

Participation of Female Farmers in Achieving Household Food Security

Hayati Zakaria¹, Siti Amanah², Aida Vitayala S Hubeis³, and Prabowo Tjitropranoto⁴

¹ Department of Agribusiness, Faculty of Agriculture, University of Mataram
Mataram Indonesia
Corresponding author's email: hayatizakaria75 {at} yahoo.com

² Department of Communication and Community Development, Faculty of Human Ecology, IPB
Bogor Indonesia

³ Department of Communication and Community Development, Faculty of Human Ecology, IPB
Bogor Indonesia

⁴ Department of Communication and Community Development, Faculty of Human Ecology, IPB
Bogor Indonesia

ABSTRACT— *Female farmers in East Lombok are doing important works in household food security. Therefore, female farmers should have sufficient ability to be able to participate optimally to gain household food security and all family members could live healthy and active. The aims of this study were to analyze the ability level of female farmers, the participation level of female farmers and the status of household food security; and to analyze relationship between the ability level of female farmers and the participation level of female farmers, and the status of household food security. The number of respondent was 300 female farmers who have been selected randomly. The results of this study showed that female farmers do not have sufficient ability in household food security yet, the participation of female farmers has not been optimized in each stage and the household food security status was generally insecure; there is a positive and very significant relationship between the ability level and the participation level of female farmers, and the status of household food security; there is a positive and significant relationship between the participation level of female farmers and the status of household food security. Partially, there is a positive and significant relationship between the stages of obtaining benefits and the household food and energy status.*

Keywords: *Female farmers, ability, participation, household food security*

1. INTRODUCTION

Household food security is the ability of households to meet food sufficiency for its members in order to live healthy and active and able to perform their daily activities [1]. The sufficient food is indicated by energy consumption that meets the needs of doing activities and lives healthy based on the minimum standard of living [2]. Household food security will be achieved when no household is food-insecure and no body suffering malnutrition and poisoning of unsafe food and drink [3].

In the rural of East Lombok, the ability of households to meet sufficient food for its members is depend on the participation of female farmers in the component of food availability, food access and food utilization. The previous studies of female farmers participation in development used the concept of participation as the involvement of female farmers in implementation stage of development activities [4][5][6][7][8]; the involvement of female farmers in making decision [9]; the involvement of female farmers in the stages of planning, implementation and evaluation [10][11]. In this study, the participation of female farmers in achieving household food security includes four stages: planning, implementation, benefits acquisition, and evaluation [12], on the three components of household food security that are food availability, food access, and food utilization. Some studies asserted that female have important participation in the three components activities. On the component of food availability, female are the active producers, as the most labor for food production activities. It is noted that 70 to 80 percent of female produce food for their household in Sub Sahara Africa, 65 percent in Asia, and 45 percent in Latin America and the Caribbean [13][14][15][16]. In the component of food access activities, female are the gate keeper, the person in charge of the household food needs. Female are access

the food directly in the field/yard area, or by way of purchase. Female often use her income to buy food for their family as the form of responsibilities towards their family. Female also do the household strategies to meet food shortages [13][15][16][17][18][19]. In the component of food utilization activities, female are responsible for the nutritional needs of the whole members of their household. Female make sure that the food consumed is diverse and have a certain quality as well as contributing to the development of both physical and cognitive, process and provide the food in accordance with the needs of the household members, including giving food to infants and toddlers [13][15][16].

Participation of community has a very close relationship with ability [20][21][22]. Farmer participation in society hazelnut forest management in Maros regency, South Sulawesi Province, Indonesia is influenced by the ability of technical, managerial, and social of the farmers [23]. Participation of fishing communities in the management of community-based marine protected areas in Seribu Island, Jakarta is also influenced by the fishermen ability of managerial, social and technical [24]. Therefore, improving the knowledge, skills and attitudes of female farmers related to food security is a necessity. These behavioral changes can be done through non-formal education or extension approaches [25] so that female farmers have sufficient ability to manage and achieve the household food security. The capable female farmers are those who are highly confident because of mastering the knowledge, skills and positive attitude in doing the household food security activities in accordance with the values and conditions set [26]. The capable female farmers are those who have: (1) technical ability in ensuring food availability, food access and food utilization in farmer household level; (2) managerial ability, that is the ability to plan, organize, direct, and evaluate the activities of ensuring food availability, food access and food utilization in the household; (3) social ability, is the ability to build and establish relationships with others.

