

# Factors That Influence Farming Behavior In Agricultural Environmental Management In Taebenu Sub-District, Kupang District

By  
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## Abstract

In an attempt to increase agricultural productivity and environment, it is important to understand farmers' behavior and in agri-environmental management. The study was conducted to analyze farming behavior in agri-environmental management in Taebenu District, Kupang, East Nusa Tenggara Province. The aims of this study were: 1) To find out characteristics of farming in Taebenu and 2) To find out farming behaviors in agri-environmental management.

This study is based on survey study of descriptive method, with samples were farmers who live and farming in Taebenu, Kupang. The respondents were 75 farmers household chosen with a random sampling technique. Data analysis were conducted with Chi Square methods. Results showed that farming behaviors the mean score were 17.84 (medium). The socio-economic characteristics influenced farmer's behavior in agricultural activities were: age ( $\chi^2 = 10.306$ ;  $df = 2$ ;  $p = 0.006$ ), farming experience ( $\chi^2 = 10.720$ ;  $df = 2$ ;  $p = 0.005$ ) and income ( $\chi^2 = 10.505$ ;  $df = 2$ ;  $p = 0.005$ ); while the socio-economic characteristics that did not influence farmer's behavior in agricultural activities were: education ( $\chi^2 = 2.725$ ;  $df = 4$ ;  $p = 0.605$ ), family size ( $\chi^2 = 5.096$ ;  $df = 4$ ;  $p = 0.278$ ).

**Keywords:** *Socio-economic, farming behavior, environmental management.*

## 1. INTRODUCTION

Sustainable development is important, especially in matters of inter-generational justice, which means that each generation must enjoy the same level of welfare or have the same opportunities for its environment. This means that the environment does not have to deteriorate over time, and preserving the environment is a way to avoid increasing inequality between generations. Therefore, rational use of natural resources in a sustainable

manner certainly provides the best support in various conservation efforts for present and future generations.

*Organization for Economic Co-operation and Development* (OECD), in its 2012 report, stated that to support sustainable agricultural businesses, technology and practices that have been proven relevant to increase production and environmental sustainability (increasing productivity and promoting environmental sustainability) are needed, according to local needs and conditions.

Farmers in carrying out their farming will always interact with the surrounding environment, and so that the surrounding environment is maintained its sustainability is needed sustainable agricultural business

Furthermore, land management practices such as reduced tillage, maintenance, use of organic soil cover, crop rotation to improve nutrition and management of crop pests and integrated water management techniques, are important factors associated with production and the environment (FAO). , 2011b, 2001c cited OECD 2012: 39; UNEP, 2012: 52). The same source also stated the importance of agricultural institutions such as extension services. This is evidenced by the existence of a report which states that extension services are the only active institution to facilitate small farmers with various eco-friendly agricultural systems (Christoplos, 2010; Klerkx et al. (2009) cited OECD 2012: 31).

Agricultural development in an effort to meet the increasing need for food along with the increasing population, also needs to be directed towards sustainable agriculture. However, in reality there are many challenges that must be faced, business improvements and a better environment for the sustainability of farming shows that excessive and disproportionate use of fertilizers and pesticides has negatively affected farmers' productivity and income, as well as causing environmental damage. others, which are feared will threaten the sustainability of agricultural development itself (Mackenzie 2008: 198; MacLean, 2014: 85). In addition to, Nazarian (2013) found that there is a positive and significant correlation between social participation and environmental behavior of farmers in using pesticides. In addition, farmers with higher incomes have better environmental behavior, because with

higher incomes, farmers generally have more land and have more relationships with agricultural extension workers and extension centers.

In Baumata Village, Kupang District, West Nusa Tenggara Province, more than half (57.80%) of the households make a living as farmers.

