



The Participation of Tenggerese Farmers in Supporting Food Security

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Abstract. Food security is a system consisting of three sub-systems, namely availability, distribution and consumption. The participation of horticultural farmers in efforts to support food security is needed to achieve food self-sufficiency. The purpose of the research is to analyze; (1) gender conditions and the level of participation of horticultural farmers in the farming activities of potatoes, leeks and cabbages conducted in the Tengger-Bromo mountain region and (2) determinants of the participation level of horticultural farmers especially in potato, leek and cabbage farming on the basis on gender and ecological perspective. This research used quantitative approach and equipped with qualitative data. Respondents were 30 male farmers and 30 female farmers who joined a farmer group in Ngadisari Village, Sukapura District, Probolinggo Regency. The data were collected by using methods of interviews, observation and documentation and then analyzed by using descriptive and inferential with U-test and multiple linear regression. The results of the research show that: (1) gender roles are generally balanced in various fields, there is no significant difference in the participation of male and female farmers in planning and implementation as well as evaluation (U-Test value $0,97 > 0,05$). (2) F-Test-value ($0,000 < 0,05$) shows a significant effect of all variables in the model and adjusted R Square 76,1%. Factors that influence farmer participation from a gender and ecological perspective (sig. of variables $< 0,05$) are personality traits of farmers, ecological environmental support and economic institutions. Factors that not influence farmer participation (sig. of variables $> 0,05$) are intensity of counseling/empowerment and customary strength.

Keywords: participation · Tenggerese farmer · food security · horticulture · gender · ecological perspective

1 Introduction

Ecological damage in several areas due to natural disasters and human destruction has an impact on food production and security [1]. The issues relating to the world food crisis needs to be anticipated and properly prepared. The results of studies related to the

Tengger Tribe on Mount Bromo state that forests must be guarded and preserved from generation to generation and become an ecological system that forms a positive attitude to utilize only what is necessary and not excessive [2]. Meanwhile, in rural Indonesia there are still many gender disparities in productive, reproductive and social roles [3]. Labor is the most important factor in farming. The participation of female farmers has a crucial position in agricultural development. The most visible role is as a supporter of entrepreneurship, labor, and assistant in marketing [4]. Community development and empowerment based on gender perspective are essential for justice and social and economic and ecological sustainability [5]. In the household, women often help their husbands who work as farmers and even involve their children as a form of sharing and mutual control and mutual support in improving the family economy [6]. In addition, the perception of food security in Kenya is negatively related to the level of education of the head of the family [7].

Food security according to Law No. 18/2012 is the condition that all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their food preferences and food needs. Women's participation in the household activities is very important both in farming and household domestic affairs in order to fulfill food security for better life. The empowerment must always be directed at the synergy of farmers with urban communities as consumers so that farmer participation in helping food security can be sustainable [8]. In addition, the social capital of farmers in the form of mutual cooperation can often be used to market their agricultural products together [5]. The number of families positively influences the perception of family members in maintaining the food security of a family [7].

Gender Mainstreaming in farming constitutes a strategy to divide tasks and responsibilities between men and women in a fair, open and mutual respect for each role [9]. The empowerment level of male farmers is higher than female farmers because of the concept of participation and personality traits of female farmers who are often complementary in farming activities and are subordinate to male [10]. Therefore, the empowerment of gender equality needs to be continuously strengthened by the government with law enforcement and social protection, especially for the informal sector such as farming work in the horticulture sector [11]. The results of the study shows that the status of women do not affect the level of food security of a family or household. The food security of a household can be seen by looking at the variety of food sources [12]. Although women's participation in farming and domestic households is very important in supporting the success of food security, there are still many weaknesses and undeveloped potentials such as managing medicinal plants around the house, knowledge of alternative food sources, and variations in types of food in the household [13]. The socio-economic support and access to empowerment activities also greatly influence the head of the family in supporting the success of a family's food security in West Java, Indonesia [10].

