Mother’s Ecoliteracy in Maintenance Family Food Security in Rural Area

P L Nugraheni1*, V Zulfa1, U Hasanah1

1Universitas Negeri Jakarta, Jalan Rawamangun Muka, 13220, Jakarta, Indonesia

*prastitilaras.unj@gmail.com

Abstract. Food security is a condition of fulfilling the needs of foods every household, which is reflected in the availability of adequate food, both quantity and quality, equitable, and affordable. As the main manager in the fulfillment of food and nutrition needs in the family, mothers must maintain family food security under any conditions. Through good environmental knowledge, it can become a mother's capital in utilizing a home garden to be planted with local food crops. Utilization of the yard can not only fulfill family food and nutrition needs but also increase family income. This study explored the influence of the mother's ecoliteracy in maintaining family food security. The sample consisted of 100 mothers in Segaran Village, Karawang District. The study method used was quantitative descriptive with survey techniques. The result of the analysis revealed the mother's ecoliteracy has a significant correlation with a mother's role in maintaining family food security with a determination coefficient of 20.2%. The results showed that the mother's ecoliteracy in Segaran Village still had to be improved by counseling and training. It is hoped that the increase in the mother's ecoliteracy can impact increasing family food security through the movement of utilizing a home garden.

Keywords: Ecoliteracy; Environmental Knowledge; Food security; Utilization of Home garden

1. Introduction

Karawang district is known as the national rice barn and is listed as the second-largest producer area after the Indramayu district. Karawang has a paddy field area reaching 95,906 hectares or around 53% of the regency's total area spread throughout the sub-district [1]. As a large rice barn in West Java, Karawang can produce rice production reaching 1 million tons, with a harvest area of 185.158 ha in 2011. Karawang can donate rice out of its territory by 49.82% of its production in 2011. Rice production is supported by an adequate irrigation system because the Citarum river crosses it, the largest and longest river in West Java Province. An adequate irrigation system causes rice production in Karawang to be less influential with the dry season. This abundant rice production is not accompanied by the household food security of the Karawang district community.

According to Law No. 7 of 1997 concerning food, food security is a condition for fulfilling food for every household, reflected in the availability of sufficient food, both in quantity and quality, safe, even, and affordable [2]. The low food security in the Karawang regency community is indicated by the presence of around 270 toddlers who suffer from malnutrition throughout 2016 in 25 sub-districts in Karawang District [3]. From the recapitulation results, there were only five sub-districts in 2016 that were free from malnutrition, including Pangkalan, Ciampel, Telukjambe Barat, Tempuran, and Pakisjaya Regencies. The case of malnutrition in Karawang shows that the adequacy of food is not fulfilled in terms of quantity, quality, flatness, and affordability by the Karawang community. One sub-district in Karawang where there is a case of malnutrition is the Batujaya sub-district.

The majority of the Batujaya people have low education, with the last education being Elementary School. Their average livelihood is that her husband works as a farmer and his wife is a housewife [4]. However, most of them work as farm laborers from other people's fields, so their income is only the minimum wage. This is what may be a factor in the occurrence of malnutrition in the Karawang regency community.
Batujaya Subdistrict is a village that is a national rice barn and has the potential as a Tourism Village because it has a prehistoric heritage before the century BC in Batujaya Temple, the village was named Desa Segaran. Batujaya Temple is located in the middle of rice fields. This temple has now been inaugurated to become one of the national cultural reserves. But unfortunately, the environment around Candi Batujaya does not support the potential of the area it owns. There is a lot of rubbish found on the road's edge, along the river and scattered in the house's yard. Allegedly, the lack of ecoliteracy of the community, especially mothers' ecoliteracy in waste management, is the origin of the Segaran Village environment's pollution, which should be one of the tourism potentials in the Karawang District [5].

