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ENVIRONMENTAL MANAGEMENT MODEL WITH IMPLEMENTATION OF CONSERVATION AGRICULTURE AND ITS ROLE ON FOOD SECURITY OF FARMER HOUSEHOLDS IN KUPANG DISTRICT, INDONESIA

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ABSTRACT

This research was conducted in Kupang Regency, with the aim of analyzing: 1. Agricultural environmental management in Kupang Regency; 2. Management of the agricultural environment by applying conservation agricultural techniques to dryland agricultural systems; 3. Factors influence farmers in managing the agricultural environment with the application of conservation farming techniques; 4. Conservation agriculture model and its relationship with households food security. Path analysis with SPSS and Amos V20 programs is used to find factors that influence the management of the agricultural environment with the application of conservation farming techniques and describe a conservation agriculture model in relation to household food security. The results show that: 1. The average score of agricultural environmental management is 16.80 or in the "Moderate" category with a range of 13-23, with the farms carried out by respondents characterized by dry land farming (field farming), yards, rainfed and mixed rice fields known as Mamar (traditional agroforestry); 2. Agricultural environmental management with the application of conservation agricultural techniques in dry land farming systems with an average score of 5.30 with a range of 2.00 - 7.00 or in the "Moderate" category; 3. The factors that influence farmers in managing the agricultural environment with the application of conservation farming techniques are the land area has a critical value of CR 4.196, has a very significant effect on the management of the agricultural environment with conservation farming techniques at the 1% significance level, the land area also has a direct effect. positive towards household food security; The number of family members with a critical CR ratio value of 1.912 with an absolute value of 0.056, in other words, the regression weight for the number of family members in the prediction of conservation agriculture was not significantly different at the 0.05 level (two-tailed test). While the factors that did not have a significant effect on management with conservation farming techniques were the farming experience at the 5% confidence level ($p = 0.557 > 0.05$). Likewise, the age of the respondent CR was 0.341 ($p = 0.733 > 0.05$) and farmer group membership CR 1.402 ($p = 0.161 > 0.05$), 4. Meanwhile, farm size and education have a direct positive effect that is greater than the indirect effect on household food security. The model obtained by path analysis of the relationship between each variable has a direct positive relationship, the model does not differ significantly from the saturated model so that it can be concluded that the developed model has a good suitability in the development of agricultural environmental management models with the application of conservation agricultural techniques and their relationship with household food security.

KEY WORDS

Agriculture, conservation, food security.

Management of the agricultural environment is an important side of sustainable development which discusses how to meet the needs of the current generation without causing future generations to be unfulfilled. For this reason, agricultural environmental management is directed towards a healthy and sustainable environment and supports household food security in the long term. (Fao, 2018, Hendrik, 2015). Agricultural environmental management can be carried out using conventional techniques from generation to generation, modern agricultural techniques and conservation farming techniques. Conservation agriculture with three main principles, namely zero tillage, the use

of cover crops and crop rotation has spread throughout the world, but with application on a very diverse land area, it has been shown to increase production yields in various places in the world (Fao, 2015a ; Hobbs, 2012). Conservation Agriculture as advocated by the world body FAO is "A management approach for the production of resource-efficient agricultural crops that seeks to achieve acceptable benefits along with high levels of production and sustainability while simultaneously preserving the Environment" (FAO, 2014). Furthermore, from the same source it was also known that all crops could be grown adequately in this system, and there had not been any plants found that would not grow under this system. The conditions under which agricultural conservation systems are implemented successfully around the world, the economic, social and environmental benefits and recognition as a truly sustainable agricultural system must ensure the expansion of this technology to areas where adoption is low, thereby overcoming barriers for the adoption of this system (Kassam *et al* 2009, FAO,2015, Palm *et al*, 2016). There is no single indicator that best measures household food security, so several were used by Maxwell *et al.* in their research. One common indicator is calorie adequacy (Payne 1990; Habicht and Pelletier 1990; Maxwell and Frankenberger 1992; Haddad, Kennedy, and Sullivan 1994; S. Maxwell 1996; Chung *et al.* 1997, in Maxwell *et al*, 2000). This measure captures adequacy of food in terms of quantity but does not address food quality or issues of sustainable vulnerability or access. The traditional approach to measuring household food security using dietary intake has chosen the optimal calorie intake based on the recommended daily allowance (RDA) for adults equivalent to moderately active and compared with observed household calorie intake per adult. To identify households with food insecurity, the researchers used a cutoff point for calorie intake. This technique presents two problems; the first is how to determine the correct cutoff point in the absence of complete information to estimate the energy demand of the sample. The second, more common one is whether applying certain calorie requirements makes sense or not, given fluctuations in household and individual dietary requirements and the ability of individuals to adjust to inadequate energy intake (Beaton 1983; Dugdale and Payne 1987; Edmundson and Sukhatme 1990). Given this warning, calorie adequacy can be evaluated using several cutoffs. The first cutoff is 80 percent of the RDA (2,320 kcal / aeu / day; aeu = adult equivalent unit). The second is 2,200 kcal / aeu / day, a figure that has been used in previous studies to measure calorie adequacy in elsewhere (Kennedy *et al.* 1994; Haddad 1993; Brown and Kerr 1997 cited Maxwell *et al*, 2000: 93).