This aims of this study were to: (1) analyze the ability of female farmers to support household food security; (2) analyze the participation level of female farmers in achieving household food security; (3) analyze the food security status of farm households; (4) analyze the relationship between the ability level and the participation level of female farmers and the household food security status; (4) analyze the relationship between the participation level of female farmers and the household food security status.

2. METHODS

The research was conducted in the district of Terara and Aikmel, East Lombok and was designed quantitatively using a survey approach. The samples of this research were female farmers (either as a wife or head of household) from 300 households that were randomly determined. Primary data collection was done through the structured interviews with respondents using questionnaires, open-ended interviews, 24-hour food recall, and observation. The primary data consisted of the ability level of female farmers, the participation level of female farmers and household food security status. Validity and reliability test of instruments provided the valid results ($r \text{ count} = 0.306 - 0.963 > r_{0.05} = 0.361$) and reliable (Cronbach Alpha value = 0.610 - 0.997). The data obtained was scored and transformed into a scale of 0 to 100 in order to make the comparison between variables become easier. Once processed, primary data was analyzed by statistics descriptive and inferential Pearson correlation using the program of Statistical Product and Service Solutions (SPSS) version 18, and the Food Processor to acquire the energy status (energy consumption level/TKE) household/capita/ day.

3. RESULT AND DISCUSSION

3.1 Ability Level of Female Farmers

The ability of female farmers to support the household food security is presented in Table 1 and Table 2. Female farmers do not have sufficient ability to support household food security yet. Female farmers have the technical ability that relatively higher than the managerial and social ability. The trend is female farmers have the ability (psychomotor aspect) which is lower than the component of understanding (cognitive aspect) and attitude (affective aspect). That means, female farmers have a low understanding (cognitive aspect) about food production and food diversification, how to obtain food, how to do the diversification activities of food consumption and the provision of quality food; have interest to apply, but do not have the skill to implement it. Therefore, the ability of female needs to be developed in order to support the household food security.

Table 1: The ability level of female farmers in supporting the household food security

Variable	Low (%)	Medium (%)	High (%)	Mean scores
The ability of female farmers	25.3	68.3	6.3	44
- Technical ability	4.7	58.0	37.3	61
- Managerial ability	74.0	22.3	3.7	29
- Social ability	61.3	27.7	11.0	37

Low scores = 0-33.3, Medium = 33.4-66.7, High = 66.8-100

Ability as one's own individual skills can be congenital or the result of training or practice that is used for a variety of tasks through an action [27]. Technical ability on the component of food security is obtained by female farmers through informal education from their husband, parents, family, neighbors or other farmers, not through non-formal education/extension /training from extension worker. Since adolescence, female farmers are used to plant in rice field/moor/yard area, labor of farmer. Technical ability regarding food access and food utilization were obtained from the parents (especially mothers) as a teenager, such as the habits to make handicrafts from bamboo to earn money; how to obtain food; and how to process, provide, and distribute the food for household members. Those are the routine activities that female farmers do. This condition strengthens the enactment of gender role stereotypes that female are responsible for the implementation of social reproduction (keepers of the family), the competent and diligent housekeeper [28].

Table 2: Mean Scores of the aspects of female farmers cability in supporting the household food security

Variable	Mean scores			Total
	Cognitive aspect	Affektive aspect	Psychomotor aspect	
The ability of female farmers				
- Technical ability	63	65	56	61
- Managerial ability	33	28	26	29
- Social ability	39	38	33	37

Mean scores: Low = 0-33.3, Medium = 33.4-66.7, High = 66.8-100

The low managerial and social ability of female farmers are due to the lack of opportunity to learn and practice both through informal education from families and communities and non-formal education/extension/training from the government. Managerially, female farmers have not been able to plan, organize, move/direct and evaluate the implementation of household food security. Female farmers have not been able to set up fund, identify the social problems and the benefits of quality food for the household members, allocate the resources and facilities, taking important decisions, conduct business administration, arrange the household financial report and action plans in the future. Socially, female farmers have not been able to communicate and work in teams, negotiate, build networks and businesses in order to achieve household food security. Beside that, there are still many female farmers who have not been actively involved in farmer groups and community organizations. The existing groups of female farmers (PKK) are elite bias and programs regarding food and nutrition through posyandu activities, just touching the pregnant and lactating mothers. The program of Food Security Agency, East Lombok dedicated for the group of female farmers, the target elite bias and the material does not touch the components of food and nutrition at all. Other existing groups, such as "Banjar" has also not been used as a place of study for female farmers to achieve household food security. Groups can be used as a medium of learning and working together among female farmers associated with the embodiment of household food security [29][30]. This is in line with the statement that household food security can be realized through the development of the ability and potential of each group/individual such as PKK, posyandu, dasawisma, a grassroots organization that has been formed [19][31][32].