The results of study relating to the participation of male and female farmers in managing Subak in Bali show that there are differences in the division of tasks and work [14]. This is consistent with the nurture theory that there are still differences in the status of men and women which have an impact on difference participation in various fields of life. Furthermore, agricultural extension activities as a principle of empowerment that prioritizes the participation of all people are influenced by various factors such as

program availability, intensity of farming training, motivation and experience of farmers [15]. The same thing also happens that women farmers participate in agricultural activities in the village of Songan Bali very high due to geographical factors, formal education, habits and economy. Feminism values have been practiced as social values for gender equality in this region [16]. Even the results of previous studies state that the participation of female farmers in vegetable farming in Kersamanah District, Garut Regency is higher than that of male farmers because it is influenced by the intensity of counseling and the role of a reliable extension agent [17]. The results of other studies also state that the participation of farming women is influenced by experience and motivation factors [18]. Women farmers often do not get socio-cultural support and access to things that are productive in participating [19]. Even so, female farmers like in Tengger people agree to live side by side with nature and use the forest wisely for future generations [20]. Empowerment of women, of course, must be adjusted to its first level or goal, namely: 1) improving welfare, 2) opening access as wide as possible, 3) doing critical awareness, 4) participation and 5) self-control [21]. This is in accordance with research findings that accessibility and availability of food can be influenced by heads of households led by women [22].

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The participation of women in South Africa in selling and buying local food crops is the foundation for the food security of small and poor families [23]. The results of other studies also state that the participation of women is influenced by experience and motivation factors [18]. In the participation of productive activities, female farmers often do not get socio-cultural support and access [19]. Even so, female farmers like

in Tengger people agree to live side by side with nature and use the forest wisely for future generations [20]. Empowerment of women, of course, must be adjusted to its first level and goal such as: (1) improving welfare, (2) opening access as wide as possible, (3) doing critical awareness, (4) increasing participation (5) doing self-control [19, 21]. Based on these conditions, the study has been conducted with several objectives, namely; 1) identifying and analyzing the participation level and gender roles in various aspects and fields, for there is no significant difference in the participation of male and female farmers in planning and implementation as well as evaluation, 2) identifying the factors that influence farmer participation from a gender and ecological perspective.

2 Research Method

The location of the study was determined purposively, namely in the Village of Ngadisari, Sukapura District, Probolinggo Regency of East Java Province with the consideration that most population in this village was horticultural farmer. The study that used quantitative approach and equipped with qualitative data analysis was conducted from Juli to Nopember 2022. The population of the study were all farmers incorporated in a farmer group in Ngadisari Village, at total of 70 family. Respondents were 30 male farmers and 30 female farmers determined by Simple random sampling. Profile of respondents were having completed junior high school and having farming experience for about 23 years. Qualitative data taken from 5 key informants in the research location by purposive sampling. The data were collected by using methods of interviews, observation and documentation and analyzed using descriptive and inferential with U-test/mann whitney and multiple linear regression. Dependent variabel (Y) was participation level by indicators planning, action and evaluation. Independent variabels adalah X1 (personality traits of farmers), X2 (intensity of counseling/empowerment), 3) ecological environmental support, 4) customary strength and 5) economic institutions. The indicators were measured by likert scala, using a range scala of (1–4), with the criteria as follows 1: very low/never 2: low/rarely, 3: high/usually, 4: very high/every time. Based on the references and preliminary studies, the internal characteristic variables were measured by some indicators: 1) enthusiasm for work, 2) dare to take risks, 3) self-confidence and 4) entrepreneurial spirit. Empowerment intensity variables were measured by following indicators: 1) technical ability, 2) innovative behavior, 3) involvement, 4) partnering ability and 5) access to resources. The variable ease of agricultural information was measured by indicators: 1) benefits, 2) quality, and 3) speed of access to information. Furthermore, a multiple linear regression equation model was designed as follows.

$$Y = \beta_0 + \beta_1 X_1 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + e \quad (1)$$

Information:

Y = Participation rate of horticulture farmers (score)