The Batujaya community generally has a home yard. Housewives must take advantage of this condition to empower themselves at home by planting green plants in the yard, such as growing vegetables, fruits, and cultivating fish or chicken. This can beautify not only the village but also benefit household food needs. Not by destroying the view of Segaran Village with a pile of garbage. The condition of food security in Segaran Village, Batujaya Subdistrict can be optimized to utilize the existing land to become a productive and independent food commodity land.

Low community food security with a marked case of malnutrition, environmental problems, and lack of land management knowledge illustrates the public's awareness in protecting their environment. Fritjof Capra calls this awareness as ecoliteracy [6]. Ecoliteracy or ecological intelligence is the ability of a person to adapt to the ecological realm or environment [7]. A person's ecological intelligence is based on knowledge, attitudes, and behaviors in harmony with nature. Ecological intelligence is complex. This intelligence is supported by cognitive, affective (social and emotional), and psychomotor elements [8]. That statement was also confirmed by Gardner [9] in Goleman [10], who said that ecological intelligence is a combination of cognitive aspects, empathy, and action for all life. Desire arising from within to maintain the environment is based on knowledge about the environment, awareness to save the damaged environment is based on affective aspects, while actions to preserve the environment describe the psychomotor aspects. This shows that ecological intelligence is not just talking about aspects of knowledge but also in the aspects of awareness and action that we have to do to realize sustainable living principles.

With the community's awareness in protecting the environment, it is assumed to maintain households' food security through land use in the home yard to reduce the number of malnutrition. Therefore, this study's objectives were to identify and analyze the correlation of the mother's ecoliteracy in maintaining family food security.

2. Methods

This study aims to determine whether mothers' ecoliteracy correlates with mothers' role in maintaining family food security and its influence. The research was conducted in Segaran Village, Batujaya sub-District, Karawang District. This place was chosen because, in Segaran Village there were cases of poor nutrition and a bad environment, even though this area was one of the tourism potentials in Karawang District. This research is a type of quantitative research with a correlational approach. The method used in this study is the survey method. The use of the survey method with this correlational approach is to determine whether there is a correlation between the variables of mothers' ecoliteracy and household food security. The population in this study were families in Segaran Batujaya Village. The sampling technique in this study is probability sampling, which is using simple random sampling. The sample of this study was 100 families.

The data was collected using a questionnaire to 100 mothers. Data collected includes family characteristics (age, education level, employment, and monthly income), ecoliteracy indicators (knowledge, attitudes, actions), and indicators of food security (food sufficiency, the stability of food availability, food accessibility, food quality). The indicator of Ecoliteracy refers to [11]. Ecoliteracy is divided into three aspects, namely attitudes, knowledge, and actions [11]. Concern measures the level of individual attention in environmental protection efforts. The indicator of food security refers to the Food and Agricultural Organization (FAO) (1996) [12] and Law No. 7 of 1996 [2]. Based on the definition of food security from [11] and [2], four components must be fulfilled to achieve conditions of food security, namely: (a) Food sufficiency, (b) Food stability, (c) Food accessibility, (d) Food quality/safety. The four components are used to measure food security at the household level.
Data was collected through interviews and enumerators’ guidance by referring to the questionnaire by [13] and [14]. The type of instrument used in this variable is a closed-ended question. Closed-ended questions are questions that can only be answered by selecting from a limited number of options. This research questionnaire using a Likert scale. There are four choices on the Likert scale that are used, namely Strongly Agree (SS), Agree (A), Disagree (D), and Strongly Disagree (SD). Ecoliteracy and food security data are processed by entering scores from the Likert scale for each variable. The data analysis technique used in this study was descriptive and inferential statistics using SPSS.

3. Results and Discussion

3.1 Characteristics of Respondents

Respondents in this study were 100 mothers in Segaran Village, Batujaya Sub-district. Based on the profile data of respondents in the questionnaire, information obtained about family data as follows:

3.1.1 Age

Age is one of the factors that influence a person's ability and progress in work, so that age influences mothers' productive activities in maintaining family food security and the activities of husbands in working for a living. The characteristics of the respondent's family by age are shown in Figure 1. The survey results found that the majority of respondents were in productive age, i.e., 15-65 years. There are only three people who are non-productive age.