3.2 Participation Level of Female Farmers in Achieving Household Food Security

Table 3 indicated that the participation of female farmers at every stage seemed not develop optimally. Figure 2 showed that the gender division of labor caused the participation of female farmers in each stage was more often done on the components of food access and food utilization than of the food availability.

Table 3: The participation stage of female farmers in creating household food security

Variable	Low (%)	Medium (%)	High (%)	Mean scores
Participation of female farmers	11.0	76.3	12.7	52
- Planning	18.3	63.7	18.0	55
- Implementation	15.0	73.0	12.0	48
- Obtaining benefits	10.7	70.0	19.3	53
- Evaluation	29.7	28.7	41.7	54

Low score=0-33.3, medium=33.4-66.7, high=66.8-100

3.2.1 Participation of Female Farmers in the Stage of Planning

In the planning stage of the component of food availability, female farmers are involved with man/husband in planning the utilization of upland rice field/yard area, determining the type of crops grown in upland fields and yards, and the storage of rice production. Man/husband more often plans which plants will be grown in the fields, and trying to farm/breeding/keeping fish in the home yard. On the component of food access, female farmers sometimes plan ahead to: (1) taking any food in the field/yard area or bought in the market; (2) purchase merchandise materials for sale, buy raw materials and sell the crafts; (3) find a way to address household food shortages. On the component of food utilization, female farmers sometimes plan ahead to perform the following activities: (1) diversification of food

consumption; (2) process and provide food in accordance with the needs of household members; (3) give food to infants and toddlers.

Planning activities conducted by female farmers were never written but just based on experience and habit. Female farmers assumed that the work is the work of "female" that carried out hereditary and is not a difficult job. Female farmers are the main responsible person for the implementation of domestic work that strongly associated with the activities on the components of access and utilization of food.

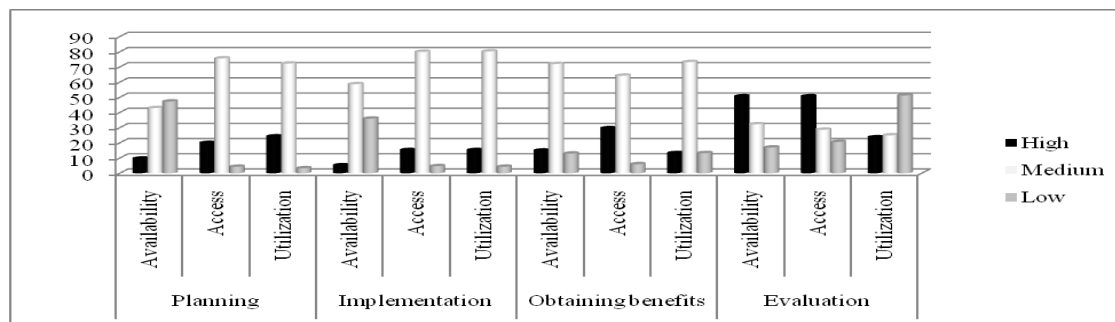


Figure 1: Participation of female farmers in the three components of food security in East Lombok

3.2.2 Participation of Female Farmers in the Stage of Implementation

During the implementation stage, women farmers often do the activities on the components of food access and food utilization. On the component of food access, the activities that are often performed by female farmers are: (1) taking food in rice field/upland rice field/home yard/storage area and buy food in the market; (2) receive food aid and handle the food shortages by borrowing food or money to a neighbor or a family to buy food; (3) distribute food to each household member; (4) conduct the activities of management household income to meet household food needs. These finding are consistent with research findings in Nigeria that female do the activities of taking food in the yard, buying food, borrowing food or money used to buy food and also provide food for their family members [33].

On the component of food utilization, female farmers are the one who conduct the diversification of food consumption, process and provide food for household members and feeding in infants and toddlers. These finding are supported by the previous studies that female are responsible for fulfilling the family food and nutrition through food preparation, process them into food, and determine the number in quantity and quality [15][17].

On the component of availability, female farmers are involved in crop cultivation in the rice field/upland field/yard, weeding plants in rice field/upland field/yard, as well as fertilize in the yards. Female farmers are rarely involved in the implementation of the selection of seeds, seedlings, land preparation, irrigation, pest prevention and eradication of crops in rice field and upland fields but are often involved if planted in their yards. In the livestock enterprises, female farmers are also sometimes involved in the implementation activities such as provide food, provide water, penning, the application of maintenance management, prevention and eradication of pests and diseases.