β = Coefficient

X_1 = Internal characteristic (score)

X_2 = Empowerment intensity (score)

X_3 = Ease of farm info (score)

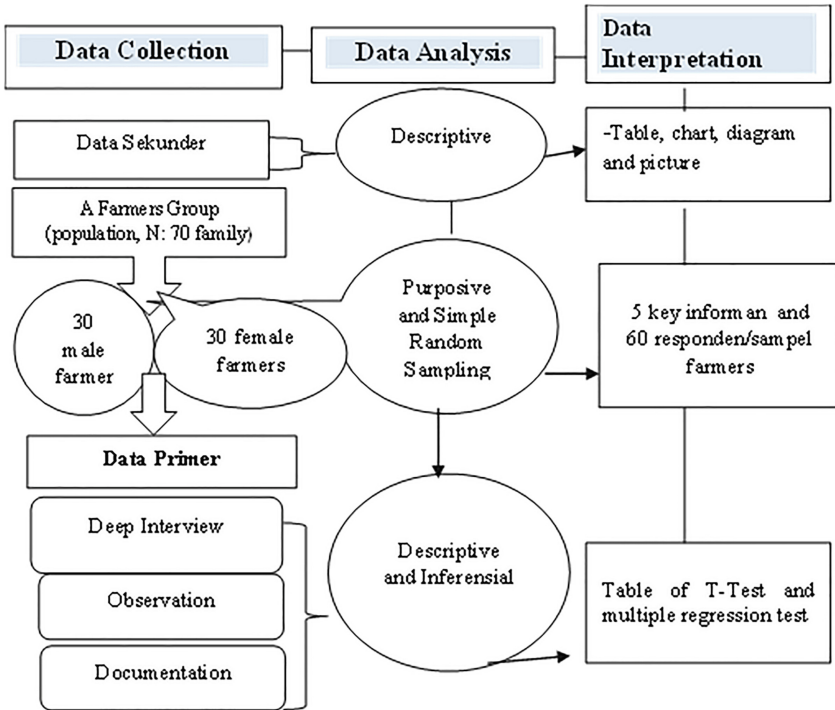


Fig. 1. Research Method Diagram.

- X₄ = Physical and social environmental support (score)
- X₅ = Custom strength (score)
- X₆ = Economic institutions (score)

Physical and social support variables were measured by indicators: 1) government policy support, 2) availability of infrastructure and 3) economic and social institutional support. The variable of customary strength was measured by indicators: 1) traditional ceremonies related to farming, 2) the integration of culture with farming life and 3) support for traditional regulations that have been passed down from generation to generation. Economic institutional variables were measured by indicators: 1) existence of market for horticultural products, 2) existence of cooperatives at the sub-district level, 3) existence of production, capital and marketing partners. Research methods diagram can be seen (Fig. 1).

3 Result and Discussion

A. General description of the average activity index of Tengger_Bromo horticultural farmer households from a Gender & Ecological perspective

In this study, the Gender Empowerment Index (GEI) is obtained by measuring the level of active participation of female farmers in economic, political, social, cultural

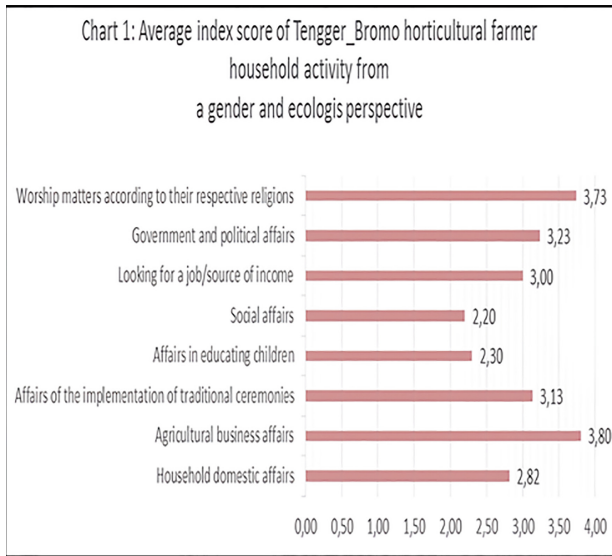


Fig. 2. Performance Index the average total activity index and household activities of horticultural farmers. Note: N = 60 (30 female, 30 male), Range: 1–2 = Low, 2–2,9 = moderat., 3–4 = high, conclusion index = 3,1 (High/equality).