![Figure 1. Distribution of Respondents' Age Levels](image)

The age distribution of respondents in Segaran Village, Batujaya District, shows that 97% of respondents are in the age range of 19-55 years, and 3% are above 65. The highest percentage in the age group 20-35 years, 37 people in the age group of the husband and 55 people in the wife's age group. Based on the results of the study, the majority of the age husband and wife are still in the productive category (15-65 years), where the age group is the potential age group to work or do other productive activities so that it is good for developing potential and self-empowerment. According to [14] in [15], productive working age is divided into three categories, namely (1) unproductive categories (15 years n ≥ 65 years); (2) productive category (46-65 years); and (3) very productive categories (16-45 years).

3.1.2 Education Levels

The level of education affects a person in thinking, acting, and acting on something. The characteristics of the respondent's family based on the level of education are shown in Figure 2. The study results found that 60% of husbands and 68 wives in Segaran Village, Batujaya Subdistrict, were educated at the Elementary School level. These conditions indicate that the level of formal education of respondents is low. The low level of education is caused by the low awareness of respondents'
parents sending their children to higher education levels. Another factor is economic problems, namely income that is only enough to meet daily food needs.

![Figure 2. Distribution of Respondents' Family Education Levels](image1)

### 3.1.3 Type of Work

Jobs can affect family income. The characteristics of the respondent's family by type of work are shown in Figure 3. Based on the results of the study, it is known that the majority of husbands work as farmers (27%) and traders (26%), while the majority of wives are housewives (85%). A sufficient number of wives who do not work can empower themselves by utilizing home gardens to be planted with local food to meet their daily needs to maintain food security. The husband who becomes a farmer can also teach their wives to farm because they know about farming.

![Figure 3. Distribution of Work Type of Respondent Families](image2)

### 3.1.4 Family Income

Family income can affect family purchasing power. The characteristics of the respondent's family based on income are shown in Figure 4. Based on the results of the study it is known that most family heads have income <Rp. 1,000,000 / month (50%), and the majority of wives have no income (87%) because they do not work. Low family income can affect family purchasing power in meeting family needs, including nutrition and children's education. Therefore, a housewife should empower herself by utilizing a home garden to be planted with food crops to reduce spending on daily food and set it aside for children's education.
3.2 Description of Variables

This study used two variables: the variable of mothers' ecoliteracy and household food security. Variable of mothers' ecoliteracy has three indicators: knowledge, attitudes, and actions, which refer to [11]. Variable household food security has four indicators: food sufficiency, stability of food availability, food accessibility, and food quality, which refers to the [12] and [2].

3.2.1 Ecoliteracy

Ecoliteracy is a person's understanding of global ecological awareness's importance to balance the community's needs and the natural system on earth to work, how it impacts, and its relation to human action[17]. Ecoliteracy is developed through knowledge, attitudes, and human actions when dealing with environmental problems. The term ecoliteracy is more than a measurement of one's ecology knowledge and measures one's ability and willingness to use that knowledge for a sustainable lifestyle [18].

The description of the ecoliteracy variable data is obtained by filling out a questionnaire on a Likert scale, which amounts to 15 items by 100 respondents. Based on the processing of the Likert model questionnaire data obtained an average score of 2.67 and a percentage of 66.72% with the meaning that the average respondent answered the questionnaire with a choice of disagree and agree answers. The results of these data indicate that the level of ecoliteracy of respondents is not good enough. Good environmental knowledge will shape a person's attitude and behavior in solving environmental problems for a better life. Ecoliteracy is an understanding of ecosystem principles and uses these principles to form sustainable societies [19]. Ecoliteracy is a determinant in pro-environment behavior because people who have high ecoliteracy have higher environmental knowledge to impact behavior more towards the environment [20]. The environment has an important role in human life. Humans take natural resources that exist in the environment to meet their needs. Human life needs are closely related to the environment. Therefore humans need to have ecoliteracy knowledge to be able to maintain the environmental sustainability.