3.2.3 Participation of Female Farmers in the Stage of Obtaining Benefits

At the stage of obtaining benefits, female farmers and their household members have not received optimal benefit as a result of the participation of female farmers in the implementation of the component of food availability, food access and food utilization.

On the component of food availability, obtaining benefits of female farmers are in the middle category (63.7%), meaning that the obtaining benefits by female farmers has not been optimal. Harvesting and marketing of food crops in the field/yard area and harvesting of livestock and poultry are still conducted not in the right way. The rice in the rice field is not harvested by themselves but rather by the "merchant", who is the merchant and the lender of capital/money/goods by reason as a debt payer, households of female farmers do not have money to pay the wages harvest, the rice field lies away from home. This led the female farmers to be often unable to enjoy the rice harvest to feed the members of the household. Female farmers through her husband will earn rice for household food consumption by borrowing rice at the "merchant" or "debt bondage". It is similar with the cattle that are often sold before the time to the "merchant" or "bonded" to get capital/money/pay debts. Poultry and or fish freshwater maintenance results are more often sold to meet the food, especially rice, sugar, oil, and daily spending money for the kids, and other needs. This leads the female farmers to be not able to enjoy the results the poultry and freshwater fish optimally to fulfill the food and nutrition needs of the household. The benefits received by female farmers is that female farmers can establish good relationships with their family, fellow farmers/neighbors and communities, and female farmers can easily getting access to the field but it is difficult to access credit.

The obtaining benefits on the component of food access that the participation of female farmers are in the medium category (66 percent). Female farmers easily obtain food, especially vegetables in the fields/yards, and gain it in the market by buying it because there are no barriers of transport or road damaged. Female farmers and other household members can also access the food fairly because essentially there is no distinction type of food given to each member of the household. In addition, the benefits received by female farmers and other household members are that female farmers can use all of their income to meet household food needs.

The obtaining benefits on the component of food utilization that the participation of female farmers were moderate (47.7 percent) in which the rest is mostly low (38.6 percent) compared to the relatively high one (13.7 percent). This indicated that the benefits received by female farmers and the household members on the component of food utilization are still lower than those on the components of food availability and food access.

The benefits received by female farmers and other household members on the component of food utilization is that almost all members of the family received food in accordance with the needs, especially in the quantity, because they are not pay much attention to the food quality (nutritional aspects). The main focus one is that all members of the household have eaten and the most important is to get "full". However, although female farmers are involved in the planning and implementation stages of household food security, female farmers are very rarely have access to extension services, information and appropriate technology.

3.2.4 The Participation of Female Farmers in the Stage of Evaluation

Based on Table 3 and Figure 1, the participation of female farmers in the evaluation stage can be interpreted that the regular monitoring and evaluation and the efforts to make improvements in the implementation activities on the components of food availability and food access are relatively higher than those on the component of food utilization.

On the component of food availability, a portion of female farmers (50.7 percent) also perform the regular monitoring and evaluation, and make improvements on food crop production activities. Female can change the type of crops, especially vegetables, nuts or horticulture in the planted field/home yard that more needed or beneficial according to female. Female also decide whether the food products in the field/moor fields/yard are stored or sold, and control the use of harvest and its sale. Some more of female perform the activities without conducting the evaluation.

As on the component of food access, some female farmers (50.7 percent) also perform regular monitoring and evaluation, and make improvements on food procurement activities. Female can decide what vegetables taken in the upland rice fields/home yard. If they feel bored, they can buy vegetables at the market or the shop near home. Female farmers could also decide to add the type of merchandise. They are also trying to not always depend on seeking food assistance to neighbors and family but do additional jobs, such as creating bamboo crafts and also as labor farmers. While the others just carry out their role. They rely heavily on upland rice field as the main sources of household food, especially vegetables, nuts and horticulture.

On the component of food utilization, some female farmers (51.3 percent) did not perform regular monitoring and evaluation and did not make improvements on food consumption diversification activities, processing and preparing food for household members and feed infants and toddlers. Female farmers are continuously allowing the way of saling the rice harvest and cattle to the "merchant" or "ijon" to get capital/goods/money for their business or non-food consumption needs, and to pay the debt on the "merchant" or "ijon". Female farmers often did not utilize their protected livestocks to meet the needs of animal protein for their household. They also are not able to change the habit of feeding on toddlers with rice mixed with water and salt, or the local term "four healthy five sebur aik".