and agricultural activities. As for all indicators of the gender empowerment index in each activity covering various matters, namely household domestic affairs, agricultural business work affairs, matters of carrying out traditional ceremonies, matters of educating children, social affairs, matters of finding a job/source of income, government affairs and politics, as well as matters of worship in accordance with their respective religions. Explanation and description of the gender empowerment index can be seen in Fig. 2.

Based on the Fig. 2, it is known that the average total activity index and household activities of horticultural farmers is 3.1. Index 3.1 illustrates that the Tengger horticultural farming community has a gender perspective in their household activities and interactions with their social environment. In other words, gender equality/equity in the horticultural farming community in the Tengger people, Bromo region is already high. In addition, when broken down, household activities and activities that are in the high category are praying according to their respective beliefs (3.73), being active in government and political activities (3.23), working and earning income (3.0), carry out traditional ceremonies, (3.13), and engage in farming activities (3.80). If the value of the gender empowerment index is related to food security, it can mean that female farmers in the Tengger Bromo area have a major contribution in actively managing horticultural farming such as potatoes, leeks, and cabbage. This condition is in accordance with the results of research [2] that the Tengger people's economy originates from farming and trading with tourists, so the forest is not explored. Horticultural female farmers have double roles, namely the domestic role and the public role in order to fulfill availability, affordability, equity, as well as food safety and security. Tengger Bromo horticultural farmers are also very caring and adaptive to the mountain environment so that ecologically based and

Table 1. The participation level of farmers in the Tengger Bromo Mountains, Probolinggo Regency, East Java

Element of farmer participation	category	Horticultural Farmer		U-Test
		male (n:30) (%)	female (n:30) (%)	
Planning	very high	43,33	33,33	0.97 (signnificant, no any difference)
	high	20,00	33,33	
	low	33,33	30,00	
	very low	3,33	3,33	
		100	100	
Implementation	very high	33,33	43,33	
	high	33,33	26,67	
	low	23,33	23,33	
	very low	10,00	6,67	
		100	100	
Evaluation	Very high	10,00	3,33	
	high	46,67	43,33	
	low	36,67	50,00	
	very low	6,67	3,33	
100			100	
Conclusion/avarege		high	high	

Source: Primary Data 2022

ecosystems are interdependent on one another. This is in accordance with the opinion [1] that the essence of ecological-based community development is elaborative and comprehensive cooperation towards sustainability.

B. The Participation Level of Farmers and the Influential Factors of Farmer Participation

The participation level of horticultural farmers in Tengger Bromo varies and is influenced by many factors. The level of farmer participation in this study was measured by indicators of planning, implementation and evaluation. Forms of farming activities include participations in formulating problems faced by farmers, formulating various alternative horticultural farming activities, deciding the types of farming activities to be carried out by groups, determining resources and costs in farming activities in groups, and determining the time and selection of locations for carrying out farming activities in groups. A detail participation of horticultural farmers can be seen at Table 1.