The highest percentage is in the attitude dimension in the ecoliteracy variable of 74.63%, with an average score of 2.985. They are followed by the knowledge dimension with a percentage of 68.75% with an average score of 2.75. The lowest percentage is in the action dimension with a percentage of 59.75% with an average score of 2.39. Knowledge is the result of knowing humans to something, or all human actions to understand a particular object [21]. Attitude is a reaction or response of someone who is still closed to a stimulus or object [22]. Behavior is all activities or human activities, both can be observed directly or that outsiders cannot observe [23]. Based on the results of the study, it is known that the respondents have knowledge about ecoliteracy. However, it is not yet good enough, and this knowledge can lead to readiness in responding to an object in its environment. The knowledge that is not yet good enough can be caused by the educational factors of respondents who are only at the elementary school level. The factors that influence knowledge level include education, information, culture, and experience [23]. A fairly good attitude can be caused due to factors in the village situation.
that are not good and their experience of the effects of a poor village environment. Factors that influence attitudes include psychological, physiological motives, experiences, situations, norms, obstacles, and drivers [24]. This is also explained in the theory of reasoned action that behavioral responses are determined by individual attitudes and subjective norms that exist within the individual [25]. It also described in Kurt Lewin’s theory model that behavior is a function of individual personality factors and environmental factors [26]. However, sufficient knowledge and attitude did not produce a comparable reaction. This is possible because giving a reaction depends on the characteristics or other factors of the person concerned, for example, the level of knowledge. Knowledge is divided into 6 levels based on the taxonomy of Blooms [27], which is knowing, understanding, applying, analyzing, synthesizing, and evaluating. However, because the respondents' average education level is at the elementary school level, they may only have the knowledge of ecoliteracy to the point of understanding but have not been able to apply and analyze a problem related to the environment. The average ecoliteracy variable score is shown in Figure 5.

Figure 5. Average Variable Ecoliteracy Score

3.2.2 Food Security

Household food security is defined as the ability of households to fulfill the food adequacy of their family members from time to time to live health and carry out daily activities. The statement fits the definition from the [28] that household food securityexists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Efforts to realize food security can be carried out by maintaining food sufficiency, food stability, food accessibility, and food quality [12 and 2].

Description of data on food security variables obtained through filling out questionnaires in the form of a Likert scale, amounting to 10 questions by 100 respondents. Based on the processing of the Likert scale model questionnaire data obtained an average score of 2.86 and a percentage of 73.20% with the meaning that the average respondent answered the questionnaire with a choice of disagree and agree answers. The results of these data indicate that the respondent's household food security level is not good enough. Even though food is a basic human need, its fulfillment becomes a human right. Quality, nutritious, and balanced food is a key prerequisite for health, prosperity, and household welfare. Food security is a condition of fulfilling food for households, which is reflected in the availability of adequate food, quantity, quality, safe, equitable, and affordable. Therefore, food security is important to improve the community's health and welfare [12].

Based on the definition of food security from the Food and Agricultural Organization (FAO) (1996) [12] and Law No. 7 of 1996 [2], four components must be met to achieve food security conditions, namely a) adequacy of food availability, b) stability of food availability, c) accessibility of food, d) quality of food. The four components are integrated into a household's food security system. The four dimensions interact so that the realization of food security. The average score for the variable food security is found in Figure 6.
Based on the results of the study, the highest percentage was found in the dimensions of food quality in the food security variable by 78%, with an average score of 3.12. Food quality is measured by looking at whether the type of food consumed meets nutritional needs. Food quality is very difficult to measure because it involves various kinds of foods with different nutrient content, so it is only seen based on the presence or absence of food ingredients containing animal or vegetable protein, fiber and vitamins, and carbohydrates. But the actual quality of food is related to the nutritional content and food security, and freshness of the food. A high percentage of food quality shows that people consume plant foods. However, based on the dimensions of food accessibility, they find it difficult to get animal food because of the high price, so that their food consumption is low.