METHODS OF RESEARCH

This research was conducted in 2 sub-districts in Kupang Regency, each sub-district was then selected one village that had previously carried out conservation agriculture activities. These two areas are characterized by dry land agriculture with a generally rainy season for 4 months, from November to February, with cultivated crops such as field rice, corn, beans and vegetables such as cabbage, mustard greens, beans, kale, and spinach; from types of fruits such as bananas, mangoes, papaya and jackfruit. Corn is generally planted once a year, namely during the rainy season, as well as the type of field rice.

Data were collected from two villages: Manulai 1 village, 104 heads of farmers, and a total sample of 51 people, Baumata Utara Village: 176 families of farmers, the number of samples was: 64 people, so the total sample of respondents was 115 people.

The score for the Application of Conservation Agricultural Techniques is the number of scores for the level of the application of Conservation Agricultural Techniques in environmental management which is measured based on the farmers' answers to the question items on the Application of Conservation Agricultural Techniques. Each question is given a score of 1 to 3. Furthermore, based on the results of the maximum score obtained and the minimum score, the data on the Application of Conservation Agricultural Techniques are categorized into three categories: Good, Moderate, Poor.

Measurement of household food security in this study will be limited to the availability of household staple food. Food availability according to Soemarno, 2010, can be measured based on the availability of rice as staple food, with the following measurement categories:

1. If the food supply is sufficient for 240 days, it means that the household supply is sufficient.

2. If the food supply is sufficient for 1-239 days, it means that the household food supply is insufficient. 3. If food is not available, it means that the food supply is not sufficient in the household. Household food availability is calculated based on the number of calories equivalent to rice from production, purchase and assistance or provision. Available Food Ingredients Calories are calculated by the formula:

$$KBM = (BDD / 100) \times (Jts / 100) \times Bm$$

Where:

KBM: Calories of Food Ingredients (calories);

BDD: percent of any edible staple food (DKBM);

Jts: Amount of food available (calories);

Bm: food calories (DKBM).

To find out the number of days of household food availability in one year, it will be calculated based on the number of calories available divided by the calorie requirement per capita per day and then divided by the number of members in the respondent's household. Furthermore, the number of days of food availability in 1 year will be categorized according to the following categories:

$X < \text{Mean} - sd$	Less Available
$\text{Mean} - sd < X < \text{Mean} + sd$	Sufficiently available
$X \geq \text{Mean} + sd$	Available.

Path analysis is based on simple regression techniques, but allows for a richer understanding of the relationship between and among the variables studied (Kellar & Kelvin, 2013 in Devlieger Ines and Yves Rosseel, 2017). Simple multiple regression allows prediction of Y based on a collection of X variables. This constructive path analysis examines both the direct and indirect effects of various variables X on variable Y.

Figure 1 – Path Model of Conservation Agriculture Development

Variables are exogenous, which means that the variance is independent of other variables in the model, or endogenous, which means that the variance is determined by other variables in the model. Exogenous variables may or may not be correlated with other exogenous variables.

The relationship pattern between variables is described by a path diagram, a type of directed graph. Variables are connected by straight arrows which indicate the direction of the causal relationship between variables. A straight arrow can only point in one direction, because it is assumed that a variable cannot be the cause and effect of another variable; that is, the model is recursive and there are no feedback loops.