As the perpetrator Mainly agricultural development, farmers generally carry out agricultural activities with various limitations, such as lack of access to information and land, inputs environmentally friendly agriculture, social and economic limitations. In addition, there are quite a lot of farmers with agricultural land which is directly adjacent to the 37 Ha conservation area located in the village. The question is, do farmers in Baumata Village, Kupang City, East Nusa Tenggara Province, who are generally subsistence farming actors, have involved ecosystem services in the agricultural production system, by increasing the efficiency of the inputs used? To answer these problems, this study investigates what socio-economic factors influence farming behavior in environmental management in Baumata Village, Kupang Regency.

## 2. Research Methods

The descriptive method used in this research is a descriptive method (Nawawi 2003: 63). This research used a descriptive survey method. The research was conducted in Baumata Village, Kupang Regency. The dependent variable (affected) in this study is farming behavior in environmental management. The variables that influence are socio-economic variables which consist of:

- 1.Age: the time in which the respondent has passed, calculated from the year of birth
- 2.Education: length of time in school that has passed.

3.Number of family members: total members consisting of husband, wife, children,

parents, and others who live in one house.

4.Duration of doing business: the period of time carried out in the business which is measured in the number of years

5.Household Income: the amount of money obtained from farming and non-farming which is measured in rupiah per month (Rp / month).

The data collected consisted of primary data (obtained from the results of measurements / researcher's records) and secondary data (data obtained from quoting records from other people / certain agencies). The sampling technique used is simple random sampling, which is a random selection of sample members, based on the number of community workers / producers and owners of agricultural land in Baumata Village. Presentation of data in the form of tables or frequency distribution and cross tabulation (crosstab), so that the trend of the category of research findings (low, medium or high category) is known

As the basis for determining the sample size, the method of determining the sample size is used based on the number of population. To determine the amount used the Slovin formula (Sevilla, 1994 in Umar, 2002: 133).With a population of 295 people and with e = 0.1, the number of research samples is calculated as follows. So, the number of samples in this study = 74.68, rounded to = 75 people.

Reliability test results show that the reliability of the instrument = 0.763, included in the "high" category, so that the research instrument can be trusted to provide results according to what be measured. Furthermore, the data were analyzed as follows:

1. To determine the effect between variables, the Chi - Square test was used

$$\chi^2 = \frac{\sum k(O_{ij} - E_{ij})^2}{\sum E_{ij}}$$

Where :

O = Observed frequency

E = Expected frequency

i = Row (row)

j = Column (column)

2. For the above analysis, the available computer statistical program packages (Excel and SSS v19) were used.

### 3. Results and Discussion

#### 3.1. Education

The education level of the respondents was classified as low, with the number of those with elementary school education and equivalent being at most, namely 78.7%, with sufficient education (SLTP-SMU) as much as 21.3%. The distribution of the respondents' education level is shown in Table 3.1.

Table 3.1. Level of education

Level of education	Number of Respondents	Percentage
Low (primary school)	59	78.70
Enough (junior high school)	16	21.30
total	75	100.00

#### 3.2. Respondent Age

The mean age of the respondents was 49.12 years, with a range of 26 - 77 years. In table 3.2. can be seen the distribution of respondents by age.

Table.3.2. Distribution of Respondents by Age

Respondent Age	Number of Respondents	Percentage	Cumulative Percentage
26-33	5	6.67	6.67
33-40	12	16.00	22.67
41-48	20	26.67	49.33
49-56	18	24.00	73.33
57-64	13	17.33	90.67

Farmer Group Membership	Number of Respondents	Percentage
Yes	44	58.70
Not	31	41.30
total	75	100.00

The question whether the respondent is a member of an agricultural organization such as a farmer group generally shows the results as shown in the following table:

Table 3.4. Farmer Group Membership

From the table above, it can be seen that the number of respondents who are members of farmer groups is quite high, namely 44 people (58.70%), and 31 people who are not members of farmer groups (41.30). Respondents who were members of the group generally stated that group meetings were always held once a month to discuss matters related to the development of farming, in addition to mutual cooperation in carrying out their farming, particularly rice farming.