3.2.5 Household Food Security Status

Household food security status is presented in Table 4. Status of household food security is divided into two: (1) *household food* is food security index that is measured using three indicators namely food availability, food access and food utilization; (2) *household energy* is the level of energy consumption of household/capita/day. Generally, the household food security status of farmer is in the medium category (92.7 percent). This assumed that the households are food insecure. The high category (54.7 percent) on the component of food availability is characterized by the households that have food (rice) availability average of 15.3 days, and the eating frequency of households generally is 3 times per day, in the morning, noon and night.

The medium category on the component of food access is characterized by the households that can access the food directly on the rice field/upland rice field/home yard. Female farmers also need to meet other food needs indirectly by buying in stalls or markets. They receive food aid of "Raskin" from government through the village head sometimes, or on the neighbor that have a booth, borrow rice or money to a neighbor who acts as a "merchant" through her husband. Female farmers are looking for the way to overcome the lack of household food (coping strategy). Female replace the foodstuffs of animal protein with vegetable protein. It is not found that female farmers replace the staple food (rice) with others. Female also borrow money to buy food or groceries to neighbors/family.

Table 4: Household Food Security Status

Variable	Low (%)	Medium (%)	High (%)	Score mean
1. Household Food	0.3	92.7	7.0	57
- Food availability	11.3	34.0	54.7	62
- Food access	10.0	69.7	20.3	55
- Food utilization	9.3	78.7	12.0	56
	Highly food insecure (%)	Food insecurity(%)	Food secure (%)	Mean (%)
2. Household Energy	42.7	39.0	18.3	75

Low score = 0-33.3, Medium = 33.4-66.7, High = 66.8-100

Highly food insecure= <70 percent, food insecurity = 70- 90 percent, Food secure = >90 percent

Medium categories on food utilization component is characterized by the households of female farmers that always satisfy in eating staple food (rice) in every meal time, but they do not always consume animal protein (meat, poultry, fish or eggs) every day in a week. In almost every day, female farmers set up a meal pattern of eating rice, vegetables and “sambal”, and sometimes come with vegetable dishes such as nuts, tofu or tempeh instead of animal dishes. It can be argued that female farmer households have poor quality food because they consume more from vegetable dishes than animal protein per day in a week.

Standard of the sufficient food is shown by energy consumption that meets the needs for activity and healthy living based on the minimal living standard [2]. Household food security status of female farmers is in accordance with the results of calculations using the measurement of food consumption (energy intake). The households are categorized as highly food insecure if the level of energy consumption is lower than the cut-off point or TKE <70 percent, food insecurity if the level of energy consumption is between 70-90 percent, and food secure if the level of energy consumption > 90 percent [34].

Based on the results of the energy consumption calculation of the food consumed by all members of the household at one day before the survey (a 24-hour food recall), the average household energy intake of female farmers is 1771.9 kcal/day/person. This number is still lower than the number of the National Nutritional Adequacy that is 2200 kcal/day/person. Based on Table 4, the household of female farmers are categorized as highly food insecure (very vulnerable of food) in the range of 42.7 percent to the food insecurity of 39.0 percent. This means that almost all female farmers household has the energy status that has not been able to meet the needs for activity and healthy living.

There is a positive and highly significant relationship at $\alpha = 0.01$ between household food security status and the status of energy (TKE). This indicates that women farmers' assessment of their household food security status represents the actual status of the household energy.

3.2.6 Relationship of the Level of Ability of Female Farmers and the Participation Level of Female Farmers and the Household Food Security Status

Table 5 showed that the ability of female farmers simultaneously has a positive and highly significant relationship to the $\alpha = 0.01$ with the participation level of female farmers and household food security index, and positively and significantly related to $\alpha = 0.05$ with household energy. That is, the sufficient ability of female farmers can optimize the participation level of female and improving the household food security status both in terms of food and energy. Most of female farmers (68.3 percent) have the ability that is categorized as medium (Table 1), which gives the sense that the opportunity to improve the ability of female farmers' participation level is still high, so that the participation level of female farmers and household food security status stand to be improved. Partially, adequate technical capacities will optimize the participation of female farmers in the stage of planning, implementation, obtaining benefits, and evaluation of food security activities that they do, and the technical ability will also increase the food index through the increasing of food availability and food utilization of food.

