

Attitude and perception of farmers to the implementation of conservation farming in the mountainous area of South Sulawesi

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To cite this article: N Busthanul *et al* 2018 *IOP Conf. Ser.: Earth Environ. Sci.* **157** 012055

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Attitude and perception of farmers to the implementation of conservation farming in the mountainous area of South Sulawesi

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Abstract. Farmers' attitudes and perceptions may be the cause of ineffective implementation of conservation farming for agriculture sustainability due to vary of implementing of conservation techniques. The purpose of this research is to know the attitude and perception of farmer toward the application of conservation technique and to know correlation between farmer attitude and perception toward the application of conservation technique. The research was carried out in Kanreapia Village, Tombolo Pao District, Gowa Regency, South Sulawesi Province, Indonesia. Sampling was done by randomly with 30 farmers; using non-parametric statistics with quantitative and qualitative descriptive data analysis approach, using Likert scale. The result showed that farmer attitude and perception toward conservation technique implementation which having the highest category (appropriate) is seasonal crop rotation, while the lowest with less appropriate category is the processing of land according to the contour and the cultivation of the plants accordingly. There is a very strong relationship between farmer attitude and perception. The implications of the findings are that improvements the implementation of conservation farming techniques should be made through improved perceptions.

1. Introduction

Implementation of sustainable agriculture is needed in the framework of food security and resilience of the world population. However, whether or not the implementation is determined by the attitude of farmers. Being attitude is determined by perception [1] and [2]. Therefore, a correct perception of conservation awareness is essential for the sustainability of agriculture. This is especially urgent in the central areas of agricultural food production especially on agricultural land with intensive processing in upland areas and slopes [3]. One area that has the characteristics of such areas is the production center of Kanreapia highland vegetables.

The area located in Gowa regency, South Sulawesi, Indonesia, in addition to being processed intensively, also has many critical lands that require conservation measures. According to the Provincial Forestry Office of South Sulawesi, currently the area of critical land is about 28,000 ha. Critical land is located in several areas including Tombolo Pao District about 6,830 ha, Tinggimoncong District 5,590 ha, Parangloe District 5,403 ha, and the rest spread in other districts.



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The critical land is part of the total critical land in South Sulawesi Province which recorded 920,452 ha in 2011.

Measures or treatment of farmers on conservation will differ across regions, in accordance with land type, land area, availability of on farm and off farm, and policies of local government programs [4]. The attitude or tendency of farmers to do or not to take conservation measures on their agricultural activities is driven by many factors. In this case the opportunity to increase profit or welfare may be the most important thing [5]. In the same word, appropriate conservation activities can increase farmers' production and income [6]. The purpose of this research is to know the attitude and perception of farmer toward the application of conservation technique and to know correlation between farmer attitude and perception toward the application of conservation technique. The research was carried out in Kanreapia Village, Tombolo Pao District, Gowa Regency, South Sulawesi Province, Indonesia.

2. Material and Method

2.1. Data collection

The research was carried out in Kanreapian Village, Sub-district Tombolo Pao, District Gowa, South Sulawesi, Indonesia in October to November 2016. Collecting data was done through observation and interviews directly with the respondents who were conservation farmers while secondary data were supporting data obtained through literature review.

This study uses non-parametric statistics, with data analysis approach descriptively quantitative and qualitative, using Likert scale to measure low, medium, or high attitudes and perceptions of farmers on the implementation of conservation farming. Data types are interval scales [7, 8, 9] and [10]. For "attitudes" are measured three variables: (i) whether to know about, (ii) whether to do, and (iii) whether to do (accordingly theory); while "perceptions" are measured three variables: (i) the level of importance to do, (ii) the level of effect/benefit to their farm business, and (iii) whether there is or not influence of other people's knowledge on the implementation of the nine factors of conservation action. These nine factors include: (1) aging of terraces or beds on sloped land, (2) Planting plants or turf for terrace reinforcement, (3) processing of land according to contour lines, (4) Cultivation of plants according to contour lines, (5) seasonal crop rotation, (6) planting annual crops on high slopes, (7) use of mulch (or manure), (8) maintenance of terraces (or beds), and (9) making drainage canals.

2.2. Data analysis

To measure per indicator (question) of each variable can be done by determining the interval and category setting as follows [11]: The maximum value is $3 \times 3 = 9$ while the minimum is $1 \times 3 = 3$. Thus the data interval = $(9-3) / 3 = 2$; then the value categories are obtained: 3-5: Low; 6-7: Medium; and 8-9: Height.