Table 1 shows that the participation of female farmers and male farmers in horticultural farming is in the same category, namely high. This indicates that socially, there is an equality between male and female farmers in working in the agricultural sector, with the difficult terrain conditions because the land is sloping and hilly and there is

Table 2. Results of Multiple Linear Regression Tests on the Participation of Farmers in Ngadisari Village, Sukapura District, Probolinggo Regency

Variable	coefficient	t-count	Sig
(Constant)	41.891	21.447	0,00*
X ₁ = internal characteristic	.349	4.689	.000*
X ₂ = empowerment intensity	.375	4.751	.000*
X ₃ = Ease of farm info	-.039	-.509	.613
X ₄ = Physic and social unsupported	-.178	-2.284	.026*
X ₅ = customary strength	.111	1.571	.122
X ₆ = economic institutions	.664	9.629	.000*
Adjusted R Square			0,761
F Count			28.116
Sig (95%)			0,000*
N = 60			

Source: primary data processed 2022

often a volcanic eruption, there needs to be cohesiveness between men and women to help each other deal with problems and adapt to changes in weather and climate. The results of the study [20] shows that women have a clear structure in social capital so that they are compatible with marketing, capital and farmer cooperative activities for the development of food security.

Mann Whitney test (U-Test) also shows no significant difference between male and female participation. This can be interpreted that women in the Tengger mountains are very equal in farming activities, so that they can support family food security by helping with accessibility, availability and safety and sustainability of the food itself. Women have had many equal places with men to participate in community development and development programs [14].

Table 2 shows that the adjusted R square value on the results of the multiple linear regression test, the independent variable on the participation of horticultural farmers in managing their farming business is 0.761, meaning that 76.1% of the variability of the variable participation of horticultural farmers is influenced by internal characteristics, intensity of empowerment, ease of agricultural information, physical and social environmental support, customary power, and economic institutions. The remaining 23.9% is influenced by other variables outside the model. The results of the F test of $0.000 < 0.05$ show a significant effect, all independent variables jointly affect the farmer participation variable. Based on the results of the multiple linear regression test above, the regression mode equation can be obtained as follows.

$$Y = 41.891 + [0.349x]_1 + [+0.75x]_2 + [-0.039x]_3 + [-0.178x]_4 + [+0.111x]_5 + [+0.664x]_6 + c \quad (2)$$

The t-test which examines the influence of independent factors partially has shown that the factors that have a significant effect on the level of participation of horticultural farmers are internal characteristics, empowerment intensity, physical and social environmental support, and economic institutions. Meanwhile, partially the variables have no significant effect, namely the independent variables, the ease and availability of information and the strength of adat. For the variables of ease and availability of information, based on interviews and observations, it was found that horticultural farmers in communicating mostly use the media of group leaders and traditional leaders with the opinion leader approach. Thus, other media lack the trust and validity of horticultural farmers. In addition, why does the customary power variable not significantly affect farmer's participation because the Tengger people already assume that humans are obliged to establish sexual relations in a supernatural ritual vertically with their god and horizontally with fellow human beings. Participating in agricultural land is not a customary order but a form of responsibility to serve the family so that it is prosperous. This situation is in accordance with the results of research [24] that in order to increase the role and function of extension workers so that they can carry out scoping and need assessments so that empowerment media can be implemented with a gender and ecological perspective.

4 Conclusion

Gender roles are generally balanced in various aspect and fields, there is no significant difference in the participation of male and female farmers in planning and implementation as well as evaluation. This condition is in accordance with the results of research that the Tengger people's economy originates from farming and trading with tourists, so the forest is not explored [21]. The participation level of male and female farmers in Tengger Bromo Probolinggo regency is in a high category. Factors that influence farmer participation from a gender and ecological perspective are personality traits of farmers, ecological environmental support and economic institutions. Factors that do not influence farmer participation are intensity of counseling/empowerment and customary strength. This situation is in accordance with the results of research [24] that in order to increase the role and function of extension workers so that they can carry out scoping and need assessments so that empowerment media can be implemented with a gender and ecological perspective.

5 Authors' Recommendation

To develop conservative horticultural agriculture based on ecological principles, a harmonious relationship between the natural environment and humans is needed through the application of farmer participation based on local wisdom, customary law and gender mainstreaming as an active and synergistic form of agricultural development. Assistance and empowerment of horticultural farmers by the government and non-government needs to be increased again to accelerate the downstreaming of agricultural technology innovations that are sustainable but still with an environmental perspective in mind.

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