The adequate managerial ability can optimize the participation level of female farmers in the stage of implementation, obtaining benefits, and evaluation of food security activities that they do. Technical capabilities will also increase the food index through the increasing of food availability and utilization, and also improve the energy status of the household. The increasing of managerial ability will help female farmers to understand and realize the benefits of consuming quality food for themselves and the household members. Female farmers will be able to prepare, treat, and make sure that all household members consume quality food, so household members can meet the needs for activity and healthy living.

Table 5: Coefficients of correlation between the level of ability of female farmers and the participation level and household food security status

Variable of female ability	Variable of female participation					Variable of household food security status				
	Participation stage				Participation level	Household food				Household energy
	Planning	Implementation	Obtaining benefits	Evaluation		Food availability	Food access	Food utilization	Food index	
The ability level of female farmers	.190**	.332**	.248**	.348**	.351**	.340**	-.044	.243**	.254**	.137*
- Technical ability	.261**	.269**	.226**	.335**	.327**	.256**	-.094	.173**	.152**	.034
- Managerial ability	.071	.265**	.204**	.225**	.256**	.245**	.057	.199**	.245**	.137*
- Social ability	.128*	.284**	.174**	.295**	.278**	.344**	-.075	.231**	.233**	.178**

***) significant in $\alpha=0.01$; and *) significant in $\alpha=0.05$

The sufficient social ability of female farmers will optimize the participation level of female farmers in the stage of planning, implementation, obtaining benefits, and evaluation of food security activities that they do. Social ability will also increase the index of food and energy through the improvement of household food availability and food utilization. Social ability can support female farmers to work together in groups, communicate in groups or interpersonal with fellow group members and others outside the group, develop and foster network with other parties associated with food availability and utilization. Female farmers can participate optimally, household food security can be gained as well as all household members can receive the energy intake according to a predetermined standard. Therefore, the social ability of female farmers should be enhanced through the female farmer groups as the expansion of the existing groups ("Banjar", PKK) to enhance access to information, learning and working together for female farmers. This supports the findings of the study in India that the formation and expansion of female farmers' group or organization is the key to improve household food security [28].

3.2.7 Relationship of Female Farmers Participation and the Household Food Security Status

Table 6 showed that the participation of female farmers simultaneously has positive and significant relationship at $\alpha = 0.05$ with household food security index, meaning that the optimal participation level of female farmers support the realization of household food security index. However, the participation level of female farmers is not related to household energy, meaning that the optimal participation level of female farmers did not cause the increase of household energy status.

Table 6: Correlation coefficient between female farmer participation and the household food security status

Variable of female participation	Variable of household food security status				
	Household food				Household energy
	Food availability	Food access	Food utilization	Food index	
Participation of female farmers	.145*	.015	.109	.130*	.105
- Planning	.079	-.111	.104	.024	.021
- Implementation	.145*	.012	.029	.090	.107
- Obtaining benefits	.090	.146*	.123*	.186**	.135*
- Evaluation	.145*	-.124*	.166**	.079	-.012

***) significant at $\alpha=0.01$; and *) significant at $\alpha=0.05$

Partially, the participation level of female farmers in the stage of obtaining benefits is positively and highly significantly related at $\alpha = 0.01$ with the household food index, and positively and significantly related at $\alpha = 0.05$ with household energy. The optimal participation of female farmers in the stage of obtaining benefits will create the household food security either from the household food index or energy intake of household/capita/day. Household food security can be achieved when the female can easily access food in the field/ moor/ yard, buy animal food, distribute food to all household members equally, using the income to meet household food needs, ensuring that each households member consume animal protein, and gain knowledge and skills about food quality and nutrition through counseling activities. Therefore, it is needed to give the extension activities for the female farmers about food quality and nutrition for our life and health of every individual, and dissemination of information about the need for quality food and nutrition among the wider community.

Today, most female farmers (70 percent) have the participation level on the medium category so that it has a big chance to improve, especially on the component of food access and food utilization. The obtaining benefits on the

component of food access, female should distribute the quality and nutritious food because principally there is no distinction in the type of food given to each member of the household. The obtaining benefits on the component of food utilization suggested that the benefits received by female farmers and the household member are lower than the benefits received on the component of food availability and food access.

4. CONCLUSIONS AND SUGGESTIONS

Simultaneously the female farmer ability is categorized as medium (68.3 percent), but partially the technical ability is medium (58 percent), managerial ability is low (74 percent), and the social ability is low (61.3 percent). The ability of female farmers, especially in managerial and social ability should be improved through counseling activities with regard to the problems and experiences of female farmers.