The first metric is called unstandardized, and uses a measurement scale of the original variable. Here, the paths are unstandardized regression coefficients, covariances link the independent variables, and the aim is to explain variances and covariances. The second metric is called standard. Literally, it is the result of a path or regression analysis performed on all variables that have been converted into standard variables (that is, by means of 0 and standard deviation of 1.0). In standard units, the path coefficient is the same as the standard regression coefficient (i.e., weight), and the aim is to explain the proportion of variance and correlation between variables (Carey, 1998; Williams, 2015). Excel and SPSS v19 and AMOS v 20 programs will be used for data analysis. Furthermore, the agricultural development model that will be tested in this study is as shown in the following figure:

RESULTS AND DISCUSSION

The United Nations Environment Program (UNEP) states in its annual report that the handling of waste which is waste material which is unused from agricultural activities, if not managed properly, can cause pollution to the surrounding environment. Waste that is disposed of in the surrounding environment can cause pollution to the surrounding environment such as soil, water and even rivers or water flows in the surrounding environment and this will disrupt the ecosystem. Therefore, agricultural waste management is very important to do properly (UNEP, 2002). However, in reality there are many challenges that must be faced in efforts to improve for a better environment for the survival of farming. The research of Hendrik (2015), Nazarian (2013) for example, in his research obtained results that showed that several characteristics of respondents were significantly related to environmental behavior and management of the agricultural environment.

In handling waste such as bottles, cans or used plastics used for pesticides or fertilizers, from the total number of respondents, 14 respondents (12.17%) stated that they just throw them around rice fields or fields, 89 respondents (77.39%) bury them in the ground, while 12 respondents (10.43%) stated that they put them in plastic bags to be disposed of in public trash cans. For the question of whether respondents separate waste such as stems, twigs and leaves (organic) from plastic, cans and bottles (inorganic), 35 (30.43%) respondents said they often separate organic waste from inorganic waste, 54 (46.96%) respondents stated that they sometimes separate waste, and 26 (22.61%) respondents stated that they never separated organic and inorganic waste. The average score of agricultural environmental management is 16.80 or in the "Moderate" category with a range of 13-23 as shown in Table 1.

Table 1 – Distribution of Respondents by Environmental Management Category

Score	Category	number of respondents	Percentage
< 14,33	Poor	26	22,61
14,33 – 19,27	Moderate	73	63,48
>19,27	Good	16	13,91
Total		115	100,00

The distribution of respondents based on the environmental management category in the good category is 16 respondents (13.91%), the respondents in this category generally state that it is important to dispose of agricultural waste such as bottles and cans of used

pesticides and fertilizers in place. disposal on the grounds so as not to pollute and poison the plants. In addition, respondents also stated that it is important to separate organic and inorganic waste. On the other hand, respondents with the "poor" environmental management category did not separate organic from inorganic waste because they were deemed unimportant, garbage was simply thrown away or burned around the garden / field.

Respondents in the category of good environmental management generally have participated in environmental activities in the village and are actively seeking and sharing information with fellow farmers, and often participate in environmental activities in the village such as tree planting. and vice versa, respondents in the bad environmental management category are respondents who have never participated in environmental activities, are not actively seeking information about environmental management both in the village and in the group where the respondent is a member, this finding is in accordance with the results of research by Nazarian (2013) which found that there are positive and significant correlation between social participation and environmental behavior of farmers in using pesticides, in addition, farmers with higher income have better environmental behavior, because with higher incomes generally have more land, have more relationships with agricultural advisors and extension centers.

The results of the data analysis showed that the respondents who cultivated the land on rice plants generally carried out the maximum tillage, namely using a tractor (100%), for corn plants cultivating the soil with a tractor were 6 respondents (5.22%), cultivating the soil using hoes. In the area where maize is to be planted minimum tillage as many as 62 respondents (53.91%) and no tillage (NT) as many as 47 respondents (40.87%). The maximum tillage is done by the respondent using a tractor or a hoe in farming.

The data analysis showed that 39 respondents (28.4%) left crop residues in the garden until the following planting season / used crop residues as ground cover organic material (28.4%), were given to livestock 56 respondents (48.70%), and the rest of the plant was burned by 20 respondents (17.39%).

Respondents who did crop rotation were 13 respondents (11.30%), while 55 respondents (47.83%) sometimes did, and 47 respondents (40.87%) who never did crop rotation.