The dimensions of food accessibility have a percentage of 74.92%, with an average score of 3.00. Food accessibility by looking at the convenience of households in obtaining food. The dimensions of accessibility show that the ease of getting food is quite good but only for plant foods at high prices, while animal food is classified as difficult, expensive, and not fresh.

The dimensions of food stability have a percentage of 66.13%, with an average score of 2.65. Food availability stability at the household level is measured based on the frequency of daily household member meals and adequate food intake. The results show they do not always eat with a frequency of 3 times a day, but can be less than that. Unstable food stability can be caused because food is not self-produced, and the low income decreases the purchasing power of food. This has an impact on many of their children who experience weight under normal weight.

One of the factors that influence food security is economic factors [29]. The size of household income and expenditure will affect household food security because it impacts people's purchasing power on food. Based on respondents' characteristics, it is known that the average income of a husband is <Rp.1,000,000 / month, and his wife is Rp. 0. Low income will affect the family's ability to buy food and meet the availability and stability of family food. Therefore the mother should be able to use the land to be planted with food crops. It can reduce spending on food purchases and even increase stability, accessibility, and adequacy of food and even increase maternal income.

3.3 Test for Prerequisites

4.6.1 Test of Normality

A normality test is a test conducted to find out the data obtained in the field with a normal distribution. The test used in this study uses liiliefors with a significance level of $\alpha = 5\% (0.05)$ with a sample (N) of 100. The testing criteria are if the significance value is greater than 0.05 so that the data is normally distributed. And if the significance value is smaller than 0.05, then the data is not normally distributed. The calculation results are in Table 1.
Table 1. Tests of Normality

|                | Kolmogorov-Smirnov | Shapiro-Wilk |
|----------------|--------------------|--------------|
|                | Statistic          | df | Sig. | Statistic | df | Sig. |
| Ecoliteracy    | 0.172              | 100 | 0.000 | 0.929     | 100 | 0.000 |
| Food Security   | 0.147              | 100 | 0.000 | 0.958     | 100 | 0.003 |

a. Lilliefors Significance Correction

Based on Table 1, it is known that the lilliefors ecoliteracy and food security significance values have a significance value of 0.000 and 0.003<0.05, meaning that the data are not normally distributed. Because data is not normally distributed, this data analysis uses non-parametric statistics.

3.4 Hypothesis Test
3.4.1 Correlation Test

Based on the data analysis prerequisite test that has been done before, the data on the ecoliteracy and food security variables are abnormally distributed and not linear. The data analysis in this study uses non-parametric statistics in the form of a Spearman rank correlation test. The results of the spearman rank correlation test are found in Table 2.

Table 2. Correlation Test Results

|                      | Ecoliteracy | Food_Security |
|----------------------|-------------|---------------|
| Spearman's rho       |             |               |
| Ecoliteracy          | Correlation Coefficient | 1.000 | .278** |
| Sig. (2-tailed)      | 0.005       |               |
| N                    | 100         | 100           |
| Food_Security        | Correlation Coefficient | .278** | 1.000 |
| Sig. (2-tailed)      | 0.005       |               |
| N                    | 100         | 100           |

**. Correlation is significant at the 0.01 level (2-tailed).

Spearman rank's correlation analysis results indicate that the ecoliteracy variable and the food security variable have sig values. (2tailed) of 0.002, which is where the value is <0.05, meaning that the ecoliteracy and food security variables significantly correlate. The correlation coefficient is equal to 0.309, indicating a positive correlation between the two variables. This means that the two variables directly correlate, where increasing maternal ecoliteracy increases mothers' role in maintaining family food security. The correlation value of 0.309 indicates that the correlation between the two variables can be said to be sufficient. Knowledge is the result of knowing from someone after sensing an object [19]. With the increase in knowledge of ecoliteracy, someone will become aware of changing their previous behavior. So that if the knowledge of ecoliteracy increases, the mother will increasingly be able to apply her information related to maintaining family food security to meet family nutritional needs. Based on the explanation above, ecoliteracy is one of the things that is quite related to the role of mothers in maintaining family food security.