To determine each individual category of farmer against 9 conservation implementation variables, the maximum value is $9 \times 9 = 81$ while the minimum value is $9 \times 3 = 27$. Thus the interval is $(81-27) / 3 = 18$, so the category is 27-45: low, 46-63: medium, and 64-81: high.

In the same way, to measure the total variables of farmer attitudes and perceptions on the application of conservation farming with 30 respondents, conducted by determining the interval as follows: The maximum value is $9 \times 30 = 270$ while the minimum value is $3 \times 30 = 90$. Thus the data interval = $(270-90) / 3 = 60$; then the value categories are obtained: 90-150: Low; 151-210: Medium; and 211-270: Height. Furthermore, with the same event, with 27 questions then to determine the level of cumulative attitude and perception of farmers (recapitulation) obtained categories: 810-1350: Low; 1351-1890: Medium and 1891-2430: High.

3. Results and Discussion

3.1. Farmer attitude

3.1.1. *Attitudes of farmers individually.* Attitudes of farmer individually partially and cumulatively of nine variables of implementation of conservation farming techniques are shown in table 1. Table 1

showed, the implementation of conservation farming techniques has been addressed as appropriate or high level. There are 28 of 30 farmers (93.3%) of farmers whose attitudes are at a high level. This clearly indicates the awareness of farmers on the importance of implementing conservation agriculture. There is no farmer in the low level and only 2 farmers (6.7%) in medium level.

Table 1. Partial and total score of conservation technique factors of farmers individually

No.	Name	Gender	Age (yr)	Conservation technique factors*)									Total
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
1	Karaeng Bonto	M	36	9	9	9	9	9	6	8	8	7	74
2	Muh. Jufri Basari	M	39	9	9	6	6	9	8	9	8	9	73
3	Haji. Jurhan	M	54	9	9	9	9	9	8	8	8	8	77
4	Khaerul Rizal	M	35	9	9	6	6	8	6	8	9	9	70
5	Jamaluddin	M	28	9	9	6	6	9	8	9	8	8	72
6	Usman	M	50	9	9	9	9	9	7	8	8	8	76
7	Harifin	M	46	6	7	6	6	9	8	8	8	8	66
8	Bahri	M	32	7	6	6	6	9	8	7	8	7	64
9	Mappi	M	39	7	5	9	9	9	8	8	8	8	71
10	Hawani	F	28	6	7	6	6	9	8	8	8	8	66
11	Jumarang	M	34	9	9	9	9	8	6	7	9	8	74
12	Baharuddin	M	47	9	9	6	6	9	8	7	8	7	69
13	Harding	M	29	7	5	9	9	9	8	7	9	8	71
14	Labo	M	33	9	9	6	6	8	8	9	8	9	72
15	Taufia	M	25	9	9	5	5	9	8	8	7	9	69
16	Dg. Rambu	M	28	9	9	6	6	9	8	9	8	8	72
17	Amir Cabaru	M	37	9	9	6	6	9	8	9	8	8	72
18	Sirajuddin Dg	M	31	9	9	6	6	9	6	8	9	9	71
19	Rate	M	52	9	9	9	9	8	8	7	9	7	75
20	Haji Cacing	M	46	6	7	6	6	9	8	7	9	8	66
21	Sumaryanto	M	43	9	9	6	6	9	6	9	9	9	72
22	Ujung Rahmat	F	40	9	9	6	6	9	8	8	8	7	70
23	Rahimin	F	25	7	5	5	5	9	8	9	7	8	63
24	Rusnawati	M	31	9	9	6	6	9	8	8	8	7	70
25	Sudirman	M	45	9	9	6	6	9	8	8	8	8	71
26	Sanusi	M	38	9	9	5	5	9	8	8	8	8	69
27	Muh. Syakir	M	42	9	9	6	6	9	8	8	9	9	73
28	Abd. Hakim	F	37	7	6	6	6	9	8	8	8	9	67
29	Dg. Samma	M	44	9	9	6	6	9	8	8	9	8	72
30	Mustafa Latif	M	27	6	6	5	5	9	8	8	8	8	63
Total				248	243	197	197	266	229	241	247	242	2110
Category: High level (64-81)				: 28 (93,3%) farmers									
Medium level (26-63)				: 6 (6,7 %) farmers									
Low level (27-45)				: 0 (0 %) farmer									
Total				: 30 (100%) farmers									

- (1) Aging of terraces or beds on sloped land
- (2) Planting plants or turf for terrace reinforcement
- (3) Processing of land according to contour line
- (4) Cultivation of plants according to contour lines
- (5) Seasonal crop rotation
- (6) Planting annual crops on high slopes
- (7) Use of mulch
- (8) Maintenance of terraces/beds
- (9) Making drainage channels

There is no information that explains the motivation of farmers in the research location, but is suspected due to economic motive factor. Usually the main factors that motivate farmers to improve their cultivation are income and welfare [5]. In accordance with [6], implementation of conservation farming techniques can increase farmer production and income. Furthermore, it shown that there is variation of attitude values both individual and cumulative variables. This may be due to the diversity of conservation issues facing farms, as reported by Hayley [5] and Lightenberg [6].