The number of respondents who carried out their farming with the technique no tillage (NT) and also used plant residues as soil organic matter was 9 respondents (7.83%), who applied no tillage (NT) and crop rotation were 2 respondents (1, 74%), which applied crop residues as soil organic matter and crop rotation as many as 5 respondents (4.35%), and those applying no tillage, using crop residues and crop rotation only 1 responde (0.87%). Even so, 42 respondents (36.52%) stated that they knew about conservation farming techniques from both the college extension team and the BPTP, while 52 respondents (45.22%) said they did not know conservation farming techniques, and 21 respondents (18.26%)) no answer. The average score for the application of conservation agriculture was 5.30 with a range of 2.00 - 7.00. The distribution of respondents based on the category of the application of conservation farming techniques is as shown in Table 2.

Table 2 – Distribution of Respondents by Category of Agricultural Conservation Application

Score	Category	Number of Respondents	Percentage
< 3,74	Poor	41	35,65
3,74 – 6,87	Moderate	53	46,09
>6,87	Good	21	18,26
Total		115	100,00

From Table 2, it can be seen that 41 respondents (35.65) in the "Poor" category in the application of conservation farming techniques, respondents included in this category were respondents who performed maximum tillage techniques, crop residues were generally burned or burned Throw away and do not rotate crops, on the other hand, 21 respondents (18.26%) of respondents in the category of applying "good" conservation farming techniques

(18.26%) are respondents who apply 1 to 2 of the three principles of conservation agriculture.

This result also supports the results of studies that found that crop residue retention, generated in many small-scale farms is not only low but also has many competing uses. The fate of the residue depends on many factors including human and livestock population density, regional production potential, and the animal feed market, (Magnan et al., 2012; Valbuena et al., 2012; Tittone et al., 2007). The majority of plasma farmers are mixed farmers who mostly use crop residues as animal feed. In some areas, plant residues are only burned in maize fields (Ghimire et al., 2012).

The results of data analysis showed that the average number of days of food availability in one year in the respondent's household was 216.73 days with a range between 100.9 - 392.7 days, as shown in Table 3.

Table 3 – Distribution of Respondents based on Food availability

Number of Days of Availability in 1 Year	Availability category	Number of Respondents	Percentage	Cumulative Percentage
< 141,41	Less available	21	18,26	18,26
141,41 – 216,73	Sufficiently available	41	35,65	53,91
≥ 216,73	Available	53	46,09	100,00
Total		115	100,00	

Table 4 – Cross tabulation results of the factors that influence the application of conservation agriculture techniques

Independent Variable	Category	Conservation Agriculture (CA)			Total
		Good	Moderate	Poor	
Age	Productive	16	36	27	79
	%	13.9	31.3	23.5	68.7
	Non Productive	5	17	14	36
	%	4.3	14.8	12.2	31.3
Farming Experience	Less experience	1	5	1	7
	%	0.9	4.3	0.9	6.1
	Experienced	20	48	40	108
	%	17.4	41.7	34.8	93.9
Land size	Narrow	12	30	6	48
	%	10.4	26.1	5.2	41.7
	Moderate	9	19	32	60
	%	7.8	16.5	27.8	52.2
	Large	0	4	3	7
	%	.0	3.5	2.6	6.1
Family size	Small	12	30	28	70
	%	10.4	26.1	24.3	60.9
	Medium	8	20	13	41
	%	7.0	17.4	11.3	35.7
	Large	1	3	0	4
	%	.9	2.6	.0	3.5
Pendidikan	Elementary	17	31	33	81
	%	14.8	27.0	28.7	70.4
	Secondary School	2	11	0	13
	%	1.7	9.6	.0	11.3
	High School	2	9	7	18
	%	1.7	7.8	6.1	15.7
	University	0	2	1	3
	%	.0	1.7	.9	2.6
Farmer Group	Member	19	27	30	76
	%	16.5	23.5	26.1	66.1
	Non member	2	26	11	39
	%	1.7	22.6	9.6	33.9

The number of days of food availability for household respondents in one year that is in the less available-sufficiently available category is 62 respondents (53.91%) and in the

available category are 53 respondents (46.09%). Food availability is measured using the equivalent of rice as a staple food according to Soemarno, 2010, if the food supply is sufficient for 240 days, it means that the household supply is "available", if the food supply is sufficient for 1-239 days it means that the household food supply is "less available", if there is no food supply, it means that the household food supply is "not sufficient". With this category, 41 respondents (35.65%) were included in the "sufficiently available" category, and 53 respondents (46.09%) had sufficient food supply or "available" category.