It can be seen that 73.33% of respondents are of the productive age. However, from the results of the interview, it is known that respondents who are not included in the criteria of productive age with age > 56 years still carry out their farming activities well.

### 3.3. Number of Family Members

The average number of family members of the respondent is 3.63 with the lowest number of family members 2 people and the highest number of 9 people. The distribution of respondents based on the number of family members can be seen in the following table:

Table 3.3 Number of Respondent Family Members

Number of Family Members	Number of Respondents	Percentage	Cumulative Percentage
2.00	17	22.67	22.67
3.00	21	28.00	50.67
4.00	23	30.67	81.33
5.00	8	10.67	92.00
6.00	2	2.67	94.67
7.00	2	2.67	97.33
8.00	1	1.33	98.67
9.00	1	1.33	100.00
total	75	100.00	

### 3.5. Farming Experience

The results of the analysis show that the average farming experience for the respondents is 25.27 years with a range of 5-60 years. In Figure 3.1. can be seen in the graph of the respondent's farming experience.

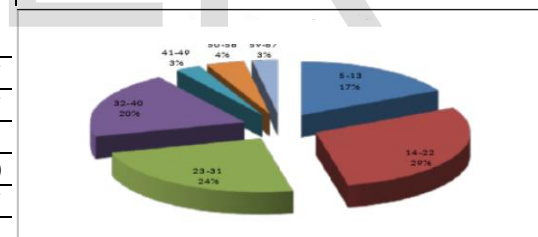


Figure 3.1. Farming Experience

From the table above, it can be seen that the respondents with the number of family members <= 4 people or including the small category were 61 people (81.33%) and the respondents with the number of family members in the medium-large category or > 4 people were 14 people (16.67 %). The minimum number of family members is related to the use of family labor in running the farm

From the graph, it can be seen that about 40% of respondents have a farming experience above the average. The duration of farming, which is the time taken by the respondent as a farmer, is a benchmark for farming experience, so it is hoped that the longer a farmer does his farming activities, the more experienced he will be in running his farm and will also behave better in managing his farm.

### 3.4. Farmer Group Membership

### 3.6. Household Income

Respondents' household income varies, the lowest income of the respondent's household is IDR 200,000 and the highest income is IDR

2,000,000 per month with an average income of IDR 602,733. The proportion of respondents' income is shown in Figure 3.2.

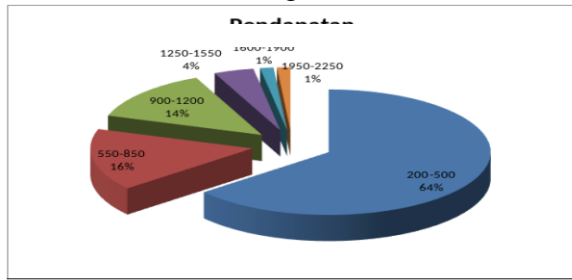


Figure 3.2. Respondents' Income

From the graph above, it can be seen that 80% of respondents are in the low category, 17.34% of respondents are in the middle category and only 2.66% are in the high category. Even so, when compared to the results of the complete enumeration agricultural census and the agricultural household income survey where the average income of agricultural households in East Nusa Tenggara was 9.03 million rupiahs a year or 0.75 million rupiahs per month or 250,000 rupiah. mean of respondents by mean Rp 602,733, which is greater than the average income at the provincial level.

### 3.7. Farming Behavior in Environmental Management

From the analysis, it is found that farming behavior is in the medium category, with an average score for farming behavior of 17.84 with a range between 11-25. In the following table it can be seen that the distribution of farming behavior scores.