3.42 Determination Coefficient Test

The determination test coefficient was conducted to determine the size of the contribution of the variable ecoliteracy on food security. The calculation of the coefficient of determination is given in Table 3.
Table 3. Determination Coefficient Test Results

| Model | R    | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|------|----------|-------------------|---------------------------|
| 1     | .449a| 0.202    | 0.194             | 2.489                     |

a. Predictors: (Constant), Ecoliteracy

It is known that the value of R Square is 0.202. This means that the effect of ecoliteracy on mothers' role in maintaining food security is equal to 20.2%, while the rest is influenced by other variables not examined.

Housewives play an important role in the supply of household food and regulate family welfare. So that housewives must be able to improve their knowledge and skills in regulating food availability with low income to meet food and nutrition needs at the household level. Therefore the mother has a big role in the utilization of the home yard. The yard can be integrated into an integrated agricultural business with various plants and plants' plantations and raise livestock and fish. So that in the short term, the use of land can increase the consumption of food and family nutrition and reduce household expenditure. And if it is cultivated well, in the long run, it can be a source of family income, and if managed properly, it can beautify the house and the village.

The purpose of land use based on the Center for Food Consumption and Safety, the Food Security Agency, is to improve micronutrient fulfillment by enhancing the family menu and fostering awareness to recognize and know the food sources. The economic function of the yard according to research conducted by [30] was revealed by [31]. From the results of an investigation conducted by the Community Plantation Service, the results showed that the yard had many functions (yard benefits), namely: Source of Carbohydrates, Producing materials every day, Sources home building materials or other needs, Producing necessary spices, firewood producers, Producing basic ingredients for household handicrafts, and Producing animal protein The social function of the yard is to provide a sense of comfort to the living environment, where children also play to let go of fatigue and relax in leisure time and to release his beloved animal.

According to the food security and food security center, the yard's use is an easy and fun job because: 1. All family members can help manage the yard. 2. Arrangement of plants and yards is an activity that is not difficult because seeds/seeds of vegetables, fruits, and livestock can be provided in the yard. With good crop rotation, food ingredients can be produced continuously with various types. 4. Animal manure can be used as fertilizer for crops, and crop residues can be used as fish feed.

The existence of women's concept is closely related to changes in the value of family, society, organization, development, customs, religion, environmental sustainability, decision-making, and multiple roles [32]. The correlation between the role of women and the increase in family income is very clear. From the results of the land use survey in Kalasan, concluded by [31], there is a basic function that belongs to the yard, namely as a source of food ingredients, as a producer of trade crops. When the use of the yard is growing, with the creativity of mothers followed, it can become a yard industry so that it can become a separate effort to increase family income. There have been many examples of successful mothers starting from the use of the yard.

4. Conclusions

Research on the role of mother's ecoliteracy in maintaining family food security shows that mothers' ecoliteracy in Segaran Village, Batujaya District is not good enough, shown by mothers' low knowledge and action environment. This is shown by the lack of use of yards to grow food needs such as various types of plants and crops and livestock and fish cultivation. It has an impact on their food security, which shows low food stability. The effect of ecoliteration on the role of mothers in food security was 20.2%. Therefore, it is necessary to increase the Ecoliteracy of mothers so that mothers' role in maintaining family food security can also increase. One way to increase maternal knowledge is to provide counseling related to ecoliteracy and land use in overcoming problems of family food security.
Acknowledgments

The authors would like to thank their colleagues for their contribution and support to the research. This work is supported by a research program in 2019, Faculty of Engineering, Jakarta State University under Grant No. [093a / 5.FT / PP / V / 2019]. They are also thankful to all the reviewers who gave their valuable inputs to the manuscript and completed the paper.

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