From the results of cross tabulation, it can be seen that what is included in the application of "good" conservation farming techniques, of the 79 respondents who were of productive age there were 36 respondents (31.3%), of the 108 respondents in the category of old farming or farming experience in the category of "long / experienced 40 respondents (34.8%), out of 7 respondents with land in the "broad" category there are 3 respondents (2.6%), the number of moderate family members is 41 people only 13 respondents (11.3%), higher education there are 3 respondents and 1 respondent (0.9%) is included in the application of "good" conservation farming techniques, and of the 76 respondents who were members of farmer groups there were 30 respondents (26.1%) including those in the application of "good" conservation farming techniques as shown in Table 4.

The land area or farm size has a critical value of C.R. 4.196, greater than 2.56. then the land area has a very significant effect on the management of the agricultural environment with conservation farming techniques at a significance level of 1%, the number of family members with a critical CR ratio value of 1.912 with an absolute value of 0.056, in other words, the regression weight for the number of family members in The prediction of conservation agriculture was not significantly different at the 0.05 level (two-tailed test). The CR value for the length of farming / experience which shows farming experience is 0.567 smaller than 1.96 so that this variable does not have a significant effect on the management of conservation agriculture at the 5% confidence level ($p = 0.557 > 0.05$). Likewise, the age of the respondent CR is 0.341, and farmer groups CR 1.402, did not have a significant effect on the management of conservation agriculture at the level of confidence, so that the most important variable to explain Conservation Agricultural Management is land area.

From the three principles of Conservation Agriculture, namely without tillage, the use of plant residues as ground cover and crop rotation or crop rotation, farmers apply more landless cultivation to maize crops, while for horticultural crops and upland rice, more conventional or modern techniques are still used, highly dependent on the use of agricultural equipment such as tractors and the use of chemical peppers and chemical pesticides. The conservation farming technique implemented by the respondents for the TOT technique is more influenced by conventional techniques, while the use of plant residues as ground cover is more competitive with its use as animal feed, especially for farmers who raise cows. Even though they do not have livestock, some farmers explain that rice or corn straw is given to neighbors or fellow farmers who have livestock while few burn the remaining crops in the fields when they start planting. Crop rotation is not done much by farmers this is due to climatic constraints and limited resources water. This condition is also added by the limited capital and low level of education of farmers. These things are the main support so that this research finds that the factors that have a positive direct effect on conservation agriculture are land area, length of farming / farming experience and education and the biggest influence is land area, so that in applying conservation agricultural techniques it is important to consider broadly the land used in the application of these techniques.

Farm size and education have a direct positive effect that is greater than the indirect effect on household food security, age has a direct positive effect that is smaller than the indirect effect, the number of family members and membership of farmer groups has a positive indirect effect on food security, thus to obtain good household food security with the development of conservation agricultural techniques is necessary. Exogenous variables of farming experience, number of family members, membership of farmer groups and conservation agriculture have a negative direct effect on household food security. This result is different from the results of research by Mango at al., 2017 which found that there was no significant effect on the adoption of agricultural techniques conservation of food security as

measured by the score of farmers' food consumption, according to the results of research by Hendrik, et al., 2019., which found that there was a strong relationship between agricultural environmental management and household food security.

The difference in the results of this study is more due to differences in the management variables that are measured more broadly compared to this study whose measurements are more focused on "Management with Conservation Agricultural Techniques / CA. Nonetheless, the results of Tshuma et al, 2012's study, which assessed the impact of conservation agriculture (CA) on food security and livelihoods show that, while CA does increase yield per acre, it does not necessarily translate into increased food security. This is mainly due to climatic factors, including the poor rainfall experienced and the nature of CA in practice. In terms of the impact of CA on livelihoods, this study reveals that CAs do expand the scope of livelihoods albeit, on a limited scale, through increased yields and income. However, this also depends on the level of rainfall. The study concludes that while CA holds promise for food insecure households in the study area.

NPAR is the number of different parameters that are being estimated, from the results of the analysis, it is known that the number of meters in the model is 34, consisting of 28 path coefficients and 8 variances for each variable, CMIN is one of the indices of model accuracy, namely the chi-square relative value which indicates how many The size of the suitability of the data with the model, by removing 1 or more paths, the index in the model shows the number 0.335 and CMIN / DF 0.168 and this means the data is in accordance with the developed model, as shown in Figure 2.