Table 3.5. Farming Behavior Score

Behavior Score	Number of Respondents	Percent age	Cumulative Percentage
11.00	1	1.33	1.33
12.00	2	2.67	4.00
13.00	6	8.00	12.00
14.00	8	10.67	22.66
15.00	8	10.67	33.33
16.00	5	6.67	40.00
17.00	8	10.67	50.66
18.00	4	5.33	56.00
19.00	6	8.00	64.00
20.00	4	5.33	69.33
21.00	8	10.67	80.00
22.00	7	9.33	89.33
23.00	5	6.67	96.00
24.00	1	1.33	97.33

25.00	2	2.67	100.00
total	75	100.00	

With the lowest score = 11 and the highest score = 25, and range = 14, then the category of poor farming behavior is the respondent with a score = 11-16; medium = 17-22; and good effort behavior = 23-28. Thus, from the table above, it can be seen that the respondents with good farming behavior are 8 people (10.67%), while 37 people (49.33%); and bad 30 people (40.00%).

Respondents with good farming behavior are respondents who are doing farming: 1). Cultivate the soil without burning or spraying herbicides; 2). Using certified seeds; 3). Perform plant care; 4) using organic fertilizers; 5). Using biopesticides; 6) handling cans and plastic used for fertilizers and pesticides properly; 7). Sees the importance of sorting farm waste; 8). Often carry out sorting of farm waste; 9). Does not burn plant debris such as stems and leaves.

The results of this study also show that there are 9 respondents (12%) who have farming land directly adjacent to the TWA area, which generally bury or just throw away trash such as cans or bottles and used plastic pesticides, herbicides or plant seeds.

### 3.8. Factors Related to Farming Behavior in Environmental Management

#### 1. The Influence of Respondents' Age on Farming Behavior

The results of the Chi-Square statistical test indicate that age has a very significant effect on farming behavior (Chi-Square = 10.306 and significance = 0.006 < p = 0.05; reject H0; compare Sugiyono, 2010. pg. 110). In the following table, we can see the results of cross tabulation between age and farming behavior

Table 3.6. Effect of Age on Farming Behavior

Age	Behavior			Total
	poor	Moderate	good	
Productive	22	30	2	54
%	73.30	81.10	25.00	72.00
Not productive	8	7	6	21



%	26.70	18.90	75.00	28.00
Total	30	37	8	75
%	100.00	100.00	100.00	100.00

From table 3.6., it can be seen that the proportion of respondents with less behavior is 73.3% of the productive age, and 26.7% of the unproductive age; respondents who behave moderately or well enough in the farming of productive age are 81.1% and 18.9% are not productive; Meanwhile, respondents with good behavior in doing farming with productive age were 25.0% and those who were not productive were 75.0%. With a significance level = 0.006, it can be explained that there is a relationship between age and the respondent's farming behavior.

In this study, where respondents with productive age with more category behavior than non-productive. This means that respondents carry out their farming management by burning crop residues in the land, not using organic fertilizers, rubbish such as bottles or cans of pesticides or herbicides being buried or just dumped near rice fields or gardens, which are more often done by respondent farmers at productive age. In addition, the results of the analysis between question items and the age of the respondent also showed that respondents at productive age had a particularly bad attitude towards eradicating pests and plant diseases ( $p = 0.047$ ), namely spraying insecticides that are not environmentally friendly with irregular doses and frequencies. ,

## 2. Effect of Respondents' Education on Farming Behavior

Chi-square test results show that the respondent's education does not affect farming behavior at the significant level of 0.05 ( $\chi^2_{hit} = 1.476 < \chi^2_{tbl} (2; 0.05) = 5.991; p = 0.478 > 0.05$ ; accept  $H_0$ ), which means that the respondent's low or high education does not affect the respondent's behavior in doing farming. In Table 3.7.. It can be seen the results of cross tabulation between education and farming behavior.

