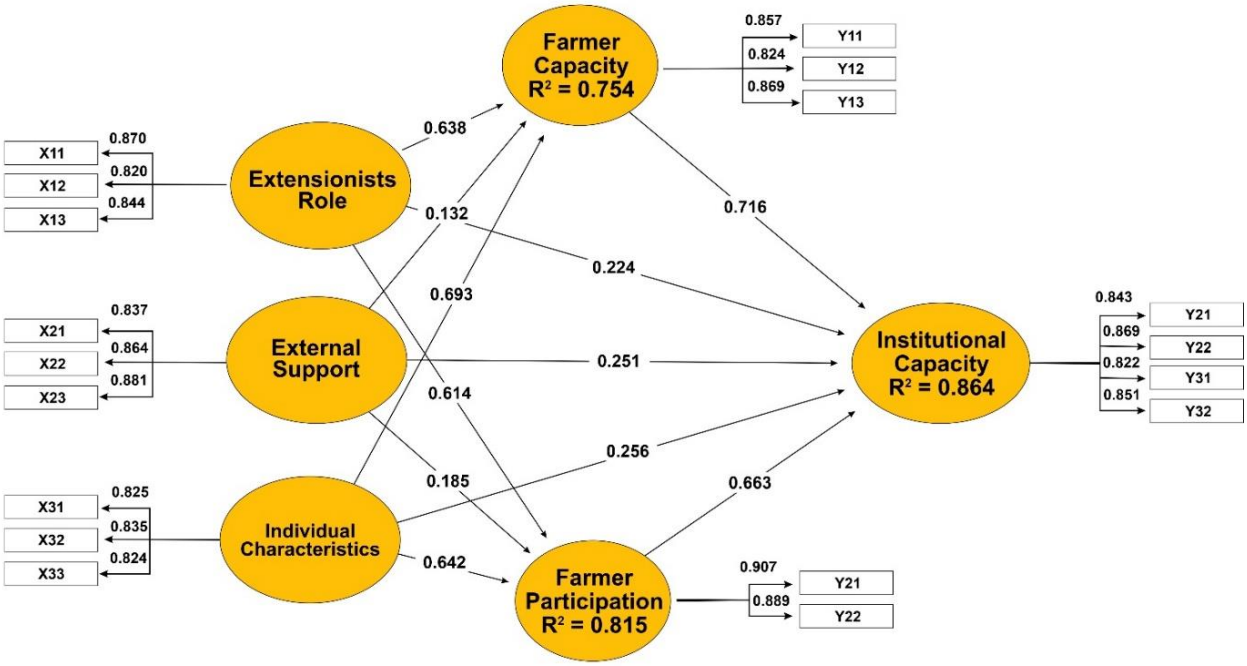

Figure 2. Theoretical Model for Increasing Institutional Capacity of Coffee Farmers Groups Based on the Trimming Model

4. Conclusions

The capacity and participation of farmers are influenced by individual traits, external assistance, and the involvement of extension workers, which, in turn, impact farmer participation. Farmer participation, in its own right, affects the institutional capacity of coffee farmer groups. Therefore, the capacity and engagement of farmers play a crucial role in enhancing the institutional capacity of coffee farmer groups. Meanwhile, the institutional capacity of farmers is directly influenced by the capacity and participation of farmers. Stakeholders can make policies that coffee farmer groups can implement to improve farmer group institutions: (1) A policy can be made to determine the appropriate and useful counseling type through organized groups so that farmers can increase economic resources, awareness and training, and the most relevant technological capacity for adaptation capacity; (2) Farmer group institutions can encourage farmers to increase the continuity of their agricultural business in the long term by building more cooperative social relations and mutual respect and establishing social bonds; (3) Institutional managers can make policies using an extension approach, such as growing and developing farmer institutions to become productive farmer economic institutions that are competitive, have good governance, and are sustainable.

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