Figure 2 – Model of Conservation Agriculture and Household Food Security
(Analysis results of Amos V20)

To find out how much the variance and covariance index in the model is different from the variance and covariance of observations, it can be seen from the value of RMR or the root mean square residual in this research model, the RMR index is 0.016, which means the variance and covariance in the model is not much different from the variance and covariance of observations. The smaller the RMR index the better the resulting model. The Goodness of Fit Index (GFI) is an index that shows the suitability of a model, this value must be more than

0.9 for a good model. From the Table, it can be seen that the GFI value is 0.999, which means that the model is well developed. Furthermore, the value that is also important to determine the suitability of the model being developed is the value of the Normed Fit Index (NFI), which is the chi-square difference of the two models divided by the chi square of the independent model. An NFI value of 0.9 or more indicates that the resulting model is good. The NFI value of 0.996 from the developed model shows that the car is good. This means that some of the suitability indices discussed shows the same results that the model being developed is a good model. The value of The Root Mean Square Error of Approximation (RMSEA), is also a number that shows the suitability of a model to the saturated model, an RMSEA value less than 0.05 indicates a good fit, and 0.05-0.08 is quite appropriate. The RMSEA value of the model in this study is $0.000 < 0.05$, which means that the model shows a good suitability.

In the development of conservation agriculture at the farmer level, the model implementation scenarios produced in this study to increase agricultural productivity and household food security need to be considered so that agricultural environmental factors (agro-environmental) have a direct or indirect effect in the model. In developing conservation agriculture, it is very important to involve the community, especially farmers in farming behavior, it needs to be improved to be more environmentally friendly. Development of agricultural programs in an effort to increase agricultural productivity with conservation agricultural techniques in an effort to support household food security must also consider the environmental side of sustainable agriculture, so that productivity is not only good for the short term but sustainable and stable.

As farmers who meet more food needs than their agricultural products, farmers are also supported by the existence of rice assistance from the government, and this causes the household food availability of respondents to generally be in the sufficient category in this study, because generally respondents are subsistence farmers who work on their farming for meet the needs of the family, in addition to some households also receive rice assistance.

The results show that several factors have a positive indirect effect and are greater than the direct effect on food security, namely age, number of family members and membership of farmer groups that have a positive indirect effect on household food security, and agricultural environmental management models with the application of Conservation farming techniques in relation to household food security need to consider the productive age of farmers, length of farming / farming experience, number of family members, membership of farmer groups. The number of household members who are of productive age will be useful as a potential source of energy in carrying out farming, in the application of conservation agriculture using hoe replacement equipment can reduce labor by up to 75%, but because farmers in Kupang district use more hoes with conventional techniques then the productive age and number of family members are still considered. Another thing that also needs to be considered in the application of conservation farming techniques is the dependence of farmers on the use of chemical fertilizers which can indeed provide increased yields but in the long run will cause poor soil degradation.

Thus the model implementation scenario will involve these factors in the application of conservation agricultural techniques while supporting household food security. Education, land area, and age respectively have a positive direct effect on household food security. Although the results of this study indicate that conservation agriculture has a direct negative effect on food security, a model can still be developed by considering the factors that have a direct influence. or indirectly to conservation agriculture and household food security.

Thus, from the results of this study, which becomes a serious challenge for the implementation of the conservation agricultural technique model and its relationship with household food security is the problem of limited land as farming capital, adaptation to erratic rainfall, and competition for the use of crop residues as land cover with use as agricultural capital, animal feed or burn.

The role of government is very important in overcoming challenges for the prospect of developing conservation agriculture in the future which will provide support for increasing household food security through increasing sustainable and stable agricultural production.

CONCLUSION

The management of the agricultural environment is in the "moderate" category with the average score of agricultural environmental management is 16.80 with a range of 13-23.

Agricultural environmental management with the application of conservation farming techniques on dry land farming systems with an average score of 5.30 with or in the "Moderate" category.

Factors that influence farmers in managing the agricultural environment with the application of conservation farming techniques are that the land area has a very significant effect on the management of the agricultural environment with conservation farming techniques at a significance level of 1%, the number of family members not significantly different at the 0.05 level (two-tailed test), farming experience at the 5% confidence level ($p > 0.05$). Likewise, the age and education and farmer group are not significant.

The model obtained by path analysis of the relationship path between each variable has a positive direct relationship, the model does not differ significantly from the saturated model so that it can be concluded that the developed model has a good suitability in the development of agricultural environmental management models with the application of conservation agricultural techniques in relation to household food security.

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