Table 3.7. Effect of Education on Farming Behavior

Education	Farming Behavior			Total
	Poor	Moderate	Good	
Low (SD)	25	27	7	59
%	83.30	73.00	87.50	78.70
Expectation Frequency	23.6	29.1	6.3	59
Enough (junior high school)	5	10	1	16
%	16.70	27.00	12.50	21.30
Expectation Frequency	6.4	7.9	1.7	16
Total	30	37	8	75
%	100.00	100.00	100.00	100.00

From table 3.7, it can be seen that 83.3% of respondents with a low level of education (SD) are in the poor behavior category, while respondents with a sufficient level of education (SLTP and SMU) the proportion of total farmers in the poor behavior category is 16.70%. This means that the proportion of respondents with poor or bad behavior in doing farming is mostly at the elementary education level. The significance level of 0.478 means that 4.7% of the null hypothesis is true, and there is no difference in farming behavior as a result of different levels of education. However, the results of the analysis between the question items and the respondent's education showed that education had little effect on the behavior of handling waste used for fertilizers or pesticide cans ( $p = 0.051$ ). In addition, respondents with low education also have more bad behavior in how to fertilize crops, eradicate plant pests and never separate farm waste. This result is not in line with the results of research by Filson, Bucknell, and Hilts (2012) quoted by MacLean (2014) which found that education affects farmers' considerations regarding agriculture and the environment, educated farmers will be more environmentally oriented in their farming behavior. This difference is due to the different research locations as well because

the respondent farmers in this study generally still do their farming with techniques that are not environmentally sound, such as still depending on inorganic fertilizers.

### 3. The Effect of Respondent's Number of Family Members on Farming Behavior

Chi-square test results show that the number of family members of the respondent at the significant level of 0.05 does not affect farming behavior (Chi-squarehit = 2.433; <Chi-squaretbl (2: 0.05) = 5.991; p = 0.296> 0.05; thank H0). In Table 11, it can be seen the results of cross tabulation between the number of family members and farming behavior.

Table 3.8. The Relationship between Number of Family Members and Farming Behavior

Number of Family Members	Farming Behavior			Total
	Poor	Mode rate	Good	
Low	26	30	5	61
%	86.70	81.10	62.50	81.30
Expectation Frequency	24.4	30.1	6.5	61
Moderate-Many	4	7	3	12
%	13.30	18.90	37.50	16.00
Expectation Frequency	5,6	6.9	1.5	14
Total	30	37	8	75
%	100.00	100.00	100.00	100.00

The higher the number of family members in the respondent's household will certainly lead to higher daily needs, and this will certainly cause the respondent farmers to try to increase their farming productivity. In this effort, farmers will try to find farming methods or behavior that are considered good by the farmers themselves, and this effort can result in a sustainable increase in productivity or vice versa. According to BKKBN (1998), size of the household is the number of family members consisting of husband, wife, children, and other family members who live

together. Based on the number of household members, the size of the household is grouped into three, namely small, medium, and large households. A small household is a household whose number of members is less or the same as 4 people. Medium households are households that have between five and seven members, while large households are households with more than seven members. In this study, the category of the number of household members consisted of a few categories, namely the household members <= 4 people and the moderate-large category > 4 people.

From the table above, it can be seen that from a total of 30 respondents who belong to the category of poor or poor farming behavior, 26 people (86.70%) have a small or low number of family members (86.70%), while 4 people are (13.30%). Respondents with moderate behavior totaled 37 people with a small or low number of family members 30 people (81.1%), moderate-high 7 people (18.90%). The number of respondents with good behavior was 8 people, who had a small number of family members, 5 respondents (62.5%), the number of moderate family members was 3 people (37.50%). These results indicate that the difference in the number of members in the respondent's household does not cause a difference in the respondent's behavior in farming with p = 0.296.

### 4. Effect of Respondents Farming Experience on Farming Behavior

The results of the Chi-square test showed that the respondent's farming experience at the significant level of 0.05 influenced the farming behavior (Chi-squarehit = 10.720 > Chi-squaretbl (2: 0.05) = 5.991; p = 0.005 < 0.05; reject H0) . In Table 3.9, it can be seen the results of cross tabulation between the farming experience and the behavior of cultivating.