Simultaneously, the participation level of female farmers in establishing the household food security is in the category of medium (76.3 percent). Partially, female farmers participation on the planning stages are medium (63.7 percent), the implementation stage is medium (73 percent), obtaining benefits is also medium (70 percent), and the evaluation is high (41.7 percent).

Simultaneously, household food security status based on the food index is less of food secure (92.7 percent). Partially, the component of food availability is categorized high (54.7 percent), the component of food access is medium (69.7 percent), and the component of food utilization is medium (78.7 percent). Based on the energy intake, the households is classified into very insecure food (42.7 percent) and insecure food (39.0 percent).

Simultaneously, the level of female farmers ability is positively and highly significantly related at $\alpha = 0.01$ with the participation level of female farmers and household food security index, and positively and significantly related at $\alpha = 0.05$ with household energy. The ability of female farmers should be improved in order to be more adequate to support the female participation in achieving and improving household food security status both in terms of food and energy. Therefore, the managerial and social skills should be prioritized in the development of female farmers' ability.

Simultaneously the participation level of female farmers is in positive and significant relation at $\alpha = 0.05$ with household food security index, but not in relation to the energy (TKE) of household. Partially, the participation of female farmers in the stage of benefits acquisition has a positive and highly significant relation at $\alpha = 0.01$ with household food security index, and positively and significantly related at $\alpha = 0.05$ with household energy. The development of female farmers participation is done by prioritizing the participation of female farmers in the stage of benefit so that the household food security status can be improved.

5. REFERENCES

- [1] Food and Agricultural Organization, FAO's State of Food Insecurity, FAO, Rome, 2001.
- [2] Maxwell, S and Franksenberg, T.R., "Household Food Security: Concepts, Indicators, Measurements, A Technical Review", International Fund for Agricultural Development/United Nation Children's Fund, Rome, 1992.
- [3] Kusharto, C.M. and Hardinsyah, "Food Security and Food Self-Sufficiency, in Revolutionizing the Green Revolution Professor of IPB", IPB Press, Bogor, 2012.
- [4] Richardson, J.G., Williams, Jo. Ann. Y., Mustian, R.D., "Barriers to Participation in Extension Expanded Foods and Nutrition Programs", Journal of Extension, vol. 41, no. 4, 2003.
- [5] Oladejo, J.A., S.O. Olawuyi, and T.D. Anjorin. "Analysis of Woman Participation in Agricultural Production in Egbedore Local Government Area of Osun State, Nigeria", International Journal of Agricultural Economics & Rural Development-IJAERD: vol. 4, no. 1, 2011.
- [6] Vatta, A.F., Krecek, R.C., Harrison, L.J.S., Pearson, R.A, "Participation of Zulu Farmers in a Goat Health Research and Extension Project in South Africa", Journal of International Agricultural and Extension Education, vol. 15, no. 3, 2008.
- [7] Strong, R. and Harder, A., "Motivational Orientations of Adults Participating in a Cooperative Extension Master Gardener Program", Journal of Extension, vol. 48, no. 4, 2011.
- [8] Akeredolu, Mercy, "Female Students' Participation in the University Mid-Career Agricultural Extension Training Programme in West Africa: Constraints and Challenges", Journal of International Agricultural and Extension Education, volume 25, 2009.
- [9] Goff, S., Lindner, J.R, Dolly, D., "Factors in Participation and Non-Participation in Farmer Field Schools in Trinidad and Tobago", Journal of International Agricultural and Extension Education, 2008.
- [10] Yazdani, Badr-al-Din Oure'I., Yaghoubi, N.M., Shakeri, R., "Cultural Development and Women Participation : A Review on Organizational Factors", Interdisciplinary Journal of Contemporary Research In Business, vol. 3, no. 2, 2011.
- [11] Squire, P.J., "Strategies for Enhancing Women's Full Participation in Sustainable Agricultural", Journal of International Agricultural and Extension Education, vol. 10, no. 1, 2003.