3.1.2 Attitudes of farmers in groups. The data of farmer attitudes group in the nine variables (factors) of implementation are shown in Table 2. From Table 2 it can be shown that, among the nine variables in the implementation of conservation farming techniques, seven (77.8%) are categorized appropriate match and only two (22.2%) are in the less appropriate category. The highest is the rotation of seasonal crops, while the lowest and less appropriate is the cultivation of land according to contour lines and cultivation of plants according to the contour line. There is no factor categorized not appropriate (not match). The corresponding attitude on the crop rotation variables is motivated by the growing season (climates) that corresponds to the needs of plant growth and commodity price developments. Likewise, with the low attitude in processing of land according to contour and cultivation of plants according to contour, also due to the adjustment to the climatic conditions with the demands of cultivated crops. At certain times they deliberately do so against the principle of soil conservation by cultivating the soil or making a bed and planting it in the direction of the slope (cutting the contour lines) so that the beds do not hold water in the rainy season [12] and [13]. Generally they plant vegetables that are not resistant to soil saturated water conditions (high humidity) such as potatoes, tomatoes, carrots, onions and kola or mustard greens. The position of the transverse bed can also result in the collapse of these beds during heavy rains.

Table 2. Values and categories of farmer attitudes toward conservation variables

No.	Variable of Conservation Technique	Value	Category
1	Aging of terraces or beds on sloped land	248	Match
2	Planting plants or turf for terrace reinforcement	243	Match
3	Processing of land according to contour lines	197	Less match
4	Cultivation of plants according to contour lines	197	Less match
5	Seasonal crop rotation	266	Match
6	Planting annual crops on high slopes	214	Match
7	Use of mulch	241	Match
8	Maintenance of terraces/beds	247	Match
9	Making drainage channels	233	Match

3.2. Farmers Perception

3.2.1. Perceptions of Farmers in Group. The values of perception and category are shown in table 3. As in "attitude", the highest value in perception is achieved in the seasonal crop rotation factor, while

Table 3. Values and categories of farmer perception toward conservation variables

No.	Variable of Conservation Technique	Value	Category
1	Aging of terraces or beds on sloped land	244	Match
2	Planting plants or turf reinforcement	240	Match
3	Processing of land according to contour line	193	Less match
4	Cultivation of plants according to contour lines	189	Less match
5	Seasonal crop rotation	257	Match
6	Planting annual crops on high slopes	217	Match
7	Use of mulch	244	Match
8	Maintenance of terraces/bunds	255	Match
9	Making drainage channels	252	Match

the lowest value with the "less appropriate" category is the processing of land according to contour lines and cultivation of plants according to contour lines. There is an indication of a strong relationship between attitudes and perceptions.

3.3. Correlation of Attitude and Perception

Perception is the most important thing in attitude formation. Simply can be described that the action starts from the attitude while attitude may be based on perception. Therefore, to understand more about the formation of attitudes toward one action, need to be understood more in the relationship attitude with perception. The correlation test results showed that the correlation coefficient of $r = 0.97$ shows a very strong relationship between farmer attitude and perception in Kanreapia. A correlation greater than 0.8 is generally described as strong, whereas a correlation less than 0.5 is weak [14]. These values vary from the type of data being examined. A study utilizing 'cores' of scientific data may require a study of social science data [15]. Harmony of attitudes and high perceptions in this case may be a very good tool for the neglect of attitude (further action) in the future because perception can be changed or motivated by filling individuals with knowledge although there is no absolute guarantee. On the other hand, good perceptions of the KPHP Model of the Poigar Model do not have a significant effect community behavior; the influential is education [1]. In general, however, the farmer's decision to adopt a new agricultural technology, depends on many factors; and one of them is perception [16] and [17], including less pro-poor policy interventions [18] agricultural extension sustainability [19] and providing transfer-source income [20].

1 Conclusion

The result showed that farmer attitude and perception toward the implementation of conservation farming techniques which having the highest category (appropriate) is seasonal crop rotation, while the lowest with less appropriate category is the processing of land according to the contour and the cultivation of the plants accordingly. There is a very strong relationship between farmer attitude and perception. The implications of the findings are that improvements the implementation of conservation farming techniques should be made through improved perceptions.

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