Table 3.9. The Influence Of Farming Experience On Farming Behavior

Farming Experience	Business Behavior			Total
	Poor	Moderate	Good	
Low	24	29	2	55
%	80.00	78.40	25.00	73.30

Expectation Frequency	22	27.1	5,9	55
Medium-High	6	8	6	20
%	20.00	21.60	75.00	26.70
Expectation Frequency	8	9.9	2.1	20
Actual Total Frequency	30	37	8	75
%	100.00	100.00	100.00	100.00

### 5. The Effect of Respondents' Income on Farming Behavior

Chi-square test results show that the respondent's income at the significant level of 0.05 does not affect farming behavior ( $\chi^2_{hit} = 10.505; > \chi^2_{tbl}(2: 0.05) = 5.99; p = 0.005 < 0.05; \text{reject } H_0$ ). In Table 3.10, it can be seen the results of the cross tabulation between income and farming behavior.

From the table, it can be seen that there are 30 respondents with poor or poor farming behavior category, with the proportion in the low category of income 10 people (33.30%), 20 people (66.70%) in the medium-high category of income; respondents with moderate farming behavior were 37 people, with the proportion of low-category income 10 people (27.00%), moderate-high income categories were 27 people (73.00%); Respondents with good farming behavior were 8 people, with the proportion in the low category income was 7 people (87.50%), medium - high income was 1 person (12.50%). This means that the lower the respondent's income, the higher the possibility of bad behavior in running his farm or vice versa and the null hypothesis can be said to be true only 0.05%.

Farming experience of the respondent if the longer it means that the more experienced it is in doing his farming, so that it is expected that his farming activities will also behave better, the length of farming is the amount of time in farming until the time the interview is carried out which is calculated based on the number of years of being a farmer, measured based on the average length of being a farmer from the data obtained in the field.

From the table above, it can be seen that of the 30 respondents who were in the poor category of behavior, 24 people (80.00%) were respondents with low experience in farming; 6 people (20.0%) with moderate to high experience or long duration of farming or the most experienced; 37 respondents were included in the medium behavior category consisting of 29 people (45.9%) long running low farming, 8 people long (21.60%); and good behavior category amounted to 8 people, with the number of respondents included in the old category of doing farming was low 2 people (25.00%), the old category of doing farming was 6 people (75.00%). So, it can be said that the longer the farming experience, the better the farming behavior ( $p = 0.005$ ). This result is different from that found by Nazarian (2013), namely that there is no significant relationship between farming experience and the behavior of using pesticides in farming and environmental safety. However, Pratiwi and Sudrajat's (2013) research found suitable results where based on the results of the analysis, it was found that there was a significant relationship between farming experience and land management behavior ( $p = 0.05$ ).

Table 3.10. Effect of Income on Farming Behavior

Income	Farming Behavior			Total
	Poor	Moderate	Good	
Low	10	10	7	27
%	33.30	27.00	87.50	36.00
The frequency of expectations	10.8	13.3	2.9	27
Medium - high	20	27	1	48
%	66.70	73.00	12.50	64.00
The frequency of expectations	19.2	23.7	5.1	48
Actual total frequency	30	37	8	75



%	100.0 0	100.00	100.00	100.00
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The results of the analysis between items and data collection show that respondents with high incomes are particularly well-behaved in soil processing activities, use of certified seeds, weeding plants, handling waste fertilizers and pesticides, handling farm waste and never burning crop residues on farms. The results of this study are in line with what was found by Marzall, Filson, and Adekunle (2012) quoted by MacLean (2014), a higher level of income provides a positive correlation with farmers' adoption and environmental behavior. Likewise Nazarian (2013), found that farmers with higher income have better environmental behavior, because those with higher incomes generally have more land.

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#### 4. Conclusion

From the discussion above, the conclusions of this study are:

1. Farming Behavior Respondents are in the medium category with an average score of 17.84
2. Factors socio-economic related to farming behavior are the factors of age, length of farming and income, while those that do not affect are education and number of family members.

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