- [12] Uphoff, N., Cohen, J.M., Goldsmith, A.A., “Feasibility and Application of Rural Development Participation Place in Rural Development: A State of the Art Paper”, Rural Development Committee, Center for International Studies, Cornell University, 1979.
- [13] Ibnouf, FO., “The Role of Women in Providing and Improving Household Food Security in Sudan: Implication for Reducing Hunger and Malnutrition”, *Journal of International Women’s Studies*, vol. 10, no. 4, 2009.
- [14] Ogunlela, Y.I, Mukhtar, A.A., “Gender Issues in Agricultural and Rural Development in Nigeria: The Role of Women, Humanity and Social Sciences Journal”, vol. 4, no. 1, pp: 19—30, 2009.
- [15] World Bank, “Gender in Agriculture Sourcebook”, The World Bank, FAO, IFAD, Washington, DC., 2009.
- [16] Brown LR, Feldstein H, Haddad L, Pena C, Quisimbing A., “Generating Food Security in the Year 2020: Women as Producers, Gatekeepers, and Sock Absorbes, di dalam The Unfinished Agenda: Perspective on Overcoming Hunger, Poverty, dan Environmental. International Food Policy Research Institute, Washington DC, 2001.
- [17] Arumsari, V., Rini, W.D.E., “Women’s Role in Achieving Food Security at Household Level in Sleman District of Yogyakarta”, *Journal of Development Economics*, vol.13, no. 1, pp: 71-82, 2008.
- [18] Baliwati, Y.F., Khomsan, A., Dwiriani, C.M., “ Introduction to Food and Nutrition”, Penebar Swadaya, Depok, 2010.
- [19] Hubeis, AVS., “Gender Relation and Food Security, in Revolutionizing the Green Revolution Professor of IPB”, IPB Press, Bogor, 2012.
- [20] Ndraha, T., “Community Development”, Rineka Cipta, Jakarta, 1990.
- [21] Zimmerman, M.A., Rappaport, J., “Citizen Participation, Perceived Control and Psychological Empowerment, di dalam American Journal of Community Psychology”, vol. 23, no. 5, Desember,1995.
- [22] Slamet, M., “Improving Community Participation in Rural Development , in : Sudrajad and YUSTINA , editors , Shapping Pattern of Human Behavior Development”, IPB Press, Bogor, 2003.
- [23] Suprayitno, A.R., “ Participation Improvement Model of Farmer who Live Around the Forest in Managing the Community Candlenut Forest (The Case of Candlenut Forest Management in Bulusaraung Mountainrange in Maros District of South Sulawesi Provice), Dissertation, Doctoral Program, IPB, Bogor, 2011.
- [24] Erwiantoro, “Startegy of Community Participation Improvement in Managing Community Based Marine Protected Area in Kepulauan Seribu Dicitric, DKI Jakarta”, Dissertation, Doctoral Program, IPB, Bogor, 2013.
- [25] Amanah, S., “ Meaning Extension and Transformation Behavior Extension”, *Journal of Extension*, vol. 3, no. 1, 2007.
- [26] Tjitropranoto, P., “The Consept of Self-Undertanding, Potential, Self Readiness, and Introduction to Innovation”, *Journal of Extension*, 2005.
- [27] Robbins, S.P., “Organizational Behaviour”, Prentice Hall, New York, 2003.
- [28] William, J.H., “Psychology of woman: Behaviour in a biosocial context”, W.W. Norton and Company, New York, 1987.
- [29] Setiawan, I.,”Dynamics of Farmer Empowerment: A Reflection and Generalization in West Java”, Widya Padjadjaran, Bandung, 2012.
- [30] Soemardjo, “Extension in Agriculatural Development, in Revolutionizing the Green Revolution Professor of IPB”, IPB Press, Bogor, 2012.
- [31] Ariningsih, E., Rachman, H., “Strategy to Improve Household Food Insecurity”, *Center of Social and Economic Analysis and Agricultural Policy*, vol. 6, no. 3, pp: 239—255, 2008.
- [32] Ramakrishna, R., Subbarao, N., Chiranjeevi, Ch., “Role of Women in Improving Household Food Security in India”, *Indian Journal of Agricultural Economics*, 67. 3 (Jul-Sep 2012): 525-526.
- [33] Abdullahi, Y.Z., Abdullahi, H., Mohammed, Y., “Food security first: the role of women through empowerment for sustainable food, general security and economic development in Nigeria”, *European Scientific Journal*, May edition vol. 8, no.9 ISSN: 1857 – 7881 (Print) e - ISSN 1857- 7431 46
- [34] Maxwell, S. & T.R. Frankenberger, “Household Food Security: Concepts, Indicators, Measurements, A Technical Review”, International Fund for Agricultural Development/United Nation Children’s Fund, Rome, 1992.
- [35] Zeitlin, M., and L. Brown, “Household Nutrition Security: A Development Dilema”, Food Agricultural Organization, Rome, 1990.